habits & HABITATS
An ethnography of learning entanglement

A thesis submitted in fulfilment of the requirements
for the degree of Doctor of Philosophy

by
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AUTHOR’S DECLARATION

This is to certify that:

I. this thesis comprises only my original work towards the PhD Degree,
II. due acknowledgement has been made in the text to all other material used,
III. the thesis does not exceed the word length for this degree,
IV. no part of this work has been used for the award of another degree, and
V. this thesis meets the University of Sydney's Human Research Ethics Committee (HREC) requirements for the conduct of research.

Signature: …………………………………………………………………………………………………

Name: …………………………………………………………………………………………………

Date: 5 August 2015
To those from whom I have learned.

To those with whom I learn.

To those with whom I am yet to learn.
ABSTRACT

Despite an underlying assumption that, at least on some level, our environments influence what we do, a review of the literature on formal education reveals that empirical research on relations between the physical environment and learning is surprisingly sparse.

Conducted as ethnography, this study examines learning activity in an open, flexible and digitally connected learning environment. It draws on 549 hours of observation over a nine-month period in a refurbished space designed to accommodate 181 year five and six students and their team of seven teachers, using one-to-one mobile computing. Observation was informed by sociomaterial theories of learning, theories of material ecology from anthropology and archaeology, and the framework for Activity Centred Analysis and Design (ACAD) from the learning sciences. Through theoretical reflection, I consider how the qualities of materials participate in teaching and learning practice, and how we might account for their participation in learning activity.

The theoretical exposition, housed in Part 1, traverses three scale levels: the qualities and properties of materials, the relational dependences between things and humans, and the notion of emergent, systemic wholeness. Part 1 concludes with the identification of a number of repeating patterns of structure and activity that give rise to wholeness, which are presented in the form of a partial pattern language. All of this draws on ten rich descriptions of learning activity, presented in Part 2.

Throughout, I argue that there is an urgent need for a non-deterministic theory of materials in educational research, and that this type of detailed observational work can play a vital role in understanding how vibrant and participatory learning environments function and evolve. As such, this thesis makes both theoretical and practical contributions that have implications for teachers and educational leaders who wish to engage in shaping convivial places for learning.
ACKNOWLEDGEMENTS

This work is the tangible product of a journey that is not yet complete. Raised by a mother who was by nature and training a teacher, and a father who divided his time between the bush and commercial property development, much of my childhood was spent watching and waiting. In our house birds, plants, animals, currencies and financial markets all had names, characteristic patterns of behaviour and natural habitats. Holidays were spent in worlds conjured up by the books we read in solitude, or in the National Parks of Southern Africa where the exhilaration of coming face to face with the largest of land mammals was tempered by the interminable wait for a particular bird to appear and sit long enough for my father to photograph it.

It was during these times, sitting in enforced stillness and silence, that I learnt to soak up my environment - to differentiate between the everyday calls of the bush and a rising chorus of alarm that announced an intruder, and to discern the difference between the scent of the bush warming in the sun and the scent of vegetation disturbed by animal activity, ever alert to the one thing that changed in an ever-changing landscape. This might be the characteristic flick of a tail, the movement of a familiar shape in the distance, or the rhythm of flight played out in the shadow of a bird that passed overhead. As such, it is to my parents that I owe my first debt of gratitude - for teaching me the art of observation.

Half a world away and now a parent myself, it was my sons’ experiences of learning, both in and out of school, that propelled me into a space in which thinking about how and where we learn was not only valid, but valuable. And, having found a space in which they flourished, I was driven by a need to understand what made this particular learning environment sing. It is therefore to my sons, Benjamin and Campbell, for tolerating my interest in their world, and to my husband Malcolm, for his quiet companionship and gentle forbearance of my mental absence - that I owe a second debt of gratitude.
An abiding interest does not a dissertation make and without the support and guidance of my supervisor, Peter Goodyear, this project would never have seen the light of day. For his ability to see in my semi lucid ramblings ideas worth nurturing, and for providing me with the space and time in which to explore and refine them, I am eternally grateful. To Kate Thompson and Lucila Carvalho, my assistant supervisors, who helped me structure my work, allowed me to work alongside them on projects of their own, and who were often called upon to interpret academic life - a special word of thanks. To the other members of the Laureate team, to all at CoCo, the many visiting academics who made it their temporary home, and the members of the CPC STL node - a thesis is a bit like a child; it requires a village to raise it - thank you for being the village.

Conducted as ethnography, this study was contingent upon the generous hospitality of all those associated with the Zone in 2012: staff, students and parents alike. For, without their willingness to accommodate my presence, none of this would have been possible; I am forever in their debt. To Mr Harris, the principal of NBCS who dared to act on a vision of what could be, who never let fear of failure cripple him and who continues to celebrate the learning of all who walk through his gates - thank you, to you and your team for allowing me to learn alongside you and document your collective journey thus far.¹

To Fiona Young at BVN Architecture who worked on the design for the Zone, thank you for sharing your drawings and insights with me. And to Mies Guldbaeck Brons, of Loop biz, Denmark, thank you for turning our measurements into such useful drawings.

Last but not least, I am pleased to acknowledge the financial support of the Australian Research Council (Laureate Fellowship Grant FL100100203) during my candidature.

¹ NBCS, the school in which this study was conducted, plays an active role in educational innovation and, as such, has asked to be named. With the exception of the Principal, pseudonyms have been assigned throughout, and photographs reveal only those for whom I have written consent.
SELECTED PUBLICATIONS

BOOK CHAPTERS


This is a chapter in the second publication from the Australian Research Council’s (ARC) Laureate Fellowship project led by Professor Peter Goodyear. It is a detailed examination of a single, 75 minute learning session, drawn from observations conducted for my PhD. It is presented, in part, in Chapter 5 of this PhD.


A chapter in the first publication from ARC Laureate Fellowship. My contribution included analysis and theoretical framing informed by my interest in how mobile learning platforms are incorporated into peopled learning environments.

JOURNAL ARTICLES


This article is the first publication from a pre and post occupancy study of a new multi-disciplinary, open and digitally mediated super-laboratory at the University of Sydney. My contribution included fieldnotes from many hours of participant observation.
JOURNAL ARTICLES UNDER REVIEW


Kelly, N., Thompson, K., & Yeoman, P. (n.d.). The role of theory in the mindful innovation of instruments and representations: Developing a learning analytic technique for orchestration of a computer-supported collaborative design task. *Journal of Learning Analytics*.

My contribution to both these articles was based on participant observation of a 6 hour workshop, and the subsequent coding and analysis of multiple streams of video, photographic and audio data collected on the day.

CONFERENCE PAPERS AND PRESENTATIONS


This paper presentation detailed the thematic structure of this PhD.


This paper explored a single moment of learning activity using both the ACAD framework and Ian Hodder’s theory of entanglement. It is presented in part in Chapter 5 of this PhD.

This paper presentation reported on early aspects of this PhD.


These two papers report on initial stages of analysis of a 6 hour workshop. My contribution included participant observation, coding, and analysis of multiple streams of video, photographic and audio data.
NAVIGATING THIS THESIS

This work is formally presented in two distinct, but complementary parts: a discursive element illustrated below in shades of blue, and a descriptive observational element, shown in green. A third visual element, in tan, offers supplementary online material that is not integral to the reading of this work – but adds a certain richness to it.

This design facilitates different approaches to reading, two of which are illustrated below. One favours a more empirical leaning, and the other a more theoretical one.

Both require some movement in and out of the vignettes. In some instances a vignette is referenced as providing an example of something under discussion. These references are highlighted in the text, but they are not critical to the discussions that follow. In contrast, there are points where it is necessary to read, or reread, a vignette in order to follow the analysis of a period of learning activity under discussion. These are marked in the text as follows:
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PART 1

DISCURSIVE TEXT BASED ELEMENT: INTRODUCTION, EXPOSITION AND CONCLUSION

Link to supplementary online material
CHAPTER 1
MORE THAN A MEANS TO AN END

Figure 1 – Things, as more than a means to an end

How do the things we use and the spaces in which we learn shape learning activity? Why do some spaces and tools invite collaboration, and others inhibit it? Can materials exert influence? Do things in and of themselves count for something – or is it only when they come together with other things that they have meaning or purpose? Why do we use this, and not that, and how does using this or that change what we do, or where we end up? More importantly - for education- how does apprehending any of this inform practice, and to what end?

The challenge of understanding the relations between environment and activity is not new. Amongst other things, it is the desire to explain the relations between structure and agency (Bourdieu, 1977; Giddens, 1986; Simmel, 1895). In most instances, this pairing of structure and agency leads us to think about human action in relation to social structures, and not structures of bricks and mortar. I am interested in the formation, persistence, change and dissolution of social structures and social practices. But my primary research interest lies in how structures of place can be said to shape or influence human activity...
and therefore learning. Quite simply put, I am interested in things, their properties and their qualities, their relationships to other things and to humans, and the ways in which they do, or do not, come together to support learning.

Over the past decade, information and communication technologies have increased in pervasiveness, with connected devices becoming part of people’s everyday lives. Many devices are now so easy to carry around that they offer learners opportunities to access networks of interest at the park, on the bus, or anywhere connectivity is available. This has led to changes in physical settings and the emergence of new arrangements between humans and things in networked learning environments. These changes challenge traditional notions about relations between humans and things and how these relational dependences play out over time and space.

Early descriptions of networked learning focused on how computing technologies were used ‘to promote connections between one learner and other learners, between learners and tutors; between a learning community and its learning resources’ (Goodyear et al., 1998, p. 2). Studies of learning networks have tended not to privilege human-human relationships because their focus has been on the relations between nodes (Jones, Ferreday & Hodgson, 2008), and this has distinguished them from studies of communities of practice (Wenger, 1999). More recently, Goodyear and Carvalho (2014b) have described learning networks as being characterised by a greater degree of openness and flux than communities or groups, such that interactions between individuals need not be grounded in familiarity or established relationships. Furthermore, they describe movement as fundamental to networking. ‘Networking involves travel - of people, objects or messages. Community need not’ (p.10).

With this definition in mind, I seek to trace both the movement of, and the dependences between, people, things and information within a primary school context. I examine connections between elements of the physical setting and the activities of people in a learning network.
that leverages the affordances of low cost mobile computing to connect students, teachers and parents with learning resources and learning communities - both local and distant. However, as this connected-collaborative-curriculum was put into practice, staff voiced a tension between the new way of teaching and the built environment, which they described as ‘working against’ their best efforts to effect change. In response, a second phase of redevelopment was initiated and the resulting built environment, together with the digital infrastructure, forms a place-based learning network in which the movement of people, things and information can be traced, revealing an intricate entanglement of humans and things.

This unusual heterogeneous network is shaped by connections between all manner of people and things (digital and material) and is described in detail in Chapter 3. It is worth noting from the outset, however, that the physicality of this learning space - the freedom to move, build and collaborate - is born out of the mobility and openness inherent in the digital elements. In this thesis, I argue that emerging technologies have given - and will continue to give - rise to new spaces for learning. Therefore, educational designers, teachers and educators need ways to meaningfully explore and understand their effects on learners’ activities.

In examining the relationship between learning and technology, Martin Oliver (2011) argues that research on the educational use of technology often overstates the influence of technology as either technologically deterministic (technology causes change) or technicist (technology is one of the causes of change). He argues that both positions are untenable for researchers with social and or constructivist leanings. How then should we characterise the relations between learning and technology, because substituting social determinism for technological determinism does little to advance our ability to explain the relations between learning activity and the environment in which it occurs.

Oliver’s (2011) response is to explore four different ways of thinking about the relationship between technology and action. His
conclusions, summarised in Table 1, illustrate the partial nature of the explanations derived using even the most likely of candidates. Despite this, he notes that they do offer alternatives to ‘hard’ technologically deterministic accounts, by making room for human agency and, in some cases, even a moral or political sensitivity.

Table 1 - Summary of conclusions (Oliver, 2011, p. 381)

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In situating their work, Goodyear and Carvalho (2014a) note that there has been an aversion to theory in educational technology – a phenomenon that has been the subject of research and commentary by not only Martin Oliver (Bennett & Oliver, 2011; Oliver, 2011, 2013) but others (e.g. Bulfin, Henderson, & Johnson, 2013; Czerniewicz, 2010; Friesen, 2009). In short, it appears that many researchers working in educational technology confine their use of theory to enlisting theories of learning as a means of endorsing a pedagogical approach to which they are already committed. They rarely use theory to frame other key relationships in their field, such as the relationships between digital tools and students’ activity, and even more rarely do they offer explicit contributions to theory.

In examining how elements come together in assemblages that influence learning, Goodyear and Carvalho (2013) identify three central components, namely the structures of place (set design), task (epistemic design) and social organisation (social design). Their Activity Centred Analysis and Design (ACAD) framework, discussed in Chapter 3, has been applied in the analysis of several online learning networks (Carvalho & Goodyear, 2014b) and in analysis that contributes to this
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PhD (Yeoman & Carvalho, 2014; Yeoman, 2015). In developing this thesis, I have chosen to ground my work using the ACAD framework and to explore theory from outside of mainstream educational research, in order to make a contribution to what is known about how learning activity is shaped by the environment in which it is situated. I have looked for ways to do this that are neither technically nor socially deterministic. I argue that we need a holistic (Alexander, 2002, 2003, 2004, 2006) or systemic (Capra & Luisi, 2014) theory of learning that spans both time and place; one that comfortably accommodates new understandings of both humans (Clark, 1999; Immordino-Yang & Damasio, 2007; Osgood-Campbell, 2015) and things (Coole & Frost, 2010; Coole, 2013; Hodder, 2012; Ingold, 2011; Malafouris, 2013) and that is sensitive to the historical (Burke, 2014b; Miller, 2005; Shove, Trentmann, & Wilk, 2009), ethical (Illich, 2001) and political (Selwyn & Facer, 2013a, 2013b) aspects of human existence.

My opening contention is that following things in use (Sørensen, 2009) has a great deal of potential for understanding how activity and environments are co-constituted, and how practices emerge, persist and dissipate (Shove, Pantzar, & Watson, 2012). Realising this potential depends on developing ways of systematically exploring processes of adaption, change and persistence in ongoing teaching and learning practice, with particular reference to things. This is the task to which this thesis is devoted. It makes both a theoretical and practical contribution to the literature in the following ways:

A) Theoretically, this thesis makes a contribution by examining the material ecology of learning, using the ACAD framework, to reveal some of the nuanced relations between learning activity and the environment in which it occurs. Moreover, it draws on literature from a range of disciplines in order to work towards an account of learning activity that is neither socially nor technologically deterministic, but systemic.

B) Practically, this thesis illustrates how insights enabled by close observation and theoretical reflection, can be used to inform practical
action. Moreover, having identified certain reusable elements of design, it makes a case for presenting these findings in high-level pattern outlines.

Shove and colleagues (Shove et al., 2012) argue that the study of practice allows one to transcend the dualisms of agency and structure, or determinism and voluntarism. By not prioritizing human agency and choice, the study of practice enables researchers to conceptualize stability without attributing it to given structures. Building on Giddens’ theory of structuration, which states that, ‘the day-to-day activity of social actors draws upon and reproduces structural features of wider social systems’ (Giddens, 1986, p.24), they seek to describe ‘how practices emerge, evolve and disappear’ (Shove, 2012, p. 4). In doing so, they have developed a theory of social practice that explores practice-as-entity, consisting of three elements: competence, meaning and materials; and practice-as-performance, the enrolment of these elements in activity over time. Tracing the links between these three elements, they map changes in practice, in a way that is neither socially nor materially deterministic.

In this thesis, my focus is not on practices per se, but on how materials are enrolled in practice (Sørensen, 2009). What is more, I am concerned with what can be said about how materials - tools, furnishings and the designed environment (both physical and digital) - can be said to influence learning activity. In Chapter 4, I explore materials in detail and in Chapter 5 I examine not just materials, but things caught up in learning activity.

How we think, is influenced by our language. In the preceding paragraph you may have noticed that I classified the designed digital environment, along with the designed built environment. And I switched from talking about materials to referencing things caught up in learning activity. In doing so, I exposed two different, but related issues. The first pertains to how we think about and categorise the digital and the physical, and in my work I choose not to distinguish one from the other. For I am convinced that there is no digital that is not in some way physical, and that there is no physical that is not in some way influenced
by the digital. Moreover, as mobile technologies become increasingly pervasive, the distinction between the two becomes less useful. As to the distinction between materials and things, I use materials to refer to the constitutive elements of things, and things to refer to gatherings of materials in use. As such, things can be both material and im-material, where im-material refers to the ideational and not the digital.

How we think about things is not only reflected in how we name them, but in our actions. The recent past bears testimony to our collective hopes for transforming our educational futures through the built environment - with Building Schools for the Future (House of Commons Education and Skills Committee, 2007) in the UK, and Building the Education Revolution (The Auditor-General, 2009) in Australia. Both programmes undoubtedly had wider social and political motivations (Lewis, Dollery, & Kortt, 2014; Mahony & Hextall, 2013), and the Australian BER was intentionally designed to stimulate economic growth in the wake of the global financial crisis of 2009. But, at the core, they shared a belief that a better built environment would produce better education. This was articulated by the Joint Information Systems Committee (JISC, 2006) as follows:

Understanding what makes an effective design is important. The best are likely to assist all within the institution to work more productively and to produce learners who are confident, adaptable, independent and inspired to learn (p. 2).

There is recent research showing that good learning environments are associated with gains of up to one and a half additional school years for those who inhabit them (Barrett, Zhang, Moffat, & Kobbacy, 2013). But this is only one of the many moves needed to unpack these relations. Finding a correlation does not establish a causal link, and statistically significant relationships do not necessarily explain how correlations work in practice, and how we might improve upon them in the future.

In this thesis, I argue that research grounded in long term observation of activity in complex learning environments will help
answer questions about how these relations play out in everyday teaching and learning practice. In addition, theoretical reflection on how we think about things and humans, and their multiple dependences in coming to know, will equip us to sensitively design and use new environments, and the ones we already have, in more productive ways.

My convictions are not entirely based on a personal preference for qualitative methods; they derive from a wish to employ methods in educational research that speak to what Maria Montessori referred to as the ‘spirit of science,’ rather than the application of ‘mechanical skill.’ In her first publication, Montessori (1912) refers to preparing the school environment for observation. She was convinced that school environments should be designed to accommodate students – who are free to learn through meaningful activity, and teachers – who are free to observe and make adjustments to the learning environment where necessary. Her call to reform in 1912 framed the role of the environment as follows:

Education is to guide activity, not repress it. Environment cannot create human power, but only give it scope and material, direct it, or at most but call it forth; and the teacher’s task is first to nourish and assist, to watch, encourage, guide, induce, rather than to interfere, prescribe, or restrict (Montessori, 1912, p. 39).

One can only guess at how much money has been spent on educational research, technology and buildings since 1912. One thing is certain. We still have hopes and dreams that take in the whole. Yet, in some sense, we seem further from realising them. Considering that our environments become more complex with every passing day, we would do well to stop and ask some simple questions, to examine our conceptualisations and expectations of things. How do we think about the material elements of our learning environs? Could we be spending less and deriving greater benefit? What practices do the materials of our learning environments support, and how do we go about imagining their potential into the future? Moreover, given the complex relations between people and things, what unnecessary limits do we place on how learners and educators repurpose their environs to meet their learning needs?
Estrid Sørensen (2009) suggests that the answers to these questions will help us understand not only how materials contribute to teaching and learning practices, but also the consequence of failing to reframe the research agenda more broadly. She is not surprised by where we find ourselves, and attributes our current predicament to a pervasive blindness to materials in humanist approaches to educational research. In calling for a post humanist re-framing, she is not calling for the dehumanisation of learning, but would have us consider both the social and the material, or *the materiality of learning*: a framing within which materials are no longer cast as instruments for educational ends, separate from the humans who use them.

I do not suggest that prior to Sørensen the literature was silent on the matter of materials. Gadgets for learning have certainly been the central focus of studies seeking educational efficiencies and a route to the mass personalisation of learning. However, what many of these studies fail to consider is how these gadgets have changed learning activity and the learning environment, from an ecological or systemic perspective. Starting with people and their needs as assumed in advance, they measure outcomes in ways that serve to entrench the deeply rooted notion that learning is just an individual, cognitive achievement. Many theorists have worked to broaden narrow depictions of learning, and it is now commonly accepted that learning is a social achievement that is context sensitive (Kaptelinin & Nardi, 2006; Latour, 2007; Lave & Wenger, 1991; Wenger, 1999, 2006). However, Sørensen (2009) argues that the concept of materiality in these approaches is weak, and that we need to do more than include a missing dimension. We need to change how we think about learning, and therefore how we study learning.

The many and varied ways in which materials participate in practice is, as a consequence, both under-theorised and under-researched. Add to this the confounding fact that things are not always used as intended, makes studying how they are employed in practice an exercise in following the fickle. What is more, Sørensen (2009) notes that studies of efficiency often reveal unintended consequences, which may or may not be desirable, and that these findings tend to be explained in
one of two revealing ways. Those that report success tend to attribute gains to social contexts and therefore to humans; those that deal with failure tend to attribute this lack of success to the tool, technology or system. Quite apart from these overly deterministic attributions, what often goes unnoticed is that there is a vast middle ground, in which there are endless fascinating adaptations of both old and new technologies that remains largely invisible in the literature. This is not a zero sum game of (un) successful technologies and (ill) fitting spaces. It is a life lived making one’s way along a path, immersed in an environment in which things may or may not come to hand at particular moments in such a way as to facilitate or impede learning. By focusing on situated learning activity, it is my intention to open a window into this middle ground.

Having sketched the broad context within which this thesis sits, I now focus on learning and design for learning, before considering past and present thinking about spaces for learning.

**LEARNING, DESIGN AND DESIGN FOR LEARNING**

What we know about how we learn should change our concept of what it means to design for learning. ‘Paying attention to learning and development as distributed processes that exist across settings and over time has implications for how we study creativity and learning, as well as how we design inclusive and expansive learning spaces’ (Kumpulainen, Karttunen, Juurola, & Mikkola, 2014, p. 235). When considering the role of the designed environment, in learning, we would be remiss if we did not consider the full implications of a whole host of new theories about learning, including embodied (Kiefer & Trumpp, 2012), situated (Roth & Jornet, 2013), distributed and extended cognition (Clark, 2010b, 2011). When considering how practice is shaped, transformed and becomes redundant, there is much that can be said about the role of things in dynamically shaping social practice (Shove et al., 2012).

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2 Hutchins (1995), Clark (2010a) and Malafouris (2013) provide points of entry into these theories.
Goodyear & Carvalho (2014b) note that learning is traditionally described in terms of ‘a sustained change in behaviour resulting from experience’ (p. 5). But, they point out that an insistence on observable change excludes all manner of learning that is not visible in terms of altered behaviour. Therefore, they emphasise the role of persistent, rather than observable, change in behaviour as evidence of learning. Moreover, they draw a distinction between learning and studying, with the latter reserved for situated activity where learning is anticipated but not always guaranteed. They note that learning can be intended and incidental, and may be the (in)direct result of participating in formal study or in informal activity. Learning can therefore be described as persistent change that results from both formally organised study, and as a result of finding one’s way in the world.

There is much that can be said about the integration of what is known about how we learn into theories about learning and the research that that it frames (Goodyear, De Laat, & Lally, 2006; Immordino-Yang, 2011; Selwyn & Facer, 2013a). However, in the interests of progressing this thesis, I have chosen to rely on the work of Tim Ingold to frame my thinking on learning, in a world already in motion.

In considering how one might theorise a world in which things are more than a means to an end, Ingold (2012) calls for nothing less than a new theory of life itself, one in which matter is no longer cast as inanimate raw material, awaiting animation, but as we find it in processes of flow and transformation, where things are perceived as gatherings of materials in movement, distinct from objects or ‘completed forms that stand over and against the perceiver’ (Ingold, 2012, p. 439) blocking movement; and where the body is thought of as ‘a dynamic center of unfolding activity, rather than a sink into which practices are sedimented’ (Ingold, 2012, p. 439). In this world, one makes one’s way not in successional moves, with each action predetermined by its place in a sequence of steps, but processionally with each action a measured response to the last (Ingold, 2011, p. 62). Knowledge is understood as an increased sensitivity to cues in the environment, rendering as skilful those who learn to match their movements to perturbations in the
environment without interrupting the flow of their actions. Value is found, not in what you know, but in how well you know it (Ingold, 2011, p. 94), and the distance of inter-action gives way to entwined correspondence, which offers us the possibility of joining with, and answering to, a world perpetually unfolding.

What then of design and the role of the designer? For the sake of simplicity I will start with the definition of design provided by the Oxford English Dictionary: ‘the art or action of conceiving of and producing a plan or drawing of something before it is made’ (Design, 2010). Contrasting this with Ingold’s view of the world immediately reveals a tension, for it casts design as a mental process achieved through action on the world and not through a process of correspondence (Ingold, 2013). This tension is not trivial, or a matter of semantics, but relates to how we think about things, which is explored in greater detail in CHAPTER 4. I argue for a reconceptualization of design for learning, one that encompasses both representational and non-representational ways of thinking and doing. Those tasked with the responsibility for educating others understand the value of planning that is based on mental representations and foresight. What is often lacking is an appreciation of non-representational ways of acting in the world, captured in the notion of correspondence, which flourishes in sensitively planned environments. I suggest that planning and correspondence, rather than being mutually exclusive, are in fact appropriate descriptors of different phases of instructional design work.

Design-in-advance is the type of instructional design work that teachers are familiar with. It is, as Goodyear and Carvalho (2013) describe, the design of those things that are open to alteration: the task, tools, and social configuration of working groups. It is not the design of learning activity because what learners do, or do not do, is open to many influences but cannot be designed. What is more, drawing on Gatt and Ingold’s work (2013), I suggest that this type of work ought to be carried out by those who have imagined their way into the future and, on turning back, place signposts into ongoing practice for those who follow. The way forward cannot be navigated through the development of rigid
curricula. Moreover, expanding our perspective to include insights from embodied, situated and distributed cognition, not to mention neuroscience (Immordino-Yang & Damasio, 2007; Immordino-Yang & Singh, 2013; Immordino-Yang, 2011) serves to confirm that learning is a process of iterative transformation, and not a series of responses to isolated acts.

The second type of design work I refer to is design-in-the-doing that is aligned with what some have called design for orchestration (Dillenbourg, 2013; Dillenbourg et al., 2011; Dimitriadis, Prieto, & Asensio-Pérez, 2013). I draw a distinction, not because I think we need more terms, but because those who design for orchestration have difficulty in agreeing upon what is open to alteration through design. They have a tendency to focus on the development of technology and tools that are prospective in orientation. What I wish to describe is an attentive disposition that is characteristic of teachers and students who are at liberty to navigate their way through a rich and varied learning landscape, all the while learning. From my perspective, design-in-the-doing is a productive response to heterogeneous activity in open, flexible learning environments. It is an accommodating responsiveness to the tools, tasks and learners on any given day, and has more in common with improvisational jazz than it does with more formal compositions. Correspondence is explored in detail in Chapter 5. In Chapter 7, I highlight a number of productive strategies that rely on this type of correspondence, or design-in-the-doing.

In what follows, I explore past and present thinking about the design and use of learning spaces, and sketch the shape of the work to come.

**LEARNING SPACES BOTH THEN AND NOW**

If I were to say ‘please make space for learning’ it may not be understood as a request for physical space. It could be interpreted as a request for freedom from other responsibilities, or a request for permission to engage in a certain type of goal directed activity. Even
when we limit our thoughts to the creation of physical or digital space for learning, there are challenges associated with interpreting this request. Is 'space' the absence of things, the promise of possibility; is it space contained, separate and set apart; or is it merely the backdrop against which activity plays out, unshaped by its presence? Could it be that how we think about space is part of the problem when it comes to thinking about how we design spaces for learning? In my work I tend to avoid the word, opting instead to refer to environments for learning. This obviates some of the problems associated with how people talk about space, but it does more than mitigate certain problems with nomenclature. It offers a solution to deeper philosophical problems about how people think about space. For, we do not learn in empty space, but in a world already in motion. We do not learn while contained or set apart, but through meaningful shared activity, and we do not learn equally well in any context because the contours, colours and affordances of where we find ourselves suggest, obscure, illuminate, inspire and confound our every move. Apprehending the vast range of situated human experience, and its role in learning, is just the beginning. For, having done so, those who are tasked with design for learning are presented with a rich and varied landscape of opportunities that are open to alteration in ways that support and encourage learning activity.

In thinking about environments for learning, I have to admit to conducting a rudimentary Google search for images of Classrooms circa 1800, 1900 and 2014. The images returned were captivating and would make an interesting study all of their own. The first thing that struck me was how similar they all were in terms of size, shape, physical orientation, locus of attention and tools. These images of specific moments in time told a story of stasis, but I think that the story of learning environments is far more complicated than things that do not change. To suggest that all classrooms, everywhere, have been the same for well over 200 years, is to gloss over the richness of local variation that has served many well (Burke & Grosvenor, 2007; Burke, 2010a, 2014a). It is worth noting that, despite local variation, the history that is most often called upon to justify future directions in environments for learning is often an over simplified response to a problem that is not yet
well understood (Woolner & Hall, 2010), and often fails to consider those
environments that provide us with counter-culture narratives of the past
(Burke & Grosvenor, 2013).

Broadly speaking, the current narrative around school design
offers variations on the theme of ‘industrial schools for an industrial age’
versus ‘21st century schools for an unknown albeit exciting and
technologically enhanced future’. Running deep through this rhetoric is
an assumption that space ought to reflect our thinking and be designed
to accommodate valued activity. All the while, a lack of critical
engagement with how we think about where we learn renders many of
the lessons from the past, mute. Everything is not always new, especially
where people are involved. I argue that people are tool-users,
accustomed to using what comes to hand to solve problems to reach
their desired ends, and that acknowledging the benefits of the ‘ready to
hand’ ought to influence how we design spaces for learning. Whether
through happy coincidence or planned serendipity, people co-opt, divert
and repurpose their environs to suit their needs. The actions of bolting
furniture to the floor, disciplining out of turn social exchanges, and
physically ordering bodies in space to follow homogenous instructions,
are the physical and social manifestations of certain epistemic ends. Put
another way, how we think about how we learn shapes the spaces in
which we learn. Therefore, if our thinking about how we learn has
changed, ought we not to revisit how we think about where we learn?

It could be argued that debates about learning space mirror those
concerning the implementation of constructivist pedagogies. As the role
of the learner – in learning - came to the fore, some interpreted this
change in perspective to mean a diminution in the role of the teacher.
Similarly, where the role of the built environment has been considered
detrimental to certain types of learning, some have responded by
emptying out the spaces in which learners learn. Empty, light filled 21st
century learning spaces often have more in common with hotel lobbies
and frequent flyer lounges than they do with active learning
environments. In both cases, an ill-defined problem has been ‘resolved’
by removing the perceived source, first the teachers and then the walls.
Peter Blundell Jones (2015) provides an overview of how our thinking about where we learn has changed over the past 200 years:

Growing up and entering school, the child exchanges the domestic setting for a larger society ... so the building becomes not only a learning instrument in the appropriation of space, but also a more general exemplar of how rules are applied to spaces. An implicit idea of society and its organisation is therefore bound to be carried in any spatial arrangement, whether it be dictatorial, democratic, utilitarian or otherwise. The curriculum, the rule book, the head teacher’s policy, the staff hierarchy, the punishment regime and other socially prescribed matters may appear to exert a far stronger influence on the way a school works, but the spatial setting is nevertheless ever present and never neutral, for it always makes some patterns of use easier and others more difficult. We become blind to this once habituated in the use of a building, for it seems just to be there, and we have to make an imaginative leap to envisage how it might be otherwise (p. 13).

He documents the history of formal schooling in the United Kingdom from its monastic roots, to early examples of general education, to the post war modernist preoccupations with light, articulation and flexibility that were the hallmark of the progressive educational movement. Reading his analysis of Walter Gropius and Maxwell Fry’s Impington Village College, built in 1936, and the post war Hertfordshire Schools’ movement that produced Templewood School in 1950 and Hunstanton Secondary School in 1954, one might be forgiven for thinking that he was dipping into the more recent past.

A great impetus to systematic thinking was the concern for flexibility and adaptability in use, which became something of an obsession in the late 1960’s. The liberalisation of educational methods by then required not only abandonment of serried ranks of desks in favour of light furniture which could be deployed experimentally in a variety of ways, but also the tearing down of classroom walls in favour of open plan. Furthermore, the Victorian obsession with daylighting could be abandoned, for with the development of fluorescent tubes, electric lamps could produce the high standard of illumination now defined by building regulations as necessary, and achieve it night and day without inefficient variation. As energy consumption became a concern, it was evident the efficiency could be increased by minimising the area of the building envelope, while constructing it as a rectangle on a grid system for reasons noted above (modular construction methods) (Blundell Jones, 2015, p. 23).
In addition to reminding us that some of the challenges we face are not new, what this excerpt reveals is how environmental change is driven not only by changes in methods, but by changes in available material technologies, such as fluorescent lighting and systems of prefabricated modular construction. What it does not reveal is that Templewood is still a space in which learning thrives, and that Hunstanton Secondary, despite having launched careers and won awards, has been less successful in accommodating its inhabitants despite the architects’ best efforts at future proofing it:

Uses change faster than buildings, so we do not know how they will be used in the future and we should design them as general types to be reinterpreted ... For Hunstanton, the Smithsons designed a glass-sided rectangular school with three voids, two of them light-wells and the third central like an open market hall adaptable for assemblies. Identical classrooms stepped around the perimeter on two levels ... the Smithsons concentrated on the basic hardware, leaving habitation to the occupants, and published photographs showed it naked, empty and perfect’ (Blundell Jones, 2015, p. 25).

Blundell Jones (2015) notes that it is possible to interpret German Modernism in both a positive and a negative light. The former focuses on the building as a scaffold that does not impose itself on the inhabitant, whereas the latter is critical of an apparent abdication of architectural responsibility in ‘failing to respond to content and context, with the added threat that without such considerations all buildings could become the same’ (pg. 25). Having identified spatial articulation as one of the defining features of Templewood’s success, he provides examples of organic modernism that demonstrate more radical spatial freedoms in European schools built in the 1950’s, 1960’s and 1990’s. He notes that what they share in common is a desire to create spaces that feel more like home, independent units ‘strung together with the intention of registering changes of scale to help integrate the child into society’ (pg. 28). These ideas are consistent with, architect and mathematician, Christopher Alexander’s work on the underlying principles of wholeness (2002), as discussed in Chapter 6.
Returning to the notion of how we might imagine an alternate future, Catherine Burke and Ian Grosvenor (2013) call for ‘a new canon of current or contemporary counter-currents in education that might serve to illustrate what a radical educational project today might look like’ (p. 150). They note the multiplicity of historical accounts, acknowledge the many silences in the historical record, and make a case for a ‘usable past’ that is more than a functionalist project. Because there are environments in which changes in practice have emerged, and we would do well to learn from them. Moreover, having spent considerable time observing learning activity in such a space, I’d be foolish not to question where the counter-cultural ends, and the status quo reasserts itself.

How does one turn the tide; what is the point beyond which change persists? A question that may be easier to answer is what happened to the progressive educational movement, because looking back it does not appear to have become the ‘new normal’. In the short time that I have been researching learning environments, I have talked to architects and educators who, on returning to spaces they helped design, are disappointed to see the reassertion of past practice that has returned once vital learning environments to regimented and often lifeless containers. Where do the ‘fleeting pockets of anarchy’ go? (Levy, 2011, cited in Burke, 2014). In tracing Colin Ward’s work ‘exploding the school’ in the UK between 1971 and 1980, Catherine Burke comments, almost wistfully, on his ‘practical optimism’ (Burke, 2014, p. 4) when tackling issues like insurance that so often got in the way of taking children out into the world. This optimism did not survive the practical, legal and cultural restrictions placed on teachers following the promulgation of the UK’s Health and Safety at Work Act of 1974, and the Educational Reform act of 1988. As both served to limit diversity in favour of conformity.

It seems we reap the sometimes unintended consequences of legislation borne out of fear and a need to control. But the irrepressible urge to make one’s way in the world still flourishes in the in-between spaces that Ward encouraged teachers to explore, and Burke suggests that the online-in-between is yet to reveal ‘unimagined opportunities and
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challenges for educational planners to expand the parameters of school’ (Burke, 2014, p. 8-9). I argue that this thesis provides an example of one school doing just this, and that the presence and reach of current open technology will facilitate a sizable shift into the open learning future anticipated, by some, more than half a century ago. Moreover, this change, initiated by new insights into how we learn, and supported by the material qualities of the tools to hand, will be realised by those who are free from social sanction to use these new tools, technologies and spaces in the service of learning.

But I am not wholly content with an answer that attributes blame to legislative change and anticipates a future in which the sanctioned use of the material qualities of current technologies will sustain change. For it is people who make laws, and people who do, or do not, choose to use tools in new and interesting ways. I want to know why people opt for stasis, and whilst conservative legislation may explain a retreat into the school building and a reduction in perceived risk taking, I wonder at its ability to totally extinguish difference and enforce conformity, especially in the light of how new technologies penetrate even the most protected environments. People are very good at circumventing rules when they want to. Why is it, therefore, that when it comes to education, there appears to have been such inertia?

Reaching into the personal, I know very few who really loved school as they experienced it, and yet the vast majority make choices that serve to maintain the status quo for their children. They choose uniforms over diversity, and the presence of shiny new things housed in buildings designed to accommodate them, rather than complex, overlapping and well-used environments shaped to accommodate current research based practice. In the face of uncertainty, the majority still appear to hold on to a familiar, and yet deeply unsatisfying past. This internal contradiction must rank alongside those found in health and environmental sustainability, and in their work Shove and colleagues (2012) illustrate, time and again, the value of exploring the material components of practice in order to better understand a lack of change in the interest of an acknowledged good. They show that persistent change is not the
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result of acquiring the necessary tools (in this case open learning spaces and technology) but results from the interplay between materials, competence and meaning. Available materials and skills shape tools, which shape practice. However, meaning shapes both tools and practice and meaning is a complex master in heterogeneous environments. Moreover, with complexity comes an increase in unintended and often unregistered consequences (Giddens, 1986) that knowingly and unknowingly alter competence, meaning and materials.

Following things in use in a ‘progressive’ learning environment is therefore one way of exploring productive change in teaching and learning practice. I argue, however, that prior to mapping progressive teaching and learning ‘in school’, we would do well to examine our thinking about things, space and learning. For in the absence of an honest appraisal of meaning and value in the light of our stated aims, we will do nothing but perpetuate the cyclical nature of past innovation, coming to rest in a future that looks all too familiar.

In her book *Towards Creative Learning Spaces* (2011) Boys describes the relations between pedagogy and space as woefully under-theorised, and highlights the often unchallenged translation of commonsense metaphors into self-fulfilling justifications. She argues that assumptions about the productivity of new informal learning spaces, which present informal as good and formal as bad, obscure far more of the complex nature of space and its occupation than they illuminate. To redress this imbalance, she highlights three critical re-conceptualisations of architectural theory that should inform our thinking about spaces for learning.

The first is the recognition of a move towards non-representational ways of making meaning (Thrift, 2008), acknowledging that we make sense of the world through our bodies, active in our environment. From this perspective, space and its occupation are not separate, nor are they the stimulus-response pairing of behaviourist accounts. They are understood as mutually shaping one another in ongoing activity. Second, Boys notes that the mapping of space and its
occupation is understood as non-congruent - one does not mirror the other. Rather, sets of social and spatial practices examined in context reveal the specific and dynamic patterns at their core. The final reconceptualization she highlights is that encounters with space should be understood as neither cerebral nor corporeal, but affective. Boys uses the term not just to articulate emotion, but to invoke Nigel Thrift’s (2008) interpretation of affect as a form of thinking, indirect and non-reflective, but thinking all the same. She invokes space as ‘one of our means of thinking about the world and of embodying thought into action’ (2011, p6). In summary, Boys would have us pause to consider how thinking about space and its occupation as non-representational, non-congruent and non-reflective changes how we think about the relations between learning spaces and learning activity. This perspective shares much in common with Tim Ingold’s (2000, 2011, 2013) view of the world, but is largely absent from the literature on education, technology and environments for learning.

The published literature that reviews thirty years of research on the relationship between learning spaces and learning (Blackmore, Bateman, Loughlin, O’Mara, & Aranda, 2011; Temple, 2007; Weinstein, 1979; Woolner et al., 2007) consistently reports both the paucity of evidence, and the complexity of the task of mapping this relationship. Reporting on open space schools, Weinstein and colleagues (1979) note that whilst ‘it is generally conceded that the heyday of open space construction is past’ (p. 594) these environments have demonstrated:

Increased opportunities for teacher and student interaction, flexible grouping, and individualized instruction... [These] arguments, however, do not go unchallenged. In more than one community, parental response to the new facilities has been vehemently negative and antagonistic, and teachers and administrators have demanded that walls be erected as quickly as possible. Indeed, many facilities, once completely open, are now "modified open space"; some are almost indistinguishable from traditional egg-crate schools (p. 594).

The review commissioned by the Design Council in the UK (Woolner et al., 2007) was based on an interdisciplinary search to establish what empirical evidence could be found, linking elements of the
More than a means to an end

environment to effects on learning. Over two hundred papers were selected and sorted according to the type of impact reported (attainment, engagement, affect, attendance and well-being) and the nature of findings presented (positive, equivocal, or negative). The reviewers stressed that, whilst it was hard to find many causal relationships, this indicated the degree of complexity, rather than an invalidation of the relationship. Moreover, they noted how many of the studies focused on measuring the impact of change in one element, only to find that remedial action impacted negatively on other elements. For example, where noise levels were high, recommendations included increasing soft furnishings to dampen sound, which in turn decreased air quality. Where open shelving was closed in to improve air quality, a reduction in student engagement with available resources was registered. Their conclusion was that the keys to explanation lay in defining and understanding these ‘mediating chains of events’ (Woolner et al., 2007, p. 61).

The review conducted by Blackmore, Bateman, O’Mara, and Loughlin (2011) from Deakin University, Australia, concurred with many of the conclusions reached in the Design Council review (Woolner et al., 2007) and provided the basis for a study of innovative learning environments (Blackmore, Bateman, Cloonan, et al., 2011) in a number of new open learning spaces in Victoria, Australia. Their final report frames their study within the following context:

While the investment in building new spaces had been premised upon sound architectural and educational principles, there was little empirical evidence that indicated how built learning environments connected to improved student learning, how these spaces were used by teachers, students and communities pedagogically, and with what effect for different student social groups (p. 2).

Other shared findings from the more recent reviews acknowledge that altered spaces do not necessarily alter practice, positive outcomes associated with change rely on adjustment to local perceptions of value, and the degree of local participation and preparation in advance of change (Blackmore, Bateman, Loughlin, et al,
More than a means to an end


Through the production of this thesis, my intention is to shed light on how one innovative learning community makes use of space, in order to expand our understanding of the complex relations between learning activity and learning environment.

THE STRUCTURE OF THIS WORK

This work is formally presented in two distinct, but complementary parts. The first is discursive and the second is descriptive. A third, informal element, offers supplementary online material that is not integral to the reading of this work, but adds richness to it. This structure accommodates different approaches to reading, two of which are illustrated below:

![Diagram of the structure of the work]

PART 1 - DISCursive

PART 1 consists of three discursive elements: introductory and contextualising material (CHAPTERS 1-3), four different theoretical expositions and corresponding analyses based on empirical material presented in the vignettes (CHAPTERS 4-7), and conclusions (CHAPTER 8).
**Chapters 1 and 2** paint the context within which this study is situated, and explore current debates about ethnography and how they have shaped this study. **Chapter 3** describes the site using the Activity Centred Analysis and Design framework (Goodyear & Carvalho, 2014a), a theoretically grounded but practically oriented means of analysing complex learning environments, with an eye for finding and describing reusable elements of design. The ACAD framework gives shape to this entire work by helping to train attention to the full breadth of observable learning activity. What is more, it provides a relatively agnostic framework for analysing learning activity, one that includes the material without confounding discussions with notions of material agency.

In **Chapter 4**, having explored the theoretical concepts of materials, materiality and material ecology, I present a number of case studies examining the properties and qualities of materials in use. In **Chapter 5**, I examine entanglement and present a phase-by-phase analysis of two particularly rich moments of learning activity with an eye for things, people and their multiple dependences. In **Chapter 6**, I explore wholeness through a case study of a single global action and its effect on learning activity, space, the use of learning materials, and changes in learning practice. In each of these chapters I give a detailed account of the theoretical perspective, before using it to examine either a single moment, or the effects of a particular course of action, as described in the vignettes, housed in Part 2. Whilst there is a sense in which each of the chapters in Part 1 builds on the next: from materials, to things in use, to emergent wholeness and repeating patterns of valued design, individually each offers an alternate means of analysing learning activity, with a view to informing design and practice.

**Chapter 7** shares a philosophical heritage with **Chapter 6** because it looks at pedagogical patterns (Goodyear & Retalis, 2010; Goodyear & Yang, 2009; Goodyear, 2004), which are derived from Christopher Alexander’s original work on patterns (Alexander et al., 1977). After detailing the evolution of pattern languages generally, and in education more specifically, I begin the task of outlining a pattern...
More than a means to an end

language for complex learning environments. In Chapter 8 I summarise my contribution to knowledge as both: theoretical, drawing on a wide literature and using the ACAD framework to present a non-deterministic account of the relations between learning activity and the learning environment; and practical, illustrating how insights enabled by close observation and theoretical reflection, can be used to inform practical action.

PART 2 - DESCRIPTIVE

Part 2 is in many respects the heart of this thesis, because it accommodates a selection of rich descriptions from my observational work. The ten vignettes I have chosen to include are presented in chronological order. Read straight through, they reveal both my development as a researcher, and the students’ increasing learning autonomy in this unusual environment. Not all of the vignettes (Table 2) are subject to detailed analysis in Part 1. But each has been selected to provide depth of understanding and rich description of the patterns named in Chapter 7.

Table 2 - habits & HABITATS, the vignettes

<table>
<thead>
<tr>
<th>No.</th>
<th>VIGNETTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>What does listening look like?</td>
</tr>
<tr>
<td></td>
<td>On the role of gaze and gesture in open learning environments</td>
</tr>
<tr>
<td>2</td>
<td>Because this is what we do in the Zone</td>
</tr>
<tr>
<td></td>
<td>On the conscious use of space and the value of intentional disruption</td>
</tr>
<tr>
<td>3</td>
<td>The brown-eyed blue-eyed experiment</td>
</tr>
<tr>
<td></td>
<td>On the use of immersion experiences and framing stories in the life of the Zone</td>
</tr>
<tr>
<td>4</td>
<td>A lesson in 24 hour time</td>
</tr>
<tr>
<td></td>
<td>On the appropriation of the environment in the service of learning</td>
</tr>
<tr>
<td>5</td>
<td>In the future I have a moustache</td>
</tr>
<tr>
<td></td>
<td>About identity and the appropriate use of social media</td>
</tr>
<tr>
<td>6</td>
<td>Managing the here-and-now via the anywhere-anytime</td>
</tr>
<tr>
<td></td>
<td>On the role of presence in blended learning environments</td>
</tr>
<tr>
<td>7</td>
<td>Making thinking visible</td>
</tr>
<tr>
<td></td>
<td>About noticing what is lost when tools change</td>
</tr>
<tr>
<td>8</td>
<td>Ms Talbot’s workshop</td>
</tr>
<tr>
<td></td>
<td>On the value of improvisation in the use of tools for learning</td>
</tr>
<tr>
<td>9</td>
<td>Edward &amp; Isobel develop a method</td>
</tr>
<tr>
<td></td>
<td>On the value of available space and appropriate tools, and the freedom to use them</td>
</tr>
<tr>
<td>10</td>
<td>On the getting and sharing of wisdom</td>
</tr>
<tr>
<td></td>
<td>The role of the older students in establishing and maintaining learning culture</td>
</tr>
</tbody>
</table>
**Vignette 1** is a description of a typical learning session, with an emphasis on a number of social accommodations to this environment. **Vignette 2** describes the annual rotation of home bases and gives an account of activity pertaining to the move, over a period of two months. **Vignette 3** describes an immersion experience through which the work for Term 3 is contextualised. **Vignette 4** illustrates a moment of inspiration in which a teacher uses a whiteboard marker on the face of a clock to teach her students how to calculate 24-hour time. **Vignette 5** is a window into how these teachers introduced their students to social media. **Vignette 6** illustrates the use of social media in managing learning activity over time and through space. **Vignette 7** traces a single student’s attempts to reconfigure her tools to accommodate the difficulty she is having with an online numeracy task. **Vignette 8** traces how a teacher uses first one, and then another tool to assist students having difficulty with a mathematical concept. **Vignette 9** describes another pair as they interpret and execute a task using an assortment of tools. **Vignette 10** illustrates the changing of the guard at the end of the year, with the current year five students hosting next year’s year six students, in their space, for the day.

**Part 3 - Supplementary visual material**

The informal, supplementary material of **Part 3** can be found [online by following this hyperlink](http://example.com). It is presented as an interactive timeline with each of the days I was on site registered as a ‘story’. Each ‘story’ houses a single element: a photograph, an excerpt from my fieldnotes, or a video. Many of these videos have been made publicly available by the school or visitors to the school, and they document life at NBCS between 2011 and 2014.
CONCLUSIONS

In this Chapter, I broadly describe the position from which I start, the resources on which I draw, my contribution, and the structure of this thesis. What I have not described is how I think about the material qualities of each of its component parts, and how I expect their form will shape the quality of your experience, reading it. In taking the opportunity to do so, I foreshadow some of my thinking about things, and how they shape learning activity.

As this thesis took shape, I wrestled with how the reader would manage the transitions from the discussion to the vignettes and back again. I resisted the functional solution of chopping the vignettes into bits of data, as this did not reflect my methodological disposition. I imagined instead that I would present my work in two volumes, which would allow the reader to view them concurrently on any flat surface – desk, table or lap. However, as I approached completion, the regulations changed to reflect the affordances of current technology. No longer would dissertations be stored in their physical form on a shelf in a library, but as easily transferrable digital records ‘in the cloud’. This move would make them less accessible in the physical realm, but exponentially more accessible in the digital realm.

This change would not only affect storage and access but the reader’s experience, influencing how I thought about presenting my work. The two physical parts became first one, and then two, transferable digital files. In the compound document I experimented with hyperlinked text. A seemingly simple solution to my concerns provided that the reader did not convert the digital record into print, for hyperlinked text is powerless in paper form. This, in combination with new concerns about file size and digital submission, led me to remove the internal hyperlinks, despite having reverted to a single digital file.

My thinking about how I would present the visual element of this work also evolved over time. I like pictures and I especially like paging through picture books. I also enjoyed taking photographs during my
fieldwork and, in my imaginings, my final offering would include two bound text-based volumes and a printed album of annotated photographs. As it turned out, the visual diary is not a beautiful bound book, but an interactive timeline hosted online in an application I discovered while watching the students at work, in the Zone, during 2012.

This digression provides a moment to consider how the material qualities of things alter the teaching and learning practices associated with storage, distribution, access and engagement, and how these changes in practice alter how we use both space and time. What is more, it gives us a snapshot of the present and a glimpse of a future where digital connectivity and publishing might change, and be changed, by how we conduct research.

In Chapter 2, which follows, I consider what it means to conduct ethnography, and provide the details about how I conducted this ethnography.
**Chapter 2**

**Ethnography, a way of working**

![Image](image.jpg)

**Figure 2 - Participant observation: ‘an education of attention.’**

Ethnographies are traditionally about people or groups of people bound up in specific social (Mead, 1954) or institutional cultures (Goffman, 1961). More recent ethnographies have traced how people’s lives have been affected across time and space by financial markets (Ho, 2009), globalization (Tsing, 2005) and the advent of virtual worlds (Nardi, 2010). Education is not without its own ethnographers (Becker, Geer, & Hughes, 1968; H. F. Wolcott, 1967, 1973). They explore how social, economic and political issues play out in learning (de Campos Rosario, Stephens, & Delamont, 2010; Stephens & Delamont, 2009; H. F. Wolcott, 1983), fight familiarity by exploring learning in diverse contexts (Delamont, 2013; Lave, 2010), and advocate for the use of participant observation as a way of improving teaching and learning practice (Anderson-Levitt, 2013).

This work is inspired by Estrid Sørensen’s educational ethnography, *The Materiality of Learning* (2009), a seminal work in which she lays out a deceptively simple methodology for studying learning guided by two questions: How do materials participate in school practices, and what is performed through this participation? Drawing on work in Science and Technology Studies, Sørensen offers answers to
these questions by exploring how old and new technologies participate in school practice. She accounts for different forms of technology (flexible, fluid and multiple), knowledge (communal, representational and liquid), and presence (collective, authority-subject and agent) within a Danish fourth-grade classroom. Her work establishes the value of the material within the realm of the social; and it illustrates how the digital extends, displaces and liquefies existing spatial relations in teaching and learning practice. Whilst I am indebted to her work and guided by her methodology, I have not chosen to give a purely relational account of matter. Therefore, I have shaped her original questions to reflect my research interests as follows:

How do the qualities of materials participate in teaching and learning practice, and how do we account for their participation in learning activity?

We share a common interest in the role of materials. Where we differ is that I focus on the relations between activity and environment, and Sørensen focuses on the relations between practice and performance. This is a subtle but important shift in emphasis that reflects the distinction made by Shove and colleagues (Shove et al., 2012) between practice-as-entity (comprising materials, meaning and competence) and practice-as-performance (their enrolment in activity). This choice is motivated by my interest in how learning environments can be said to shape learning activity and vice versa.

In what follows, I situate my work within current thinking about ethnography.

**WHAT IS ETHNOGRAPHY?**

The way ethnography is conducted differs across disciplines, intellectual traditions, and cultures (Anderson-Levitt, 2013). There are those for whom ethnography is the act of 'participating in a culture of craftsmanship' (Marcus, 2009, p. 3) as distinct from being trained in a particular method. And there are those for whom ethnography is
Ethnography, a way of working

achieved through a series of transformations: from observation, to observational data, to quantitative evidence that is both generalizable and statistically significant (Hammersley & Atkinson, 2007). When it comes to education, there are ethnographies of education and ethnographies in education (Green & Bloome, 2004), where the former describe the particulars of a site from an anthropological perspective; and the latter address questions arising from within education, from a sociological perspective. The one thing they share in common is the label of ethnography – to write about the people. Ethnography, it seems, is about people and what they do or do not do. Moreover, in a world where old certainties have been superseded by complexity, ambiguity and fluidity, ‘Ethnography provides a way of following these changes, and of communicating stories that matter’ (Mills & Morton, 2013, p. 2).

Tracing the genealogy of educational ethnography from its anthropological (naturalistic) and sociological (empiricist) roots, Mills and Morton (2013) can be said to occupy the middle ground. From this position, they note that the fundamentally complex and permanently shifting nature of educational research is what makes the non-linear methods of ethnographic research so well suited to studying it. What is more, they resist the pull towards methodolatry, or ‘a preoccupation with selecting and defending methods to the exclusion of the actual substance of the story being told’ (Denzin & Lincoln, 2005, p. 48). They describe ethnography as ‘a reflective space in which to reflect on your research dilemmas, not as a set of rules or directions to be followed’ (Mills & Morton, 2013, p. 11). Referencing Law (2004), they highlight that ‘while standard methods are often extremely good at what they do, they are badly adapted to the study of the ephemeral, the indefinite and the irregular’ (p. 4). They note that living as we do, in self-reflexive times, we should acknowledge that neither we, nor our methods, are separate from the work we do, and that this is not necessarily a problem.

Ethnography can be deeply humanistic, scientific and political. It can be employed in the production of knowledge through observation and reflection on the everyday, rigorously applied as an empiricist method, and deliberately action-oriented. For Mills and Morton (2013)
ethnography is more than a method. It is, at once, a way of being-seeing-thinking and writing; they insist that it ought to be an uncomfortable science: questioning the routine, making the familiar strange and resisting conclusions. Above all, they say, it demands empathy from the researcher, or an attentional rather than an intentional disposition. This is something they share in common with Tim Ingold (2014), who describes participant observation as the training of attention. When it comes to conducting research in education, Mills and Morton (2013) note that ethnography has long been used to illuminate the lived experience of people, inform the process of design, and explore texts, policies and discourse.

Rather than describing an approved method, Mills and Morton (2013) propose a manifesto of writing virtues: modesty, honesty and analytical insight. The first is inspired by Donna Haraway’s (1999) call for a modest witness, who is embodied, located and accountable, and aware of their role in building on the work of those who have gone before them. The modest ethnographer ought to acknowledge enough of who they are and the ideas on which they build, in order that the reader may judge the veracity of their account for themselves. Mills and Morton choose to use ‘modesty’ rather than reflexivity in their work because they feel it affords a degree of transparency, without overshadowing the research itself. The second, honesty, describes the manner in which writers ought to situate their work, being candid about their motivations, the limitations of their work and the scope for improving upon it, all the while cultivating a healthy scepticism for overly simplistic conclusions. Their third, and final virtue, is a commitment to analytical insight, for academic writing of this genre is distinct precisely because it frames the narratives it creates, within wider scholarly debates.

Writing under the title, That’s enough about ethnography! Tim Ingold (2014) can be said to occupy the outer, anthropological left when it comes to naturalistic, narrative endeavours. Eager to re-establish the credentials of anthropology and its principal way of working (participant observation), he describes it ‘as a forward-moving discipline dedicated to healing the rupture between imagination and real life’ (p. 383). He
does not set out to expunge ethnography from the record, but, for its sake and ours, he attempts to define what is, and what is not, ethnography. In doing so, he makes space for participant observation that is not ethnography, in order that we might legitimately chart a course between where we are, and where we imagine we would like to be. He argues that the ethnographic qualifier - so liberally placed before the words encounter, observation, fieldwork, interview, method, knowledge, film and monograph – is, more often than not, a substitute for the word qualitative.

So, what is ethnography and how does one write about the people? According to the Oxford English Dictionary, it is ‘The scientific description of peoples and cultures with their customs, habits, and mutual differences.’ Ingold rails against this framing because it limits ethnography (and therefore participant observation) to cataloguing, comparison and reportage. Moreover, in leading with the word ‘scientific’, it perpetuates a paradigm in which anthropological studies are measured against ill-fitting standards, and he questions the sense in which ethnography might be described as being scientific at all. Instead, he suggests that ethnography is more art than science, a framing that should not render it less truthful or accurate. By his definition, rigorous anthropological inquiry is characterised by a ‘long-term and open-ended commitment, generous attentiveness, relational depth, and sensitivity to context’ (Ingold, 2014, p. 384).

In discussing ethnography, as distinct from participant observation, Ingold insists that ‘ethnographicness’ is not an intrinsic property of encounters in the world. Rather, it is judgments placed on these encounters after having left the field that transforms them into quasi-scientific data. Ingold takes issue with those who frame these judgements as the pre-existing conditions, and not the resulting description. He suggests that it might be simpler to refrain from calling anything that does not set out to ‘chronicle the life and times of a people’ (p. 385), as ethnographic. He advocates, instead, for a return to participant observation based on two principles: an ontological commitment to a certain way of being-in-the-world, and the centrality of
education in anthropology. For, from his perspective, participant observation is a way of being in the world that does not objectify, but attends to both humans and things, seeking to learn both with and from them. This means that there can be no observation without participation, for to observe is to be changed through an intimate coupling of perception and action. Therefore, participant observation is not a means of gathering data, but the ‘fulfilment, in both letter and deed, of what we owe to the world for our development and formation’ (Ingold, 2014, p. 388). This informs the framing of his second principle, for participant observation, he says, is quite simply ‘an education by attention’ (p. 388).

Returning to the Latin roots of education, educere - to lead out - Ingold (2014) notes that there was a time when education was not about filling the minds of students with static knowledge, but leading them out into a dynamic world. He describes this perspective as having much in common with participant observation, for the anthropologist couples their perception with the actions of another, in an act of correspondence.

To practice participant observation, then, is to join in correspondence with those with whom we learn or among whom we study, in a movement that goes forward rather than back in time. Herein lies the educational purpose, dynamic, and potential of anthropology. As such, it is the very opposite of ethnography, the descriptive or documentary aims of which impose their own finalities on these trajectories of learning, converting them into data-gathering exercises destined to yield “results,” usually in the form of research papers or monographs (Ingold, 2014, p. 390).

In summary, there are those for whom ethnography is both method and methodology; and there are those for whom ethnography and/or participant observation is a way of working-in-the-world that results from the education of one’s attention, and not through implementing a series of agreed upon steps (method). In what follows, I give an account of what I have done, and my reasons for doing so.

**IS THIS ETHNOGRAPHY?**

Perhaps the first question I should answer is, why ethnography? The simplest answer is that I found something that I wanted to
Ethnography, a way of working

understand. I had not created, developed or piloted anything, but had happened upon a convivial learning environment that raised as many questions for me as it answered; and ethnography is an appropriate way to study practice and answer open ended questions about the nature and formation of practice (Mills & Morton, 2013; Sørensen, 2009). Moreover, doing an ethnography of learning materials requires studying them in practice (Hine, 2000, 2005; Miller & Slater, 2000); and this study is driven by a desire to see what use others make of the materials within their learning environments, and how the qualities of these materials can be said to shape their learning activity.

As to whether or not I choose to call this work ethnography, I have to admit to mixed feelings, not because I would call it something else, but because it is a term that carries the weight of its history. But I feel quite strongly that if we profess a commitment to knowledge that is situated, then we should feel less affronted by the history of our thinking. What is more, moving forwards should not require us to cut ourselves off from what has gone before, but simply acknowledge past failings and commit to overcoming them. So I will call this ethnography, for it is a way of following the changes in teaching and learning practice and telling 'stories that matter' (Mills & Morton, 2013, p. 2). In part, it is also reportage, which includes judgements made both before and after fieldwork about which stories to tell and through which lenses I would choose to look. But I want to do more than tell stories; I want to share how, through a 'long-term and open-ended commitment' (Ingold, 2014, p. 384) and 'an education by attention' (p. 388), I have reached the conclusions that I have, in order that others may take what they will from what I have learned.

In doing so, I have been guided by Mills and Morton's (2013) writing virtues: modesty, honesty and a commitment to analytical insight; and Ingold's (Gatt & Ingold, 2013; Ingold, 2013, 2014) commitment to participant observation that is an act of educational correspondence.
A practical commitment to modesty has meant that, whilst I am very much a part of this story, I have tried not to get in the way. I have no doubt that by the end you will have a sense of who I am, and that this will help in establishing what use may be made of this offering. However, I am acutely aware of the fact that I have been and will continue to be a learner amongst the learning and, as such, this work is an act of correspondence on many levels: my perceptions of others’ learning activity, my thinking about what I have read in relation to what I have seen, and my altered engagement with the many and varied learning environments I have subsequently encountered. Furthermore, the timing of this work is shaped by the work that precedes it, and I am indebted to those who have carved out a space in which it is now possible for me to move on, informed - but not derailed - by debates that pitch mind against matter, the social against the material, and the physical in opposition to the digital. Freed up, but not cut off, I may now ask how our learning environments shape our learning activity, and how our learning activity might shape the learning environments of the future.

As to the second of Mills and Morton’s (2013) writing virtues, honesty, I have been candid about my motivations for writing from the start. My intention was always to understand what made this environment different, and within this framing was an implied judgment. I considered it a good example of a complex, open and digitally mediated learning environment. This stance is informed by the work of Carvalho and Goodyear (2014b), in examining the architecture of productive networked learning. They use productive, not in a critical sense, but in so far as it relates to creativity and the act of making or production, rather than to the act of passive consumption. Sometimes, I saw things that did not work and it is not that I did not note, ponder and think about how things could be different; rather, in the retelling, I described actions and materials that I came to see as fundamental to making this a site of engaged and participatory learning.

3 A reference to the name of the blog I started whilst conducting this study https://pippayeoman.wordpress.com.
The third and final writing virtue is a commitment to analytical insight, and this is what translates this work from a narrative into a contribution to wider scholarly debates on situated, embodied and experiential learning. In doing so, it reaches across disciplines from education and the learning sciences, to archaeology, anthropology, philosophy and architecture. I may be criticised for substituting breadth for depth. However, in ‘following the materials’, I trust I have managed to follow learning activity across disciplinary boundaries in a way that is both meaningful and makes a contribution - a contribution I intend to frame within the discipline of design anthropology.

Design anthropology is an emerging field, which combines the forward orientation of design with the retrospective strengths of anthropology. From design comes the practices and tools for creating products and conceptual solutions to everyday problems, a participatory orientation towards change, and a long history of interdisciplinary collaboration. From anthropology comes an emphasis on the generative role of theory in developing designs and examining current conceptual frameworks, an orientation towards the past that informs the present, and a sensitivity to the values of those whom the design will affect. For Otto and Smith (2013) the central challenge of design anthropology is ‘to extend the temporal horizon both forward and backward, to anchor images of the future in reliable constructions of the past’ (Pg. 4). It is a way of imagining the future, whilst systematically investigating the past in order to understand the present.

Next, I give an account of how this study was conducted.

**THE MANNER IN WHICH I WORKED**

**SITE ACCESS**

Northern Beaches Christian School (NBCS) came to my attention as a parent, rather than as a researcher, and my first impression is one that lingers. It was everything about the students: how they sat, how they moved from conversation to online investigation to writing up, and
how this activity held them captive-in-the-moment. My visit had been towards the end of the year. Exams had been sat the week before, and NBCS was only one of the schools I visited that week. My other appointments had taken me to classrooms filled with tired students, struggling to stay on the chair, let alone on task. Excuses were duly made - it was, after all, the week after exams. We enrolled our sons at NBCS and, as the weeks turned into months, I felt compelled to explore this world to get some sense of its measure and to share it with others.

Negotiating access to conduct this study therefore included discussions about my being a parent of children at the school, and included debates about which cohort I should follow. In 2011, as I prepared to ‘enter the field’, our sons were in years four and five; and the newest learning environments at NBCS were the Zone - the dedicated home of the students in years five and six, and the SCIL building - a multipurpose immersive learning environment used by students of all ages. Exploring my options with the Principal, I considered limiting my observations to activity in the SCIL building. However, the Principal was confident that my presence in the Zone could be managed in the same way that all familial relationships between teachers and students were dealt with at the school. And, as our sons were neither perturbed nor surprised by my interest in their learning space, the practicalities of conducting fieldwork in the Zone were worked out with the help of the Principal of the Primary School, the lead teacher in the Zone and my PhD supervisors. The details included clear lines of reporting for all, established boundaries in terms of in-school contact with my sons, and specified an exit strategy that considered the needs of all should things become complicated.

**ETHICS & ETHICAL CONSIDERATIONS**

University of Sydney HREC approval for this PhD was granted as part of the Australian Research Council Laureate Project in Learning, technology and design (HREC Approval Number: Ref. 14289). My work falls within strand eight of the project: *the analysis of systems of learners.*
Ethnography, a way of working

NBCS plays an active role in innovation in education, both locally and abroad. As such, they have asked to be named in this study. However, with the exception of the Principal, all people have been assigned pseudonyms, and signed permission has been obtained for the images reproduced in this work.

Participant information statements and consent forms were approved for staff, students and their parents. Prior to their distribution, a colleague and I gave a presentation to the entire staff about the work of the Laureate Team, and I explained what I hoped to achieve through my research. Shortly after, the Principal of the primary school introduced the study to the students in the Zone, and explained the need for all the paperwork. Forms were sent home with all students in Stage 3 (years five and six) and Stage 4 (years seven and eight), a total of 341 students, their parents and their teachers. This provided breadth and redundancy should working in the Zone become problematic. A week after the forms went home, I made myself available to answer questions from parents and teachers on site. With the assistance of the staff in the Zone, 97 per cent of all forms for Stage 3 were returned within a few weeks. Collecting forms from the older students was less streamlined, and after an uncomplicated term observing the activity of Stage 3 in the Zone, and with only 60 per cent of forms for Stage 4 returned, I focused my efforts in the Zone for the remainder of the year. The details of participation rates of students and teachers in the Zone can be found in Table 3.

Table 3 - Participation in observational study in the Zone

<table>
<thead>
<tr>
<th></th>
<th>STUDENTS</th>
<th>CORE TEACHERS</th>
<th>RELIEF TEACHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of forms distributed</td>
<td>181</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Total returned</td>
<td>175</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Full consent</td>
<td>169</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Participation rate in observational study</td>
<td>97%</td>
<td>100%</td>
<td>50%</td>
</tr>
</tbody>
</table>

| Conditional consent          | 7 | 0 | 0 |
| No photographs and/or interviews | 6 | 0 | 0 |
| No interviews                | 1 | 0 | 0 |
| Request to be excluded       | 6 | 0 | 1 |
| Excluded without forms       | 6 | 0 | 0 |
| Total excluded from the study | 12| 0 | 1 |
Conducting observations of learning activity in an open plan learning environment with only 12 of 181 students excluded was challenging. Somewhat counter-intuitively, their exclusion meant that I had to be keenly aware of who they were, in order to avoid becoming engrossed in activity, which included them. A total of 18 were to be excluded from photographs and this was harder to manage, as they would sometimes intentionally make their way into my field of view. Having learnt to recognise them, I was able to use facial recognition software to scan my photographs and delete or obscure ones in which they appeared. Of those who were to be excluded, more than a few were unduly interested in my work, and there were times when I had to explain the rationale behind research ethics and our obligation to honour their and/or their parent’s wishes to have them excluded from the study. I even had one student offer me a hand written ‘form’ agreeing to participate. We discussed it. I thanked them for their interest but left them on the excluded list. This, and the fact that fifty per cent of those excluded were excluded by default, not having returned their forms, did make me think about how participation in this type of study is managed.

Working in a learning environment that housed my sons, my first instinct was to work hard at avoiding groups in which they were present. As everyone became accustomed to my presence and what it meant to have a researcher on site, this became less of an issue. However, by that point, I had become accustomed to sitting in certain locations or following particular teachers. Therefore, my observations of groups in which they were present tended to be limited to whole or large group events. Having said this, there were moments when I’d be sitting on the floor amongst the students and I would find one or other of them, sitting behind me or within my field of view. But as a general rule we tended not to talk much to each other during the day.

There were moments in which it was hard to be both parent and researcher, times when one of them was upset, or they didn’t know what was expected of them. One of the most challenging moments was unquestionably the day covered in Vignette 3. More generally speaking, however, I felt that the staff kept their distance because I was a
parent and not because I was a researcher. This left me feeling isolated at
times. But on the whole, I felt that my status as both researcher and
parent kept me on my toes. It undoubtedly gave me greater insight into
life and learning in the Zone, as I was familiar with the workings of the
Zone well before I entered it as a researcher, and my connections with it
extended a full year after I completed my fieldwork. Therefore, my
understanding of the Zone is based on observations conducted as a
researcher during 2012 and as a parent of students resident in the Zone
from 2011 to 2013. At the time of writing, our sons are still students at
NBCS.

![Figure 3 - The Zone, a year five student’s response to a mapping task](image)

**Fieldwork**

In what follows, I provide a written account of how I conducted
fieldwork for this study. I initially planned to spend a full year on site.
But, having enrolled to study mid way through the previous year, I had
not had sufficient time to complete my extended research proposal,
submit ethics applications, and distribute and collect the necessary
consent forms prior to the start of the school year. Therefore, with ethics
and access granted, I began fieldwork at the beginning of the second
term, in April 2012. As a general rule, I would spent three full school
days (8.50 am to 3.05 pm) per week on site, which meant that by
December I had spent a total of 549 hours, over 93 days, in the Zone.
Table 4 presents an overview of the details of my fieldwork.

**Table 4 - Participants, observations and records**

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>181 students</td>
<td>Male and female 10 - 13 years</td>
</tr>
<tr>
<td>7 teachers</td>
<td>Both new to the space and familiar with it</td>
</tr>
<tr>
<td>1 researcher</td>
<td>With camera, notebook and laptop</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OBSERVATIONS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>549 hours</td>
<td>April to December 2012</td>
</tr>
<tr>
<td>93 days</td>
<td>8.50 am to 3.05 pm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OBSERVATIONAL RECORDS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Books of handwritten fieldnotes</td>
<td>Notes and sketches</td>
</tr>
<tr>
<td>246 MB of digital fieldnotes</td>
<td>Notes, video files and digital artefacts</td>
</tr>
<tr>
<td>Over 5,000 images</td>
<td>Digital stills</td>
</tr>
<tr>
<td>Examples of tasks &amp; online environment</td>
<td>Digital files and screenshots</td>
</tr>
<tr>
<td>Examples of student work</td>
<td>Digital copies and images of physical work</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENERAL RECORDS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Original brief</td>
<td>From NBCS to BVN Architects</td>
</tr>
<tr>
<td>Original concept drawings</td>
<td>From BVN Architecture</td>
</tr>
<tr>
<td>NSW Board of Studies annual reports</td>
<td>Public record online</td>
</tr>
<tr>
<td>Staff conference papers &amp; publications</td>
<td>Accessed via SCIL (NBCS) website</td>
</tr>
<tr>
<td>Staff blogs and twitter accounts</td>
<td>Public online access</td>
</tr>
<tr>
<td>School newsletters</td>
<td>Online access to school community</td>
</tr>
<tr>
<td>School websites</td>
<td>Public online access</td>
</tr>
</tbody>
</table>

Armed with my copy of *The materiality of learning* (Sørensen, 2009) and what I had read about the experiences of others in the field (Goodall, 2000; Van Maanen, 2011; H. Wolcott, 2005, 2010) I initially used a nomadic form of observation, ‘That is, one that does not dwell too long on any material or interaction’ (Sørensen, 2009, pg. 24). This was something Sørensen elected to do in order to get a sense of how different materials were enrolled in practice, without giving priority to some and failing to notice others. This style of observation ensured that her attention would not exclusively be drawn to those things most often in use, or the things the teachers themselves focused on. In writing fieldnotes, she was mindful of registering her thoughts and feelings, along with what happened around her. However, she kept her personal reflections, precipitated by observation, separate from her observational record. She described her observational style as follows:
My blue notebook, my pen, my position at the back of the classroom, and my nomadic gaze were my devices for producing field notes during my classroom study. I was a participant observer ... taking part neither in the learning nor in the teaching. I was often so busy noting what I saw and heard that I often was incapable of attending to the teaching. My way of participating was different from any other participant in the room. But I was nonetheless a participant. By my sheer presence I was drawn into the practices as a participant. Pupils, for instance, were interested in what I did; they asked what I was writing and sometimes acted in front of me in order to enter my notes. Similarly, one teacher would often provide me with a kind of stage direction, occasionally commenting on what was going on while teaching (Sørensen, 2009, p. 25).

New to this type of work, I initially tried to follow Sørensen’s lead. However, the Zone provided me with quite a different landscape in which to observe. I was one adult amongst eight, subsumed within a learning community of 188 in a large open-plan learning environment, and there was very seldom a single locus of attention or uniform activity that highlighted me as the outsider (see Figure 4). Typically, I would start the day seated somewhere on the periphery with a view across either the upper or lower section. My observation always started with things caught up in learning activity, and I would watch until something caught my attention: a style of use, a gesture, a posture, or an interesting spatial configuration of people and things. Then, if necessary, I would slowly make my way through working others to find a perch somewhere nearby from which to observe.

In writing field notes, I tried to capture as much as possible in rich description, which was not without its challenges. For example, a student working alongside me in the online environment might relocate for any number of reasons: to get additional resources, find a working partner, or to look for a teacher or a different space in which to work. What is more, students traversed their online and in person learning spaces seamlessly, and often distributed different types of tasks across any number of laptops in a group, which sometimes made it difficult for me to make sense of their learning activity. Inspired by Tim Ingold’s thinking in Lines (2007) I elected to do my best to take notes of complete threads of activity wherever possible. So my notes told stories of use,
rather than merely listing things in use as they came into my field of view.

![Image](image_url)  

Figure 4 – Learning activity in the Zone

Something I had not anticipated was how exhausting I would find days spent observing others and, in order to stave off fatigue in the afternoons, I would find something practical to do to get me moving. It also meant that I could make a small contribution to life in the Zone and, as most afternoons were spent doing project work, an extra helper was always welcome. I did have to be careful though, as certain students would have gladly monopolized my attentions - casting me inadvertently as their teaching aid for the duration. I tended to find practical, self-terminating things to do, and initially many of my interactions with students were limited to what I categorized as, ‘mother-questions’: can I be excused to go to the loo, can you help me find my book or jumper, and what time is my bus? But over time, students became accustomed to using me as a sounding board for their ideas, or as a willing audience for work they were proud of.

I used photography to record spatial configurations (see Figures 5 and 6) and sequences of interesting activity or tool use. Sometimes, I used time-lapse photography to capture how patterns of activity changed over time. On occasion, I used video to record introductions to
units of work, record levels of sound, and to get a feel for different moments in the day - coming in, going out, group work, and independent work.

Figure 5 – Working circle

Figure 6 – Inverted working circle

I had originally made provision for a small number of interviews, but found that speaking more formally to participants made them self-conscious about what they did, and sometimes even changed their behaviour when I was around. I was interested in what people did, rather than what they said about what they did, and speaking to them seemed to alter this. So, I opted not to conduct any formal interviews, keeping verbal exchanges general in nature and conducted around day-to-day practicalities.

Sørensen (2009) notes how students and staff altered their behaviour when she was present, and how one’s presence as an observer...
invariably shapes activity. Apart from the introductory period, in which I was new to the space, I seldom felt that staff altered what they did because of my physical presence, which was in contrast to my experience of initiating more formal verbal exchanges. It was not that my presence was not registered, but that in the Zone the teachers taught as a core team of seven, with two permanent relief teachers swapping in for each of them, on a weekly rotation. This was dissimilar to Sørensen’s experience. I was not the only other adult, in a single room, with a single teacher and a discrete group of thirty students. Sometimes the staff would include me in general conversations or ask my opinion, but they did not ‘perform’ for me; and I was careful not to intrude on their time in the Zone when students were not present. The school day started at 8.50 am and I would arrive in time for my sons to make their way into class, often waiting outside until the students had settled, before entering. I did this because I was conscious that the staff valued these pupil free moments, and in those moments I felt my presence was an intrusion. It also gave me time to gather my thoughts before starting the day.

**SENSE MAKING**

During my time on site, I kept a short list of particularly interesting moments of learning activity, with the intention of writing them up in as much detail as possible. I was very glad that I had acted on this advice, because by the time I was finished I was overwhelmed by the size of my observational record. I could, and did, read through all my fieldnotes. But in the absence of a short list to refine, I would have been hopelessly lost amongst endless possibilities. A second strategy I used, to narrow my focus, was to use my photographs to create categories of use, document how spatial configurations changed over time, and detail interesting instances of how the learning environment was repurposed. Then, using date and time stamps, I cross-referenced the photographs with my fieldnotes and re-evaluated my shortlist. Having settled on a final list of ten vignettes, I wrote each up in as much detail as possible using fieldnotes, images, video, staff and student blogs and other digital artefacts. The source material for each of the vignettes can be found in Table 5. It is worth noting that, for each, my central source was always
my fieldnotes, with images serving principally to orient and contextualize learning activity.

Table 5 - Details of vignettes

<table>
<thead>
<tr>
<th>No.</th>
<th>VIGNETTE</th>
<th>DATE</th>
<th>FIELDNOTES</th>
<th>SKETCHES</th>
<th>IMAGES</th>
<th>VIDEO</th>
<th>ARTIFACTS</th>
<th>BLOGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>What does listening look like?</em></td>
<td>31/05/2012</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>On the role of gaze and gesture in open learning environments</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td><em>Because this is what we do in the Zone</em></td>
<td>22/06/2012</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>On the conscious use of space and the value of intentional disruption</em></td>
<td>17/07/2012</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>19/07/2012</td>
<td>✔</td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20/07/2012</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>26/07/2012</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>07/09/2012</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td><em>The brown-eyed blue-eyed experiment</em></td>
<td>18/07/2012</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td><em>On the use of immersion experiences and framing stories in the life of the Zone</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td><em>A lesson in 24 hour time</em></td>
<td>06/08/2012</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>On the appropriation of the environment in the service of learning</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td><em>In the future I have a moustache</em></td>
<td>24/08/2012</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>About identity and the appropriate use of social media</em></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td><em>Managing the here-and-now via the anywhere-anytime</em></td>
<td>17/09/2012</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>On the role of presence in blended learning environments</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td><em>Making thinking visible</em></td>
<td>21/09/2012</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>About noticing what is lost when tools change</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td><em>Ms Talbot’s workshop</em></td>
<td>15/10/2012</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>On the value of improvisation in the use of tools for learning</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td><em>Edward &amp; Isobel develop a method</em></td>
<td>31/10/2012</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>On the value of available space and appropriate tools, and the freedom to use them</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td><em>On the getting and sharing of wisdom</em></td>
<td>15/11/2012</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td><em>The role of the older students in establishing and maintaining learning culture</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I deliberated about how to order the vignettes. My first instinct was to group them according to themes, but this created two problems. The first was that a thematic arrangement thrust the reader into activity with insufficient background knowledge. The second resulted in a missed opportunity to illustrate development over time, both in the students’ learning autonomy, and in my ability to trace learning activity as a researcher. Therefore, I chose to order them according to date,
narrating them with my reflections as I made sense of the environment over time.

From the outset, my thinking was informed by theorists and researchers concerned with understanding the material, materiality and materialism (Bennett, 2010; Fenwick, Edwards, & Sawchuk, 2011; Ingold, 2011; Knappett, 2007; Miller, 2005; Sørensen, 2009), space (Doorley & Witthoft, 2012; Goodyear, 2008; Reilly et al., 2010; Syvertsen, Muller, & Mau, 2010), time (Heidegger, 2008; Mbembe, 2001; Shove et al., 2009) and practice (Ingold & Vergunst, 2008; Shove et al., 2012).

My intention was always to follow participation, not participants, which was a subtle but material difference. I shaped my work using Sørensen’s (2007) ‘minimal methodology’, which commends the researcher to resist the urge to define the role of technology and people at the outset. Instead, through observation, description and theoretical reflection, it encourages the researcher to process theory through empirical observation. In her work, Sørensen used three concepts to guide her observation: participation, performance and the spatial imaginary. The choice of these concepts was motivated by her desire to remain cognisant of the fact that the questions she asked were themselves, ‘materials that contribute to doing theory’ (Sørensen, 2009, p.28). The concept of participation allows the researcher to ask how materials and people participate in practice, and guides observation to account for what is done. The concept of performance leads the observer to ask what is accomplished through a particular arrangement of interrelating parts. And the concept of the spatial imaginary is used to describe the ‘pattern, landscape, or shape that is formed spatially by and through relations and the parts they connect’ (Sørensen, 2009, p. 26).

In defence of her methodology, Sørensen emphasises that her discussions of theory are not designed to create a comprehensive, singular account. Rather, she uses empirical material to process theory, with the intention of making a contribution to both the theoretical and the practical through metaphors, methods and examples. Her hope was that these metaphors, methods and examples would be taken up - whole
or in part - and translated and applied within an ongoing process of exploration (Sørensen, 2007). In the same spirit, this work takes up and carries on this process, both in the doing and in its final presentation.

CONCLUSIONS

In this chapter, I have discussed what it means to ‘do’ ethnography and described how I conducted this ethnography. I have illustrated how my choices are derived from and facilitated by the production of this work, in both thought and action. In adopting Mills and Morton’s (2013) writing virtues of modesty, honesty and analytical insight, along with Ingold’s (2014) understanding of ethnography as a long-term and open-ended commitment that is characterised by attentiveness, relational depth, and sensitivity to context, I have told the story of a particular group of humans and things, and how the material qualities of their things shape the qualities of both their learning environment and their learning activity. Furthermore, drawing on early work in design anthropology (Otto & Smith, 2013), I explain how I hope to make a contribution by extending ‘the temporal horizon both forward and backward’ (p. 4) in order that we may anchor our ‘images of the future in reliable constructions of the past’ (p. 4).

In Chapter 3, which follows, I provide an introduction to both the site and the Activity Centred Analysis and Design (ACAD) framework.
CHAPTER 3
DETAILS OF THE SITE AND THE ACAD FRAMEWORK

NORTHERN BEACHES CHRISTIAN SCHOOL

NBCS is an independent⁴ school on the outskirts of metropolitan Sydney, Australia, that caters for students from pre-school to year twelve. In 1999, the current Principal took on the role of transforming a small (250) local school into what is now a large school (1300) with connections both locally and abroad.

In 2004, supported by an award from a local university, members of the school’s leadership embarked on a number of international study tours to investigate best practice in e-learning. In 2005, an Assistant Principal was appointed and tasked with a single responsibility: ‘To expose, empower, and enable staff to make the most of the technological teaching tools available to them and the students’ (Linfoot, 2006).

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⁴ Australian public (government) schools are funded by State and Territory Governments, and whilst Catholic and Independent schools receive funding for each student, parents are required to supplement fee income. NBCS falls within the independent sector and is a mid-level fee-paying school. Total enrollments in Australian schools are split across the three sectors as follows: State, 67%; Catholic, 20%; and Independent, 12% (Australian Bureau of Statistics, 2006).
Following this, in-house professional development in e-learning was designed for all staff, and those who demonstrated an aptitude for working in this medium were given the freedom and support to develop and implement new programs of their own.

As these new technologies and their associated pedagogies made their way into existing physical structures, staff reported that the environment, as it then was, ‘worked against their best efforts to effect change.’ Further research was carried out in formal and informal learning environments where technology was used to support learning, and in 2007 an integrated collaborative teaching and learning program was launched in a modified learning space called The Global Learning Village (GLV).

Designed to accommodate the students of years seven and eight in a one-to-one PC based environment, the GLV served as a catalyst for change within the school. Planning for a second similar environment began in 2009, and the Zone was officially launched in January of 2011. The Zone had, therefore, been in use for over a year by the time this study commenced in April of 2012. Some of the key developments in the history of NBCS are detailed in Table 6. This context is important as it locates alterations in practice in the Zone, within a programme of sustainable adaptation over time, within the broader NBCS community.

Table 6 - Key developments at NBCS between 1981-2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981</td>
<td>Founded Faith based school established in a local Church hall (38 students).</td>
</tr>
<tr>
<td>1984</td>
<td>Relocated Purpose built school (180 students).</td>
</tr>
<tr>
<td>1999</td>
<td>Current Principal Innovative candidate selected to develop and grow the school (250 students).</td>
</tr>
<tr>
<td>2002</td>
<td>NBCS Portal Work begins on a virtual school.</td>
</tr>
<tr>
<td>2004</td>
<td>1st Macquarie University Fellowship Funding to research and develop an e-learning platform to deliver NSW Board of Studies courses online.</td>
</tr>
<tr>
<td>2005</td>
<td>LEARNnbcs learn.nbcs.nsw.edu.au A Moodle learning management system (LMS) replaces the original site.</td>
</tr>
<tr>
<td>2005</td>
<td>2nd Macquarie Fellowship Funding to study best practice in Europe,</td>
</tr>
</tbody>
</table>
Details of the site and the ACAD framework.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>SCIL (Sydney Centre for Innovation in Learning)</td>
</tr>
<tr>
<td></td>
<td>University Fellowship with a focus on blended and distance models of learning.</td>
</tr>
<tr>
<td>2005</td>
<td>Beyond Borders</td>
</tr>
<tr>
<td></td>
<td>An online environment developed for collaborative second language projects.</td>
</tr>
<tr>
<td>2006</td>
<td>HSC Online</td>
</tr>
<tr>
<td></td>
<td>Hsconline.nsw.edu.au</td>
</tr>
<tr>
<td></td>
<td>NBCS becomes the first school in NSW to offer accredited year 12 courses, online.</td>
</tr>
<tr>
<td>2006</td>
<td>PETE</td>
</tr>
<tr>
<td></td>
<td>Pete.nbsc.nsw.edu.au</td>
</tr>
<tr>
<td></td>
<td>A separate instance of Moodle: Primary education through e-learning.</td>
</tr>
<tr>
<td>2007</td>
<td>School wide ICT rollout complete</td>
</tr>
<tr>
<td></td>
<td>Screen, projector, sound and Internet enabled hard drive in every classroom.</td>
</tr>
<tr>
<td>2007</td>
<td>Real Audience Project</td>
</tr>
<tr>
<td></td>
<td>A virtual space for publishing student work publicly online.</td>
</tr>
<tr>
<td>2008</td>
<td>The Global Learning Village launched</td>
</tr>
<tr>
<td></td>
<td>Remodelled curriculum and learning space for years seven and eight.</td>
</tr>
<tr>
<td>2008</td>
<td>Total enrolments</td>
</tr>
<tr>
<td></td>
<td>1,051 students.</td>
</tr>
<tr>
<td>2009</td>
<td>Virtual Worlds Project</td>
</tr>
<tr>
<td></td>
<td>Two instances of Second Life: one for staff development and the other for students.</td>
</tr>
<tr>
<td>2010</td>
<td>The SCIL Building opened</td>
</tr>
<tr>
<td></td>
<td>A multimodal educational playground designed to facilitate team teaching.</td>
</tr>
<tr>
<td>2010</td>
<td>Quest program launched</td>
</tr>
<tr>
<td></td>
<td>An integrated, online, inquiry-based program for year eight students.</td>
</tr>
<tr>
<td>2010</td>
<td>HSC Online enrolments</td>
</tr>
<tr>
<td></td>
<td>340 students enrolled in 31 courses from 74 school over four years.</td>
</tr>
<tr>
<td>2010</td>
<td>YouTube French</td>
</tr>
<tr>
<td></td>
<td>A programme streamed online via YouTube.</td>
</tr>
<tr>
<td>2010</td>
<td>Stage 3 move into what will become the Zone.</td>
</tr>
<tr>
<td></td>
<td>The team of teachers working in this unrenovated space are integral to the planning process.</td>
</tr>
<tr>
<td>2010</td>
<td>Wi-Fi network</td>
</tr>
<tr>
<td></td>
<td>In place for most of Secondary School.</td>
</tr>
<tr>
<td>2011</td>
<td>The Zone opens</td>
</tr>
<tr>
<td></td>
<td>Refurbished over the summer holiday, the Zone officially opened in January 2011.</td>
</tr>
<tr>
<td>2011</td>
<td>Minecraft replaces Second Life</td>
</tr>
<tr>
<td></td>
<td>A dedicated school server runs multiple environments for in-class projects.</td>
</tr>
<tr>
<td>2011</td>
<td>Community Sports Centre (CSC) opened</td>
</tr>
<tr>
<td></td>
<td>A Building The Education Revolution (BER) project that delivered a sporting facility and an industrial design and IT design studio.</td>
</tr>
<tr>
<td>2011</td>
<td>Wi-Fi expansion</td>
</tr>
<tr>
<td></td>
<td>Substantial upgrades resulting in reliable connectivity for the entire school.</td>
</tr>
</tbody>
</table>
PART 1, INTRODUCTORY TEXT

2011 BYOD All students from year’s five to twelve required to 'Bring Your Own Device.'

2011 Google Apps roll-out For students and staff.

2011 Total enrolments 1221 students.

2011 Internet upgrade Increasing speeds by a factor of 20.

2012 This study April to December of 2012.

2012 Changes to the leadership structure Greatly distributed authority with each member of the senior leadership team responsible for a single priority project.

2012 SCIL immersion days and workshops Held on site and in other schools, based on lessons learned at NBCS thus far.

2012 Visitors to the school SCIL hosts over 700 visitors to the school.

Sourced from online NSW Board of Studies annual reports.

In this thesis, I explore the relations between learning activity and the environment in which it occurs. In CHAPTER 2, I explored the rationale for choosing to conduct this study as ethnography, and I considered the benefits of taking a stance that could be described as design anthropology. As such, my intention is to describe the ebb and flow of learning activity at this particular site, and to make a contribution to future design work through theoretically grounded insights. In order to realise the second of these goals, I have chosen to use the Activity-Centred Analysis and Design (ACAD) framework of Peter Goodyear and Lucila Carvalho (2013, 2014, 2014a), an introduction to which follows.

INTRODUCTION TO THE ACAD FRAMEWORK

The ACAD framework, developed by Goodyear and Carvalho (2014a), addresses the paucity of theory within the field of educational technology research. In situating their work, they make a case for theory that is a) driven by the pragmatic goal of informing design, b) carefully distinguishes between what designers can do and what should be left to others and c) recognizes the need to trace the complex webs of people and artefacts implicated in many contemporary learning situations. The ACAD framework builds on over fifteen years of research (Goodyear,

In addressing issues related to structure, the ACAD framework adopts an architectural orientation committed to collaborating across disciplines to create designs that are coherent across scale levels. This orientation also acknowledges that, whilst architecture is an indirect practice, it is neither arbitrary nor deterministic. Architects design structures anticipating that the final built form will effect how people feel and act within them but they cannot control what use is made of their design. With regards to issues related to learning activity, and the design of learning networks, Goodyear and Carvalho focus on the following key ideas:

1. Analysis should be activity-centred, focused on what people actually do (physically and mentally) when they are learning. For there is neither experience nor learning without activity.

2. Learning is task-centred, therefore tasks play a central role in learning activity. However, tasks are viewed as suggestions of ‘good things to do’ and not prescriptions of what will be done, and students are understood as being more or less compliant, or creative, in interpreting them. Therefore, tasks are resources on which students draw, and not activities in themselves.

3. Activity is understood as situated: ‘it unfolds in ways that are shaped, subtly and powerfully, by the physical/digital tools and resources that come to hand, and by the social arrangements’ (p. 18) through which they are distributed (see Figure 8).
Details of the site and the ACAD framework.

THE ACTIVITY-CENTRED ANALYSIS AND DESIGN FRAMEWORK

![Diagram](image)

**Figure 8 – Learning activity is physically and socially situated**

(Goodyear & Carvalho, 2014a, p. 59)

4. Activity cannot be designed; it is emergent. However, the task, environment and social arrangements through which learning activity eventuates can be designed. Therefore, they form the three central dimensions of the ACAD framework (see Figure 9).

THE ACTIVITY-CENTRED ANALYSIS AND DESIGN FRAMEWORK

![Diagram](image)

**Figure 9 – Identifying that which can be designed**
5. Observation of the setting and social organisation of a learning network entails analysis of activity that is partly designed, and partly created. Therefore, careful attention needs to be paid to participants engaged in acts of co-creation and co-configuration.

In summary, Goodyear and Carvalho (2014a) stipulate that activity-centred analysis and design should consider the ongoing quality of activity, its goal oriented nature, and the manner in which it is shaped by the physical setting, the people amongst whom it plays out, and the social norms of the learning community. Their approach involves careful observation of unfolding activity and the tracing of connections between the dimensions of the framework: the task design (epistemic), the structures of place (set) and the organisational structures (social). They acknowledge this approach is easier to accomplish through analysis than it is when the designed and the emergent entangle at learn time. However, teasing them apart in analysis is necessary in order to inform redesign. Figure 10 helps in addressing this challenge.

**THE ACTIVITY-CENTRED ANALYSIS AND DESIGN FRAMEWORK**

![Diagram](image)

Figure 10 – Tracing relations across dimensions over time

The analytical value of Figure 10 lies in being able to temporarily isolate an instance of learning activity (Learn Time), before tracing
connections, across the three dimensions, both backwards (Design Time) and forwards (Learning Outcomes). The inclusion of two feedback loops assists in tracing 1) lessons learned used to inform future re-design, relevant to the teacher and/or designer (solid line); and 2) short term adjustments made during learning activity by either the teacher or the learner (dotted line). The first is illustrated in Chapter 7 by the identification and presentation of a number of reusable elements of design, and the second can be seen in the analyses of learning activity as presented in Chapter 5. The activity analysed in Chapter 5 includes acts of co-creation and co-configuration, the analysis of which is supported by the inclusion of the dimensions of the framework (set, epistemic and social) in each phase (design time, learn time and learning outcomes). For example, one might trace how epistemic intentions (design time) are helped or hindered by the co-configuration of the set (learn time) and the successful or unsuccessful completion of a collaborative task (learning outcomes).

In what follows, I briefly outline each of the three dimensions of the ACAD framework before using them to introduce the site, within a larger site, in which this study was conducted – namely the Zone.

**Structures of place, or set design**

There are two challenges to designing structures in which learning is expected to eventuate. The first is to get a sense of what constitutes a productive learning space, not merely to name and categorize things, but to get a deep understanding of them. The second pertains to how one might reliably draw connections between the physical context, in question, and emergent learning activity. In addressing the first of these challenges, Goodyear and Carvalho (2014a) call for a broad definition of learning environments, one that accounts for place as nested and diverse: rooms within buildings, computers on desks, and learning resources in the form of PDFs, books, pens and cameras all coming to hand when necessary. Moreover, this broad definition needs to account for the different qualities of what may superficially be considered the same experience: working on a shared
Details of the site and the ACAD framework.

computer in the library and using one’s laptop at home, or highlighting a hard copy of a printed journal article and highlighting an e-print whilst reading on the train.

When it comes to the second of these challenges, they insist that researchers and designers need to be able to do more than say this particular tool works well in this kind of space. Because, if this is all we can offer designers, their choices will continue to be based on preferences for certain styles, or fashions. What is more, as the complexity of the set dimension increases, so too do the number of many-to-many relationships over which the designer has less-and-less control. In response, Goodyear and Carvalho (2014a) do not take a prescriptive stance; rather, they explore ways of thinking about things that help us anticipate heterogeneous connections across time and space, which offer learners increasing degrees of autonomy. In doing so, they rely on the concepts of: affordance, interpretation and legibility.

In considering the notion of affordance, they acknowledge that it is sometimes used in the literature to imply a form of technological determinism that underestimates the human capacity to interpret, innovate and adapt (Oliver, 2013). This is something they wish to avoid, but they make a strong case for using the term because it helps us consider the material qualities of things - which are not irrelevant and their ‘meanings and uses are not infinitely variable’ (Goodyear & Carvalho, 2014a, p. 63). Affordance accounts for the quick, non-reflective quality of how we choose this and not that, when engaged in a particular task. It describes the way in which an object suggests ‘to the perceiver what use it might be to them and how it might be used’ (Carvalho & Goodyear, 2014a, p. 260).

Whilst affordance is used to describe a non-reflective impression of something, interpretation refers to the act of making sense of what one might reasonably do with it. In discussing these differences, Goodyear and Carvalho (2014a) draw on the work of Daniel Kahneman’s Thinking Fast and Thinking Slow (2011), in which a two-systems approach to judgement and choice is presented. System 1 deals with the fast and
often intuitive judgements we make through largely automatic and unconscious processes; and system 2 describes circumstances where slower and more deliberate cognitive systems are at work. Goodyear and Carvalho argue that affordance plays to system 1 (fast) and operates in familiar circumstances. Interpretation maps onto system 2 (slow) and operates in novel or problematic circumstances. The importance of this distinction, for those involved in learning design, is that some aspects of what has been designed will activate system 2 (slow) and others system 1 (fast). Both are important. However, the maximum cognitive load of a task should be concentrated where learning is anticipated, and not on the management of peripheral or ancillary actions or tools.

The last of the three concepts they recruit in mapping the relations between the physical context of learning and emergent learning activity, is *legibility*. Drawn from the literature on architecture and urban design, it describes ‘the quality of a place that enables people to understand its layout’ (Goodyear & Carvalho, 2014a, p. 63). Legibility is present in well-designed structures. It intuitively enables people to make their way through physical and digital space, establishing what is available and finding what they need with relative ease.

**Structures of task, or epistemic design**

Engaging in epistemic design can be understood as helping to structure knowledge-oriented tasks in the light of their potential to influence unfolding learner activity. Task design involves not only decisions about what students will be asked to do but how they will do it. Goodyear and Carvalho (2014a) note that the teacher-as-designer is required to make numerous design decisions. Starting with initial research, planning, and conceptualisation of a task, they must then mentally check their ideas against anticipated responses from learners. There are choices to be made about how to communicate the sequence and pacing, and what constitutes an appropriate expression of new forms of knowledge. Moreover, this design work does not happen in isolation. There are numerous stakeholders to consider, each with
different interests, goals, pedagogical intentions, knowledge practices and preferred forms of knowledge-oriented structures.

Knowing that there are certain elements that are open to design is one thing. Knowing how to shape them in ways that will implicitly and explicitly influence learner activity in productive ways, is quite another. To accommodate this challenge, Goodyear and Carvalho (2014a) suggest that the ACAD framework should be used iteratively to trace and analyse the connections between knowledge-oriented elements of a design and learner activity, in order to refine learning networks that reflect valued epistemic practices.

**Structures of organisation, or social design**

When designing a task, designers can make recommendations about the type and nature of roles required or divisions of labour, and different modes of collaboration. When designing a learning environment, designers can work to accommodate this variety within the built environment. Both aspects are open to alteration through design and underscore the fact that learning is socially situated. There is, however, another level at which learning activity is socially situated, which relates to the fact that all activity, learning or otherwise, is shaped by the culture in which it plays out. At this level activity is often shaped by its cultural antecedents and design for learning, which aims to influence learning culture, is a far more nuanced and complex task. This being so, an awareness of how different cultural contexts shape one’s design is important, if not essential, for good design.

**Bringing it all together**

The three dimensions of the ACAD framework are useful reminders of what can be designed, and how the outcomes of the designer’s work may influence what learners actually do (Goodyear & Carvalho, 2014a). Interesting things happen in well-supplied environments. However, one is not often analysing the qualities of a tool (set) in the absence of an appreciation of learning outcomes (epistemic)
or the people using them and their assorted skills, preferences and experience (social). What is more, when analysing complex learning networks, it should be remembered that interactions have influence and act at multiple scale levels. Some tools may be common across the whole network or be used by only a few in specific locations, and ways of knowing may vary locally or be shared by everyone. Moreover, actions may have unintended consequences that may or may not be registered across scale levels.

Table 7 presents a simple tool that I use in the analysis of learning activity. The upper horizontal section makes reference to levels of scale from early work on pedagogical frameworks (Goodyear, 1999). The lower horizontal section differentiates between those things which are open to designed-in-advance and those that fall within the scope of designed-in-the-doing (see Figure 10). Both are vertically divided into the three dimensions of the ACAD framework (set, epistemic and social design).

Table 7 - ACAD tool

<table>
<thead>
<tr>
<th>SET DESIGN</th>
<th>EPISTEMIC DESIGN</th>
<th>SOCIAL DESIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tools</td>
<td>Task</td>
<td>People</td>
</tr>
<tr>
<td>Philosophy</td>
<td>Learning is physically situated</td>
<td>Learning is supported through knowledge oriented activity</td>
</tr>
<tr>
<td>High-level form</td>
<td>Allocation and use of space &amp; place</td>
<td>Pedagogical intention of stakeholders</td>
</tr>
<tr>
<td>Mid-level form</td>
<td>Buildings &amp; technology</td>
<td>Task (something worth doing)</td>
</tr>
<tr>
<td>Operational strategy and tactics</td>
<td>Artifacts, tools, texts</td>
<td>Selection, sequence &amp; pace</td>
</tr>
</tbody>
</table>

*Design-in-advance*

*Design-in-the-doing*

I like to work with both the dimensions (set, epistemic and social) and the levels of scale clearly visible in order to temporarily tease things apart in analysis. This is important for tracing both intended and
unintended outcomes of a particular design (Giddens, 1986). When it comes to (re)design work, having these distinctions well-defined is useful because it ensures that one is clear about which level one is working at, and at what level one has the power to make changes. Using this tool enables a narrow focus on one dimension of the framework, whilst remaining aware of the others. Table 8 provides an example of a mid-level analysis of the built environment and the associated epistemic and social considerations.

Table 8 - ACAD tool in use

<table>
<thead>
<tr>
<th>SET DESIGN</th>
<th>EPISTEMIC DESIGN</th>
<th>SOCIAL DESIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophy</td>
<td>Learning is physically situated</td>
<td>Learning is socially situated</td>
</tr>
<tr>
<td>High-level form</td>
<td>Allocation and use of space &amp; place</td>
<td>Pedagogical intention of stakeholders</td>
</tr>
<tr>
<td>Mid-level form</td>
<td>Buildings &amp; technology</td>
<td>Task (something worth doing)</td>
</tr>
<tr>
<td>Operational strategy and tactics</td>
<td>Artifacts, tools, texts</td>
<td>Selection, sequence &amp; pace</td>
</tr>
<tr>
<td>Design-in-advance</td>
<td>Architecture</td>
<td>Project-based learning</td>
</tr>
<tr>
<td>Design-in-the-doing</td>
<td>Arrangement of furniture and tools</td>
<td>Focus on process and not on product</td>
</tr>
</tbody>
</table>

In Chapter 4 I use this tool to demonstrate the nested operational level considerations at play when analysing the material qualities of tools in use, and in Chapter 5 I explore the importance of coherence across both dimensions and scale levels through a detailed analysis of learning activity. Because,

It is when the set, epistemic and social design elements come together to form distinctive structures that a clearer insight is gained into the relations between form and function (Carvalho & Goodyear, 2014a, p. 260).
INTRODUCTION TO THE SITE USING THE ACAD FRAMEWORK

From its inception, the Zone was designed to facilitate the delivery of a mobile digital curriculum geared towards independent learning, in a refurbished environment, for the students of Stage 3 (years five and six). The first team of teachers to work in the Zone moved in a year before any building works were carried out. During this time, they were active participants in developing a new style of digitally enabled team teaching and the space that would accommodate it. Whilst this opportunity was unusual, it was offered within a context in which all teachers were encouraged to reflect on their current teaching practice, participate in research based innovation, and contribute to both physical and digital personal learning networks.

THE SET DESIGN OF THE ZONE

THE PHYSICAL ENVIRONMENT. The Zone was a refurbishment of what had been the primary school library and a number of smaller classrooms that had formed the base of an adjacent block. Connected by a series of broad carpeted stairs, the Zone spread out over two levels in one uninterrupted volume with the exception of a small glass-walled staff room, a soundproof recording room, and an art supply cupboard (see Figures 11 & 12). The lower rectangular section was fitted with two sets of retractable glass doors which, when drawn, created two smaller spaces on either side of the central section that was continuous with the stairs and upper section.

CONCEPT DESIGN BY BVN ARCHITECTURE, SYDNEY, 2010

Figure 11 - Cross-section of the Zone
At the start of each year, the students in year five were allocated home bases in the lower section, as they offered a slightly less unbounded physical space in which the newcomers could learn the skills necessary for working in this digitally extended environment. After six months they were moved upstairs. The rationale for this annual rotation in home bases was two fold: it gave the year five students a chance to practice their newfound skills, and it prevented their teachers from ‘reverting back to four-walled-teaching.’ A discussion relating to the structural affordances of the Zone can be found in Chapter 6, and the details of the annual rotation in home bases is the subject of Vignette 2.

Figures 13 and 14 illustrate two possible configurations the refurbishment was designed to accommodate (where images are angled they have been rotated so that the upper section is consistently presented on the left). These drawings are a simple manifestation of an architectural design that reflects epistemic intention, which values multiple ways of being, doing and knowing. The aim of this thesis is to trace how these intentions were interpreted, translated and transformed in and through learning activity.
Details of the site and the ACAD framework.

In furnishing the Zone, careful attention was given to providing sufficient and appropriate workstations for all, without this translating into the same for all concurrently. This meant that each area was furnished with different types of activity in mind and, whilst each functioned as the home base for one of the six home classes, this did not confer ownership or exclusive rights of use to this particular group. Use of space was determined by the size of the learning whole (1, 5, 15, 30, 40, 90 or 181) and activity type. A number of the physical attributes and
furnishings of the Zone are considered in detail in Chapter 4, and in Vignettes 4, 6, 8 and 9 learning activity - as it relates to the physical attributes of this learning environment - is carefully described.

Figure 15 recreates the spatial configurations of learning activity during the learning session in which Vignette 9 took place. Each of the six home bases is labelled and the following nomenclature is used throughout when locating learning activity in the Zone: UL (a), UL (b), UC, UR, LL, LC and LR. Figure 15 was assembled using a template created by Mie Guldaek-Broens of Loop.bz, Denmark Zone.

THE ZONE AS OBSERVED IN USE IN 2012

![Figure 15 - Floor plan of the Zone](image)

The structural differences between the original drawings by BVN Architecture (Figures 11-14) and the implementation (Figure 15)
included the omission of the orange detailing and the caboose structure, and the enclosure of the robotics and recording room.

Table 9 provides a list of furnishings and tools, available for use during 2012. It has been ordered to illustrate the manner in which certain materials were repurposed for multiple functions, the most notable of which was the enrolment of walls, windows and stainless steel tables as writing surfaces.

Table 9 - Physical tools and their functions

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>PHYSICAL TOOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work surface, seating, storage &amp; other</td>
<td>Low tables and assorted ottomans.</td>
</tr>
<tr>
<td>Work surface, seating &amp; other</td>
<td>Carpeted floor and stairs, desk chairs and studio chairs.</td>
</tr>
<tr>
<td>Work surface, storage &amp; other</td>
<td>Writable: walls, glass windows, glass doors, large whiteboards, A5 whiteboard and storage cupboards. Student's personal digital devices.</td>
</tr>
<tr>
<td>Work surface &amp; seating</td>
<td>Concrete floor.</td>
</tr>
<tr>
<td>Work surface &amp; storage</td>
<td>Tables (standard &amp; high), teacher caddies and student workbooks.</td>
</tr>
<tr>
<td>Work surface &amp; other</td>
<td>Laptop supports and large screen TVs.</td>
</tr>
<tr>
<td>Seating &amp; other</td>
<td>Upholstered sofas and bean bags.</td>
</tr>
<tr>
<td>Storage &amp; other</td>
<td>Laptop cages, shelving with boxes and digital cameras.</td>
</tr>
<tr>
<td>Work surface</td>
<td>Whiteboard markers, personal stationary and loose leaf paper.</td>
</tr>
<tr>
<td>Storage</td>
<td>Art supply cupboard, paper recycling bins and school bag hooks outside.</td>
</tr>
<tr>
<td>Other</td>
<td>Shared printer and general waste bins.</td>
</tr>
</tbody>
</table>

The digital environment. The Zone’s digital learning environment was housed in a Moodle learning management system called PETE (Primary Education Through E-learning). All students were required to provide their own personal digital device (PDD). Maintenance and the basic skills associated with using PDDs remained the responsibility of students and their parents. The school took responsibility for providing Wi-Fi connectivity for up to three devices per student, online learning environments, and shared printing capabilities. Table 10 lists a number of self-selected software applications, observed in use, during 2012.
Table 10 - Digital functions and associated applications

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>DIGITAL APPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet browser</td>
<td>Safari, Explorer and Firefox.</td>
</tr>
<tr>
<td>Text editor</td>
<td>MS Word, Excel &amp; PowerPoint; Pages, Numbers &amp; Keynote; and Google documents.</td>
</tr>
<tr>
<td>Design</td>
<td>GoogleSketchup and Minecraft.</td>
</tr>
<tr>
<td>Video recording</td>
<td>iMovie and Windows movie maker.</td>
</tr>
<tr>
<td>Voice recording</td>
<td>Assorted applications.</td>
</tr>
<tr>
<td>Camera</td>
<td>Photobooth.</td>
</tr>
<tr>
<td>Image processing</td>
<td>iMovie, Photoshop and Pixilmator.</td>
</tr>
<tr>
<td>Reference apps</td>
<td>Google Maps, Google Earth and Google Body.</td>
</tr>
<tr>
<td>Content distribution</td>
<td>YouTube, Vimeo and Edmodo.</td>
</tr>
<tr>
<td>Organization</td>
<td>Google calendar, iCal, Google documents, Evernote and Edmodo.</td>
</tr>
<tr>
<td>Video Communication</td>
<td>Skype and FaceTime.</td>
</tr>
<tr>
<td>Text Communication</td>
<td>Google mail and documents, Skype and Edmodo.</td>
</tr>
<tr>
<td>Mirror</td>
<td>Photobooth, FaceTime.</td>
</tr>
<tr>
<td>Light box</td>
<td>Images and black-line masters.</td>
</tr>
<tr>
<td>Calculator</td>
<td>Assorted applications and Excel.</td>
</tr>
<tr>
<td>Compass</td>
<td>Assorted applications.</td>
</tr>
</tbody>
</table>

The students in the Zone accessed their online learning environment, PETE, through the screen illustrated in Figure 16.

![Student login to PETE, 2012](image)

**Figure 16 – Student login to PETE, 2012**

The central portion of the student home page on PETE contained two clusters of buttons: OUR CLASS PAGES - Year by year navigation and general resources, and SPECIAL AREAS - Chinese, Leadership, Italian, Sport selections, Music, the SCIL virtual classroom, Choir and Parenting (Figure 16).
A vertical bar to the right housed a CALENDAR on which school events appeared; a Bible verse for the day; and links to the online school radio station, the local public library, and the NSW Premier’s Reading Challenge website. A drop down list on the left gave students access to MY COURSES, but most activity started with students selecting their CLASS BUTTON, which, in the case of the students in this study, bore the same name as their physical space.

Having selected THE ZONE, students were presented with four colourful buttons labelled ZONE TERM: 1B, 2B, 3B, AND 4B (see Figure 17), and a rectangular button labelled PARENT NEWS. The letter B indicated that 2012 was the second year of a two-year cycle for themed project work, within the two-year stage.

Figure 17 – Term-by-Term navigation of PETE

On selecting the appropriate TERM, students were presented with another three large buttons: LITERACY, NUMERACY and MATRIX; three smaller buttons offering associated EXTRAS; and a hyperlink to the TERM 3 STUDENT HOMEPAGE (an alternate means of navigation). To the right was a link to MATHLETICS, an external online maths tutor, and the moment described in VIGNETTE 6 describes an in-class instance of its use. On selecting either LITERACY or NUMERACY, students accessed tasks by WEEK in any given term (see Figure 18).
The remainder of their curriculum was housed within a structure called the MATRIX (see Figure 19), a thematic unit of work constructed to meet curriculum requirements that offered students some choice in how they would meet those requirements. Tasks were arranged by multiple-intelligence (people, logic, body, music, spirit, picture, self, word or nature smart) along the horizontal axis, and by Bloom’s taxonomy (remember, understand, apply, analyse, evaluate and create) along the vertical axis. Each task was given a maximum number of points, which reflected its degree of difficulty, and all students were required to set a target for the term.

![Figure 19 - A section of the Matrix in its original MS Word format](image)

Each coloured cell was linked to a TASK CARD (see Figure 20) in which the aim, steps and resources required to complete the task were laid out; many contained hyperlinks to websites, templates and tools.
During the course of 2012, the availability of applications like EdCanvas and the nature of the task card, as discussed in Chapter 4, facilitated a move from MS Word documents with hyperlinks to image based portfolios of projects, over time. Completed tasks were uploaded via a link on the MATRIX TASK PAGE, and those that included physical elements were photographed, rendering them digital. A description of this process can be found in the activity described in Vignette 9, which is analysed in Chapter 5.

**Figure 20 - Part of a task card**

**Figure 21 - Teacher moderated Edmodo group for numeracy homework**

EDMODO was the final piece of the Zone’s digital learning environment (see Figure 21). Modelled on Facebook, it combined a forum for collaborative group exchanges with a basic but robust task tracking system, and it facilitated asynchronous conversational links between learners and teachers across the spaces in which they worked. Groups were hosted and moderated by home, numeracy or literacy

**I spy with my little eye….**

**UNDERSTAND**  

**Goal of Task:**

To understand the history of communication and make informed predictions about what lies ahead.

**Things needed to complete task:**

- A partner
- Your History of Communication Timeline
- Digital mind mapping software (Portal)
- Laptop and internet connection

**Steps:** (in order they should be completed in order to produce a ‘quality matrix task’)

1. Study your timeline of the history of communication (compulsory task). Note how rapidly the changes of recent decades have happened, and then make a list of all the new technologies in communication that you have learnt to use in the 3 years. This may be chat programmes, programs to present work, new ways of saving work etc.

2. In your group of two, watch the clips uploaded to the Portal which show details of how technology might develop in the future. You can choose which ones you watch.

3. Using the Digital Mindmap program provided, produce a mind map with your original ideas about how we will be communicating in the future. Remember there is no right or wrong answer but you can let your creative juices flow! Who knows... you may even be able to invent something!

4. Upload for marking both your list of technologies you've learnt to use, together with your mindmap (and marking rubric), full bibliography for marking.

**Bibliography:**

MindMap maker: https://bubbl.us/ (accessed 26th June, 2012)

‘A Day made of Glass 2D’ (YouTube clip): http://www.youtube.com/watch?v=Sc8lzavmXOk (accessed 26th June, 2012)

‘Did you Know?’ (YouTube clip): http://www.youtube.com/watch?v=cL9Wu2kWwSY (accessed 26th June, 2012)

The Future of Communication (YouTube clip): http://www.youtube.com/watch?v=iu0ztxdsFis (accessed 26th June, 2012)

‘100 Years of Fantastic Technology Predictions’ (YouTube clip): http://www.youtube.com/watch?v=QaDLEgcPc8k (accessed 26th June, 2012)

group teachers. Some groups were used to share resources and ask questions, while others were used to manage student progress through weekly pre-learners (homework viewing content in advance of its presentation in class) and project work. Parents were invited into this space as observers. On signing up, they gained access to a personalised dashboard, which displayed updates of their child’s online activity including notification of assignments set, work submitted, grades received, and contributions to class discussion boards. A detailed description of how this system was used by one group can be found in Vignette 7.

THE EPISTEMIC DESIGN OF THE ZONE

ALLOCATIONS OF TIME FOR LEARNING. The Australian school year starts in late January, and is divided into four terms of between nine and eleven weeks. At NBCS the school day is divided into four learning sessions and a great deal of thought went into renaming these allocations of time. Class was considered too passive, and period conveyed a sense of learning that happened in discrete units that came to an end, a notion they actively wanted to avoid. Having settled on learning session, the new name was adopted and maintained with ease, and the shape of the day for students is illustrated in Table 11.

Table 11 - Daily allocations of time

<table>
<thead>
<tr>
<th>Learning session 1</th>
<th>08.50 am</th>
<th>10.00 am</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning session 2</td>
<td>10.20 am</td>
<td>11.30 am</td>
</tr>
<tr>
<td>Learning session 3</td>
<td>11.50 am</td>
<td>01.10 pm</td>
</tr>
<tr>
<td>Learning session 4</td>
<td>02.00 pm</td>
<td>03.05 pm</td>
</tr>
</tbody>
</table>

Days in the Zone were loosely shaped, with literacy and numeracy in the first two 75-minute learning sessions, and Matrix (project based work) in the last. The third learning session accommodated sports, music, languages and assemblies; or additional literacy, numeracy or project work, as needed. Students were flexibly streamed across the two-year stage, and were allocated to teachers based on learning style, interest and skill. The flexibility of this
arrangement resulted in a qualitatively different engagement with tasks, and the freedom to alter pace, depth and content depending on either an individual student’s or group’s progress. **Vignettes 1, 8 and 9** are particularly good examples of this style of teaching.

Learning sessions that included direct teaching were designed to be managed within 75 minutes, and their ends were natural pauses rather than terminations. Where natural ends fell before the end of a learning session, staff would gather their students for reflection, general administration, or to prepare for the following learning session. And sometimes, if the weather was good, they would go outside to enjoy a game or an early recess. The absence of auditory markers signalling ends, combined with the generous allocation of time for work, placed the focus on learning as a progression, rather than the issuing and receiving of facts within discrete units of time. Students engaged in independent work often had to be cajoled into leaving their work – unfinished for now - to have a snack and visit the ablutions before returning. During the course of the year, the rules about using a water bottle or eating a piece of fruit while working were relaxed for those who were absorbed in their work and had missed one of the shorter recesses - but going out for lunch remained compulsory for all.

These generous divisions of time, and the absence of end-marked-by-bells gave the day a measured pace. In all my time in the Zone, it was the ends and not the beginnings that passed unnoticed. On one particular Friday afternoon, I watched a group of year six students working with great industry, despite the absence of their teacher who had been called away. Neither they, nor I, noticed the passing of time, or the fact that everyone else had left. It was 3.15 pm before another teacher brought their week to a close, by which time some had missed their bus home.

**Use of themes and framing stories.** Themes were used to organise work across the term, giving cohesion to learning over time. This was neither new nor remarkable considering the age of these students. What was unusual was how they used framing stories, revealed
during immersion days at the beginning of each term, to introduce a theme and stimulate discussion through shared experience; and how these experiences were used to inspire future work, or highlight problems that required a mathematical or scientific solution. Immersion days were challenging, designed to make the students think and feel. For the first immersion day of 2012, students were assigned to groups and tasked with solving a number of collaborative tasks, with only limited assistance. Their teachers, housed in an adjacent classroom, kept track of their progress and communicated via written clues, hidden QR codes, and intermittent real-time audio feedback using the PA system and a live Twitter feed. One of the teachers described the day as having ‘Set in motion the creation of the DNA we require to live and learn in ... the Zone.’

The theme for Term 2 was sustainability and it was introduced during a day of hands-on activities with staff from the CSIRO (The Commonwealth Scientific and Industrial Research Organisation). Following this, students spent the term working on individual Passion Projects, supported by a d-school (http://dschool.stanford.edu) inspired framework housed within their online matrix. Each student was required to select, prototype and build something that was either made from recycled materials or demonstrated a sustainable technology.

Term 3 was given its shape by the question ‘Who am I?’ which was the starting point for a largely text-based exploration of identity. The blue-eyed, brown-eyed simulation was chosen to give the students a very real experience of discrimination. Two years earlier, the teachers had used video footage of the original experiment to stimulate in-class discussion about discrimination. Many of that particular cohort had expressed a strong desire to have been participants, rather than observers at a distance. In response, the teaching team elected to run the experiment as an immersive simulation in 2012. There was much debate, both before and after, about the degree of surprise necessary for the students to have benefited from this exercise and Vignette 3 describes the day in detail.
Details of the site and the ACAD framework.

In Term 4, all work contributed to a small business simulation in which the students used the d-school design process to select, prototype and make products to be sold at a Christmas market. All funds raised were allocated by individual students to one of four mission projects supported by the school in Uganda, Rwanda, Cambodia and Moree (NSW, Australia). Many of the teachers and older students at NBCS have spent time working in the schools, clinics and orphanages at these sites, and in an attempt to give the younger students a feel for a very different life, an educator from World Vision was brought in to run a simulation with them. This particular simulation involved communities competing for scarce resources, purchased with the proceeds from the sale of packets made from recycled newsprint.

Some themes were largely narrative and formed the inspiration for the production of a major work. Some provided the context within which the students were free to design a product or model a candidate solution to a problem. Once complete, these artefacts were presented at an exhibition or sold at a market that was open to the wider school community. Immersion experiences were deliberately designed to illicit strong emotions, confront misconceptions, or give students a deep sense of being other. Implicit in the epistemic design of the Zone was a deep conviction that learning was social, situated, and embodied, best accomplished through meaningful activity in an environment where failure and misadventure were seen not as end points, but as opportunities for further learning.

Images and videos capturing the details of immersion days, the projects they launched, work in progress and final exhibitions can be found in the VISUAL TIME LINE.

Connections across time and space. All students enjoyed access to the Internet at school on up to three mobile devices via a firewall configured to restrict access to inappropriate sites. By controlling inappropriate access, rather than granting access to pre-approved sites, the school maintained an open but responsible stance on the use of the Internet at school. Guidance about the appropriate
selection of sources and the re-use of content was given both formally and informally, and a decidedly relational stance was taken to online etiquette. As a rule, what worked in person was seen as the de facto standard for all online activity. A moment of explicit teaching about online presence can be found in Vignette 5.

Students were often required to post completed tasks online and to comment on each other’s work in online fora. This instilled in them a very real sense of being both producers and consumers of content. Moments of insight and poor choices in the use and framing of content were used to teach students about the reliability of sources and the need for correctly attributing ideas and information. On more than one occasion, I found myself listening in on discussions about how access to information and digital tools was changing the nature of doing work, the point at which repurposing someone else’s work becomes legitimate synthesis rather than outright copying, and the value of both seen and unseen work in digital collaborations.

**The Social Design of the Zone**

The community of students in the Zone was divided into three home classes per year for years five and six. Each group of approximately thirty students was allocated to a home class teacher and the seventh member of staff was tasked with oversight of the whole. Home classes gathered at the beginning and end of every day and did project work, sports and music together. At all other times it was hard to identify particular groups of working students, either by their location or their proximity to a particular teacher. Literacy and numeracy were taught in groups of varying sizes (10, 50 and 120 or 15, 45, 85 and 35) before students dispersed to work independently, or in small groups. Most students had at least one other teacher for numeracy or literacy, and this fostered the development of supportive learning relationships between the staff and students during the two years spent together in the Zone. Examples of social interaction characteristic of the Zone can be found in Vignettes 1, 3, 5 and 10.
Work in the Zone was often collaborative by design and, even when it was not officially referred to as such, varying degrees of collaboration were frequently evident. Teachers offered direct instruction and role modelling of effective strategies for working in teams, in person, and in moderating online class environments. Discussion threads were largely administrative or organisational, but social in nature, and connected work at school with work at home and vice versa. Parents were encouraged to access a customized view of their child’s Edmodo dashboard, which provided information about set, submitted and assessed work and gave a view of their child's contributions to online discussions. A rich description of the crossover of in person and online social interaction in the Zone can be found in Vignette 6.

As a faith based school, the teachers and many of the students shared a common point of reference, valuing both community and the individual’s place within it. The school’s motto Excellence in Education and Christianity in Action was often discussed with reference to how and why activity and actions were framed in the way that they were. Learning from past mistakes and ‘having a go’ were encouraged and, when pressed for ‘the general rules of the Zone’, one teacher described them to me as follows: ‘Respect the learning, respect the people and respect the space.’

The role and use of social media in learning. Rules about the use of social media by those in primary school were very simple; minimum age limits as defined by the sites themselves were to be adhered to. At least once a year, a firm but conversational note appeared in the weekly online school newsletter reminding parents that they were expected to be aware of and monitor their children's online activity, and that any student with an illegal online presence would be asked to close their account. This expectation was framed against the backdrop of social media being an extension of the playground, and that students under the age of thirteen did not have the requisite social skills to navigate these environments unsupervised. In conversations with students, the rationale for this stance was relationally framed as follows:
at school the teachers were responsible for ensuring the wellbeing of all students; and students leaving school at the end of the day, in school uniform, were to remember that they continued to represent the school. Misbehaviour outside of school, in school uniform, would be dealt with in the same way as it was dealt with at school.

This extension of the ‘playground rule’ translated almost directly into online spaces on the grounds that students interacted with classmates in school groups, and often identified themselves directly and indirectly as students of the school. What differentiated misbehaviour out of school in uniform, and out of school online, was that the consequences of online indiscretions persisted in a way that brought them into the classroom in very real ways. The result was that teachers were often called upon to manage the in-school consequences of synchronous and asynchronous antisocial online behaviour. The message the students were given was very clear: freedom and responsibility were two sides of the same coin, and an individual’s rights to online freedom were to be weighed against their responsibility to consider the effects of their actions on others.

The blurring of boundaries between in and out of school, and online and in-person activity were slightly easier for the teachers and parents of the under thirteens to navigate in school mediated environments such as PETE or Edmodo, than in any number of other online social media platforms such as Facebook and Skype. The time and social complexities involved in learning to successfully navigate online learning environments should not be underestimated, and the following thought experience, grounded in reality, should help illustrate the magnitude of the task.

Consider a group of ten and eleven year olds working on a task that involves creating an imaginary world, complete with unique flora and fauna, government, transport, security and healthcare. Some of the time the students are face-to-face and work synchronously, and sometimes they work asynchronously from home or in different locations at school. Imagine you are one of the students in this group and
you have a rich imagination, a head full of interesting ideas, which you transpose into the written form in a shared Google document. Returning to the document, a little later, you find that your ideas have been altered in ways that you feel do not honour your imaginings. Next, suppose you are a member of the group who is having difficulty getting started. Conscious that your time for making a contribution to this collaborative task is running out, this shared space may well appear to be the ideal place to start, because working with what is already there is so much easier than starting from scratch. Finally, imagine you are the teacher or parent who has to deal with the fallout of both in person and online recriminations. It is your job to teach these young people how to work with others, to illustrate what is and is not respectful and why, and to highlight that everything they commit to text persists without context, tone or facial expressions.

Where unkind or inappropriate email interactions occurred between students in the Zone they, their parents, and the teachers carefully navigated apologies and reprimands with a light touch. Where a student sent inappropriate messages from another student’s email account, or managed to create fictitious accounts from which they emailed others, the whole group was addressed and left with no doubt that it was possible to trace inappropriate activity on school servers. The way these interactions were managed in the Zone was instructive, for they were characterised by an acknowledgment of the contingent messiness inherent in navigating online social networks, and a firm but gentle willingness to reach a fair resolution.

In contrast, older students were actively encouraged to use social media and their parents were invited to attend seminars exploring the role of social media in the life of teens. Speaking to those who had witnessed the early forays of teens at NBCS into social media quickly brought to the surface the role teachers had been required to play in managing the in-school fallout of uninhibited online postings out of school. This highlighted the inherent tensions of being a school at the cutting edge - in terms of using social media for teaching and learning – and its sometimes darker, more personal consequences. It was therefore
Details of the site and the ACAD framework.

instructive to hear how teachers in the senior school had navigated this very real downside, and for the most part their success lay in the fact that they kept it simple. Against this background of fair but firm management, it was fascinating to see the staff in the Zone talking to their students about appropriate online behaviour, and Vignette 5 describes the details of students engaged in a task exploring identity in the form of an imaginary Facebook profile.

For many, all this complexity is sufficient to justify a hasty retreat into learning environments where this type of social interaction is not possible. Words that are spoken dissolve, leaving hurt feelings but no digital trace. My work is my work - and you are welcome to your work. But, if we are to embrace the possibilities offered by networked learning, we need to find ways of teaching that thrive in the open, where this type of daily misadventure becomes the starting point for tomorrow’s learning; and where lessons learnt at school stand the learner in good stead for a life lived in all manner of synchronous and asynchronous public spaces.

CONCLUSIONS

The purpose of this chapter has been to describe the shape of the Zone, and I have chosen to do so using the ACAD framework because it offers a theoretically grounded means of exploring the relations between learning activity and the structures within which it eventuates. What is more, the use of the ACAD framework connects observations conducted at this site to broader questions in the literature about the role and nature of technology, tools and space in learning.

It was fitting to introduce the site and the framework in tandem because it is important to have a clear understanding of the design of each of the three dimensions of the Zone, if one is to understand quite how remarkable their combined effect has been on teaching and learning activity in this place. Stripped of the need to house and manage individual copies of each textbook, workbook, test, assignment and bit of homework, this paper-light and not paper-less environment has evolved
as a second tier consequence of a desire to build a collaborative, connected curriculum. For, these physical spaces, now ‘empty,’ are home to mobile, autonomous learners who shape and fill what might appear to be a barely tamed anarchy and, but for the underlying digital infrastructure, it may well have been.

References to the ACAD framework are made throughout this work and the value of coherence across the three dimensions (social, set, and epistemic) is explored in detail in Chapter 5.

At this point, you may read either the theoretical exposition (Chapters 4 to 7), which follows, or the vignettes housed in Part 2. If the second option is your preference, there may be instances where a careful re-reading of a vignette is necessary in order to engage with the detailed analysis of a particular moment of learning activity when reading Chapters 4 to 7. The sketch presented in Navigating This Thesis illustrates both options clearly.
CHAPTER 4

PROPERTIES OF MATERIALS IN PROCESSES OF FLOW

Figure 22 - A wall with structural, social and educational properties

In exploring the recursive relations between learning activity and learning environment, I have chosen to start with materials in use. This choice is motivated by theoretical considerations reflecting a broader philosophical inquiry into the nature of being, or becoming (Capra & Luisi 2014; Ingold 2011; Alexander 2004); and practical considerations about making sense of what learners in complex open and computer mediated learning environments actually do. As such, it is a practical solution to the methodological problems raised by what has only recently been acknowledged to be a silence on materials in the literature across disciplines (Brown, 2001; Clark, 2010b; Clarke & Mcphie, 2014; Coole & Frost, 2010; Coole, 2013; Dudley, 2010; Hodder, 2012; Ingold, 2011; Knappett, 2007; Malafouris, 2013; Miller, 2005) and in educational research more specifically (Burke, 2010b; Clarke & Mcphie, 2014; Fenwick et al., 2011; Goodyear & Carvalho, 2014b; Oliver, 2013; Sørensen, 2009).

In this chapter, I explore the material properties and qualities of things and the constructs of materiality and material ecology. The
progression, therefore, is from things for learning, to abstract notions of things for learning, to a systemic notion of situated learning in which the qualities of things are both considered and accounted for in the processes of coming to know. The second part of this chapter consists of four case studies and a short photographic essay. In the case studies, I look at the qualities and properties of writable walls, various floors, a single red ottoman, and the ubiquitous task card. In the photographic essay, a number of images, illustrating how students participate in acts of co-creation and co-configuration, are presented.

**THE MATERIALS OF LEARNING**

Looking through the images returned by my Google search of 'classrooms' going back over 100 years, I was struck by how little had changed in the material composition of environments for school-based learning. Pencils, pens and paper; chalk and chalkboards; and tables and chairs could be found the world over. Housed in single classrooms, the domain of individual teachers with students’ desks, chairs, bodies and faces uniformly oriented towards the teacher at 'the front.' Each assemblage is so strikingly familiar in its sameness and appears with such regularity, regardless of cultural context, as to render them all but invisible. New technologies can be seen making their way into these spaces, used in parallel with old technologies, without substantially altering teaching and learning practices. As learning theories moved from models of transmission to increasingly constructivist approaches, advertising for computing technologies and their newly re-imagined environs project learners into environments where 'anything is possible', given the presence of connectivity and computing. ⁵

Reflecting on the story these images tell, it seems that the things of learning have made their way into our thinking as instruments of change, unquestioningly morphing from 'invisible objects' to 'totems of change', endowed with agency that at times appears to place them beyond our immediate control. As such, our narratives of the past, our

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⁵ [https://www.youtube.com/watch?v=BYMd-7Ng9Y8](https://www.youtube.com/watch?v=BYMd-7Ng9Y8)
Properties of materials in processes of flow

understanding of the present, and our expectations of the future are all equally impoverished by how we think about things. Researchers, administrators and teachers disillusioned with the scale of resources poured into these ‘instruments of educational reform’ have been quick to ascribe failure to the objects themselves, a lack of training and a failure in policy (Baker, Bernard, & Dumez-Féro, 2012; Kennedy, 2010; Mueller, Wood, Willoughby, Ross, & Specht, 2008; Selwyn, 2015; Weston, 2005). I argue that our failure to understand the physical constitution of our learning environments, and our superficial engagement with novelty, has kept us from carefully considering how our thinking about learning should shape our thinking about things. Steeped within a culture of objectification and consumption, and struggling to throw off the shackles of ‘education for the masses’ via the transmission of readymade knowledge, we fail to notice the many and varied things before us and how they are caught up, cast aside or carried along in learning activity. Moreover, the questions that are asked are largely motivated by considerations of cost, standardization and scale – not learning. I do not suggest that these are insignificant questions. Rather, they should not be the first questions we ask, because they do not help us make wise choices about where to concentrate our investment in learning.

When we focus on learning, we find an endless list of nuanced questions for which we have very few satisfying answers. How does visibility across a learning space affect participation, engagement, persistence, creative problem solving and collaboration? How do the material qualities of a writing surface alter the process of solving a problem on one’s own or in the company of others? How do access to mobile technology, flexible floor plans, and the joint ownership of resources alter observable learning activity? And how do teachers effectively communicate productive pathways through a rich and complex learning landscape, without diminishing autonomy or overwhelming the learner?

The underlying question is – how do the qualities of materials participate in teaching and learning activity? The purpose of this chapter is to learn to see, not just things or objects, but the material qualities of
things caught up in learning activity or the production of knowledge. To this end, I discuss theories of materiality with reference to **Vignette 4**, and the material ecology of learning with reference to **Vignette 7**. Thereafter, I present four case studies of materials whose qualities shaped learning activity in the Zone in subtle but significant ways.

The activity analysed, in what follows, is an extract from **Vignette 4**, it can be found on page 308 of **Part 2**, and the initial word of the first paragraph of the sequence is highlighted in green.

**THE MATERIALITY OF LEARNING**

According to the *Handbook of Material Culture* (Tilley et al. 2006), materiality is a concept that refers to the substance or components of things, and therefore to the substantial or real, as opposed to the imaginary or value-laden. From this perspective, things or possessions (objects) have material benefits for humans (subjects). Therefore, materiality is linked to the notion of common sense, or ideas grounded in objective evidence, as opposed to subjective ideas or values.

Making a case for a ‘sociomaterial turn’ in educational research, Fenwick, Edwards and Sawchuk (2011) challenge the centrality of human processes in learning, in favour of the materiality of learning. According to them, this shift does not come at the expense of the personal, as it treats the material and the human symmetrically in order to explain how entities, knowledge, other actors, and relations of mediation and activity converge in learning. Moreover, they note that sociomaterial accounts of learning describe relations between entities through which activity occurs, rather than individual entities themselves. In surfacing questions about the conditions, which bring things together or force things apart, they explore why some arrangements hold together in the face of apparent contradictions, whilst others dissolve in the absence of contradiction. Fenwick and colleagues argue that sociomaterial accounts of education trace this ever-shifting web of interaction that holds these processes together, all the while shaping
their properties and interactions, without relegating the environment to an inert backdrop to the main act of life or, in this case, education.

In contrast to studies of material culture, sociomaterial accounts of learning reject divisions between subject and object, nature and society, and matter and meaning. Because, from this perspective, both meaning and sense are the effects of assembled practice and provide the grounds for explanation, not a priori categorisation (Fenwick et al., 2011). Furthermore, in conducting anti-reductionist studies of education, learning and human development, sociomaterial accounts seek to articulate a role for the non-human actors – the things, the relations between them, and their relations to time and space. In doing so, they describe a world in which people and things acting in concert produce change, and in this constant series of transformations resides learning and thus the learning process (Fenwick et al., 2011).

The term, materiality, is therefore used by those working in material culture studies to focus on the everyday benefits of an object, as opposed to its role in conveying value laden meaning for humans. Political theorists have employed it to describe the physicality of assemblages (Bennett, 2010), and educational researchers have put it to use to describe how things relate to other things (Sørensen 2009, 2011).

To view the clock and whiteboard marker, described in use in Vignette 4, through the lens of material culture would be to focus on their material benefits for this group of people. Studies of this nature, whilst often very interesting, are troublesome when it comes to educational research for two important reasons. They tend to examine the everyday use or consumption of objects (Banerjee & Miller, 2003; Miller, 2008, 2010) and not how materials are caught up in acts of production (knowledge in the case of education). Second, despite being object centred, studies of material culture are socially deterministic because they focus on the objects’ usefulness to people, and attribute all forms of agency to people.
In contrast, a sociomaterial account of this moment would place Ms Talbot and her students on an equal footing with the clock and the whiteboard marker. It would seek to answer questions about what was performed through their use, tracing different forms of technology (flexible, fluid and multiple), knowledge (communal, representational and liquid), and presence (collective, authority-subject and agent).

In the first account, we would be introduced to the clock and the whiteboard marker through the narrated experience of Ms Talbot and her students and they would describe how they used the clock to meet their needs. In the second, we would be introduced to an assemblage – of teacher, students, whiteboard marker and clock – through which a lesson in 24-hour time was performed. Each account would tell a different part of the story. I argue that both would miss a central element – the material quality of the clock and the whiteboard marker. This omission has consequences for those who are responsible for the use, design, and management of environments for learning.

A high level analysis of VIGNETTE 4 using the ACAD framework, with particular reference to the qualities of materials, is presented in Table 12. As this thesis is principally concerned with identifying and presenting reusable elements of design, I include six additional terms to assist in narrowing my focus with reference to design-in-advance (design, underlying value, and intended outcome) and design-in-the-doing (re-design, accommodation, and value in action). These terms are not left in the blank outline because, for every period under analysis, they will fall in different dimension (cells) of the framework (tool).

Filling in each of the six cells with these terms is often my first move in analysing activity. Having done this, it is easier to backtrack and identify the level and dimension in which the period of activity falls. In the case of VIGNETTE 4, the activity under analysis falls within the level of operational strategy in the set dimension (see red typeface in Table 12).
Properties of materials in processes of flow

Table 12 - High-level analysis of Vignette 4

<table>
<thead>
<tr>
<th>SET DESIGN Tools</th>
<th>EPISTEMIC DESIGN Task</th>
<th>SOCIAL DESIGN People</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Philosophy</strong></td>
<td>Learning is physically situated</td>
<td>Learning is socially situated</td>
</tr>
<tr>
<td><strong>High-level form</strong></td>
<td>Allocation and use of space &amp; place</td>
<td>Pedagogical intention of stakeholders</td>
</tr>
<tr>
<td><strong>Mid-level form</strong></td>
<td>Buildings &amp; technology</td>
<td>Task (something worth doing)</td>
</tr>
<tr>
<td><strong>Operational strategy and tactics</strong></td>
<td>Artifacts, tools, texts</td>
<td>Selection, sequence &amp; pace</td>
</tr>
</tbody>
</table>

**Design-in-advance**

UNDERLYING VALUE: Having a flexible layout, and permission to respectfully use it in line with epistemic aims.

DESIGN: Two week teaching blocks, with opportunities for small workshops for those struggling to master concepts.

INTENDED OUTCOME: To ensure that all students have the opportunity to master concepts in groups with similar needs.

**Design-in-the-doing**

RE-DESIGN: Teacher’s use of a clock face to teach abstractions in time.

ACCOMMODATION: To find a concrete way of teaching students having difficulty.

VALUE IN ACTION: The right for all to learn, despite differences in learning styles.

The moment I was most interested in was when Ms Talbot reached for the clock to help explain 24-hour time (see red circle in Table 12). It was not that the clock was not useful - which it was - nor that together the tools and the people resolved this impasse - which they did. Rather, the clock face had certain material properties that within the epistemic and social design of this learning environment were valued and made available to be repurposed in the service of learning.

A list of the clock’s material properties and their attendant qualities is as follows: flat smooth plastic cover (semi-permanent writing surface), not fixed to the wall and small enough to carry (portable), familiar as a 12-hour clock (related to the problem), and large enough to view from a distance but small enough to hold (good for group work). An appreciation of these properties and their attendant qualities is the foundation upon which discussions about affordance, interpretation, and legibility must rest. However, in the absence of the structure provided by the ACAD framework, it is difficult to conduct comparable analyses of activity across time and space.
Much can be said about how this community appropriated available writing surfaces in the production of knowledge, and **Case Study 4** in this chapter examines learning activity using the whitewalls in detail. But for now, I shall conclude this short high-level summary by highlighting that, whilst the properties of the clock (set design) are centre stage, had Ms Talbot not been free to use it (social design) or if she had considered her job complete after the third presentation of the concept despite the outcome (epistemic design), then none of this would have happened and this small group would not have learnt how to calculate 24-hour time that day. This simple re-statement assists in contextualising the qualities of these materials and connecting their underlying properties to other levels and dimensions of the framework.

**THE MATERIAL ECOLOGY OF LEARNING**

Sociomaterial studies of learning extend to include materials within our purview and Estrid Sørensen’s work has been catalysing in this respect. What is absent, however, is an ontological commitment to a view of the world that does not start with man-in-mind, living in a world-out-there, furnished with objects that are the physical manifestations of human imaginings, lifeless until granted agency by man himself. In a paper entitled *Toward an ecology of things*, Tim Ingold (2012) explores what lies at the heart of this lack of agreement amongst those who study things, despite what appears to be a shared interest in the material conditions of social and cultural life. He details them as follows:

(a) a conception of the material world and the nonhuman that leaves no space for living organisms, (b) an emphasis on materiality that prioritises finished artefacts over the properties of materials, and (c) a conflation of things with objects that stops up the flows of energy and circulations of materials on which life depends (Pg. 427).

In tackling the first point, the missing nonhumans, he speaks out against a particular type of human exceptionality that ascribes human (subjects) as distinct from nonhumans (objects), in so far as they use artefacts as a means of stabilising their social relations. He notes how the
lives of migratory birds and animals are deeply anchored in the rivers, cliff faces and savannah grasslands of their birthplaces. How for countless people groups around the world, it is their connection to a particular place, and not particular objects, that orders their relations with nonhumans. Moreover, he notes how objects fashioned from what is to hand by nomadic societies cannot be said to assume a state of object permanence that could be described as stabilising social relations. Therefore, from his perspective, human exceptionality based on tool use to stabilize social relations is unfounded.

Ingold (2012) does not debate the exponential increase in the diversity of things enrolled in human activity. Rather, he questions if there ever was a time in which our actions were independent of things. He suggests that it is our awareness of them, and their role in sustaining us, which has diminished. The old has been replaced, both in nature and in scale, by the new - with the homestead giving way to the local market, and the local market giving way to the global supermarket chain. It is this distancing of things from humans, he says, that has resulted in calls for the reintroduction of things into our thinking (Latour, 2007) and a desire to see both humans and things treated symmetrically.

The caveat, however, is that whilst symmetry is invoked, it rests on a claim of human exceptionality that is justified on the grounds of our particularly human style of engagement with nonhumans, thereby omitting far more than it cares to reintroduce - the full breadth of organic life forms, and the sunlight, air, and rain on which all life depends. Ingold questions why the category of nonhumans includes only those material objects that have been conformed to, or transformed by, our (exceptional) human imagination. Furthermore, he notes that where animals or plants have played a role in our lives, they have been given the status of quasi-humans or pseudo-objects.

In speaking to his second point, prioritising the completed artefact over its material properties, Ingold (2012) illustrates what is lost when we fail to see things as gatherings of materials in processes of flow. Drawing on Simendon’s (2005) description of brick making, he
illustrates the poverty of a view of the world in which culture provides the form and nature supplies the materials. The mould from which the brick is cast is no more fixed form than the clay itself is raw material. The hardwood is shaped through chopping, milling and carpentry and the clay, having been dug from the ground, is sieved, mixed and kneaded. The two are then brought together by the motion of the brick maker’s arm; we see not the imposition of form on matter but the equal and opposite actions of form-giving and form-taking in the convergence of two ‘transformational half-chains’ (Ingold, 2012, p. 433).

In his third and final point, Ingold (2012) argues that these problems result from conflating materials with artefacts and therefore that the solution lies in moving the focus ‘from the “objectness” of things to material flows and the formative processes wherein they come into being’ (Pg. 431). The difference between objects and things is important, because how we think about them influences our perceptions of, and subsequent engagement with, that object or thing. He notes that in principle it is possible to classify everything as either an object or an instance of a particular material. But the point he makes is that, viewed as an object, a whiteboard is just a whiteboard, available for use as is, with alterations attributed to acts of use or consumption. However, when viewed as a thing, or a gathering of materials in processes of flow, a discarded whiteboard - with the addition of four short legs - becomes a writable table to be used for design work, robotics or group work on the floor. This is more than simply acknowledging the value of recycling which, from an object-orientated perspective, prioritises consumption. It is to prioritise the process of production over the process of consumption. To see the things with which we learn as materials in processes of flow is to see their potential, not to be used in the delivery or consumption of knowledge, but as they are, caught up in productive activity that produces growth in knowledge - in learning.

To understand materials is to be able to tell their histories – of what they do and what happens to them when treated in particular ways – in the very practice of working with them... To describe any material is to pose a riddle, whose answer can be discovered only through observation and engagement with what is there. To know materials we have to follow them ...
**Properties of materials in processes of flow**

Production, then, is a process of correspondence: not the imposition of preconceived form on raw material substance, but the drawing out or bringing forth of potentials immanent in a world of becoming (Ingold, 2012, pp. 434-435).

How then do we follow the correspondence of learners and materials in formal learning environments? What of the fact that, in this particular environment, the medium in which these learners were immersed was both physical and digital? And how does the correspondence of the digital to the physical play out in students’ physically situated learning activity? For, without doubt, this alteration in the nature of our materials has fundamentally changed the physical spaces in which we teach, the ways in which it is now possible to group learners and teachers, and how we think about teaching and learning - all in ways we are only just beginning to comprehend. Only in learning to use these new materials have we become aware of their qualities, and the qualities of the materials they have displaced. Qualities we may not have even registered, for it is only in their absence, or in their obstinacy, that we have begun to comprehend their effects on learning.

A close reading of Vignette 7 foregrounds materials in processes of flow, and opens a window into a period of learning activity, highlighting the need for a more holistic theory of learning.

After reading Vignette 7 it is possible to complete Table 13 in a number of ways. I started with how this student used different material constraints in one tool to help mitigate constraints in another. I have categorised this move as an operational level epistemic move because she was redesigning the task as she selected an alternate tool, and changed both the sequence (by adding a step) and the pace (by giving herself time for reflection).
### Table 13 - High-level analysis of Vignette 7

<table>
<thead>
<tr>
<th>Philosophy</th>
<th>SET DESIGN</th>
<th>EPISTEMIC DESIGN</th>
<th>SOCIAL DESIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning is physically situated</td>
<td>Tools</td>
<td>Learning is supported through knowledge oriented activity</td>
<td>Learning is socially situated</td>
</tr>
<tr>
<td>Allocation and use of space &amp; place</td>
<td>Pedagogical intention of stakeholders</td>
<td>Organizational forms</td>
<td></td>
</tr>
<tr>
<td>Buildings &amp; technology</td>
<td>Task (something worth doing)</td>
<td>Community</td>
<td></td>
</tr>
<tr>
<td>Artifacts, tools, texts</td>
<td>Selection, sequence &amp; pace</td>
<td>Dyads, groups, teams, roles, divisions of labour</td>
<td></td>
</tr>
</tbody>
</table>

#### DESIGN

- **Design-in-advance**
  - **Many different types**
  - **of semi permanent writing surfaces available for learners in connected environments.**

#### INTENDED OUTCOME

- **To support personalised independent and connected learning.**

#### UNDERLYING VALUE

- **Accommodating and accepting different ways of working.**

#### RE-DESIGN

- **Student’s use of the material qualities of one tool to mitigate constraints inherent in another.**

#### VALUE IN ACTION

- **This student is free to select her tools, and alter the sequence and pace of the activity.**

#### ACCOMMODATION

- **Using a relatively stable physical surface to avoid ‘digital sanction’.”**

Teasing this sequence apart using the ACAD framework allows us to focus on how this student re-designs the task through a change in tools, without losing sight of how things are caught up in processes of flow. Moreover, it highlights how the material qualities of things in use necessitated this change. This degree of improvisation would not have been possible had the social and epistemic design of this environment been more narrowly constituted. Therefore, this moment is in some way dependent on each of the dimensions. Moreover, moving up scale levels we could explore how changes (across all three dimensions) at different levels might increase, or decrease, the emergence of this type of learning activity in the future.

Before moving into more detailed analyses of things caught up in learning activity, I have chosen to narrow the focus by exploring the material properties and qualities of four things that were central to life in the Zone. These case studies are followed by a short photographic essay in which I illustrate a few moments of fascinating tool use that fall within the realm of activities of co-creation and co-configuration. Having
Properties of materials in processes of flow

trained our attention to the qualities of things, we can then knowingly broaden our view to take in every-thing caught up in the learning activity of the inhabitants of the Zone, as described in Chapters 5, 6 and 7.

OBSERVING THE QUALITIES OF MATERIALS IN USE

The Merriam Webster online dictionary tells us that a property is ‘a quality or trait belonging and especially peculiar to an individual or thing’ ("Property," 2014). This raises a question about the nature of a quality. A quality is described as a ‘characteristic or feature that someone or something has - something that can be noticed as part of a person or thing’ ("Quality," 2014). This circular logic does little to help, and part of the confusion can be traced to the difference between the scientific definition of property and its everyday use. The first refers to the measurable attributes of physical matter; the second references the characteristic observable effects of some thing, or collection of things (material or otherwise). Thus, matter separated from its effects is ascribed immutable (objective) properties, whilst qualities are used to give descriptive (subjective) accounts of the effects of certain properties, as perceived or experienced in use. The problem with this is twofold. It perpetuates the separation of mind and matter, and in our rush towards materiality, for all its apparent descriptive power, we fail to apprehend the qualities of properties, or the material qualities of things.

How does a property become a quality and why should we bother with the distinction? In rejecting dualistic accounts of matter (either/or), in favour of new materialist accounts (and/and), I am not obliged to dismiss either properties or their material qualities. By way of example, in what follows, I will illustrate why I think this distinction is important to grasp within the context of educational design, management and planning.
**Case study 1: Writable white walls**

![Image of writable white walls](image)

**Figure 23 - A writable white wall**

Walls are so much a part of the built environment that we do not often give them a second thought. They perform the obvious tasks of delineating an interior space from its surroundings, and they support the roof to keep the weather out. So, what makes a good or useful wall in a learning environment?

In the Zone the walls were covered in white writable Idea Paint. This simple, low-tech solution transforms all solid vertical planes into semi-permanent writing surfaces. These transformed walls were used by teachers and students to hold work in progress, shared deliberations, individual moments of quietly shared insight, compliments, the odd protest, invitations, poems, drawings and general administrative information. Reading the walls became one of my favourite pastimes, and I often got the sense that I was following the thread of an online asynchronous discussion board as I traced the evolution of a line of thought.

Watching the walls in use, I noted how they anchored working groups in space, how contested information was first written up and then altered after discussion, how stalled progress was rebooted in the physical act of returning to the wall, how they bridged the gap between
online tasks and in person activity, and how the traces of today’s work - left for a day or two - were read and annotated by those who followed. The walls were, in every sense, part of the fabric of learning in this space. And, accustomed as they all were to using them, it was unsurprising to see glass walls, doors and windows and stainless steel table tops used in a similar fashion. This enrolment of surfaces in the process of learning was infectious. So much so that, when a request for a low table to accommodate a year five robotics project reached the groundsman, he produced one fashioned from a redundant whiteboard that was given a new lease on life through the addition of some simple wooden legs. This appetite for semi-permanent writable surfaces was fed further by the introduction of a plentiful supply of small, inexpensive A5 whiteboards for shared use.

### Table 14 - The properties and qualities of writable whitewalls

<table>
<thead>
<tr>
<th>Properties</th>
<th>Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stable, flat, and visible from a distance</td>
<td>Appropriate for the display of valued examples of finished work, available to scaffold work in progress and used to communicate instructional, social and administrative information. Temporarily stabilising information, and visible to all within the learning environment.</td>
</tr>
<tr>
<td>Vertical, peripheral and shared</td>
<td>Moving toward the wall had the effect of focusing group deliberations and planning. Negotiating what was externalised appeared to stabilise group dynamics by making the activity, and not the individual, the centre of attention. Moving away from the wall, students would carry out their intentions, returning only to remind themselves of what they still needed to do, or to re-establish order within the group. The externalised information became the authority, and the fact that the wall was shared meant that information (unless otherwise stipulated) was within the public domain.</td>
</tr>
</tbody>
</table>
The semi-permanent nature invited a specific type of inscription and, despite the fact that they were more public than private, they were accommodating of alteration. In the Zone there was a nested hierarchy of privacy in terms of scribbling practices - from the scrap of paper, to the small A5 whiteboard, to the whitewalls. Cleaning working surfaces acted to reset the space for future learning.

Students often worked in groups on the floor, and the ability to remain seated and turn to write on the wall was only possible because of their generous floor to ceiling coverage. Also, the act of being able to write to the full extent of one's reach gave the writer a sense of accomplishment, and their inscriptions a place of honour, for a little longer. Paint that went to the corners, to the floor, and to the ceiling meant that artists and poets in search of either a quiet nook, or a busy thoroughfare, were equally well accommodated.

Neutral to be certain, but their whiteness invited participation in a way that other colours may not have. It echoed the crisp whiteness of the blank page of an open book.

Material qualities of things are what we assess when considering what use an element of the set design might be in carrying out the task at hand. I argue that, in this environment, the proclivity to use all manner of semi-permanent writing surfaces speaks to the notion of affordance, or thinking fast. However, this would not always have been the case. These students had to learn to interpret their properties (system 2, or slow thinking – see p. 58), before instinctively apprehending their affordances (system 1 – slow thinking). However, having done so, it is not surprising that other surfaces with comparable properties (glass and stainless) were enrolled in similar practices. What is more, students accustomed to
this practice ‘read’ these properties in new environments with ease and, where social sanction did not prohibit it, they were quick to put writable surfaces to use. This suggests that affordance, interpretation and legibility are not fixed categories but are fluid and greatly influenced by the social design of any learning environment.

A fascinating instance of the writable whitewalls in use can be found in Vignette 9 - Edward and Isobel develop a method. And in Vignette 8 - Ms Talbot’s workshop first the teacher and then the students use the A5 whiteboards to record verbal instructions, calculate answers and share the product of their work with the group.

**Case study 2: Variously appointed floors**

![Image of students working on the floor]

**Figure 24 - Variously appointed floors**

Having learned what we could from the walls, we shall now turn our attention to the floor. I have chosen to start with the upper central carpeted section (UC), which was continuous with the stairs, because this largely unfurnished space acted to draw people in, in a subtle but important way. Those who design or manage learning spaces tend to focus exclusively on what to put into them – not on what they should leave out of them. Carpeted and unfurnished, the centre was always open to possibility, much like the clean white walls. Students and teachers did sometimes move the odd couch, beanbag or ottoman around to create
Properties of materials in processes of flow

slightly different or separate spaces. But at least once a day it was the site of a general gathering, which powerfully shaped the community it housed as they planned for or reflected on their learning for that day.

The stairs were an extension of the upper section by virtue of their location, and through the extension of the dark brown carpet. But they provided more than just a means of navigating between the two sections; they were also a destination. Designed to accommodate the proportions of adults and children, they offered raked seating and extra space in which to work or gather. Their outer edges housed an additional small step, which made them easier to climb, and had the effect of directing ambulatory traffic away from learning activity. Those working on the stairs either found their way there to make use of their large flat surfaces, by kneeling on one step and facing up towards another, or to use them for more social but independent work. It was not uncommon to see groups of independent Internet researchers gathered together - like so many birds on a wire - chatting, working and searching in parallel, with laptops on laps, and the ability to view the screens of those seated next to and in front of them. In this way, the stairs ordered and limited absolute freedom, for they presented one’s screen to one’s peers and to the staff uniformly - but this quality did not seem to make them less popular or limit their use (the possibility of being approach unseen from behind was a quality that those off task would avoid). This was not so in this case, and sometimes teachers would designate the stairs ‘off-limits.’ This was done when students were battling to work constructively, or had intentionally chosen to position themselves out of sight of their teacher. At other times, a group battling to pay attention to verbal instructions or something being read out loud was intentionally moved en masse to the stairs. This was a way of physically ordering so many bodies, face to the front - ascending in rows - facilitating a quick visual scan of the whole and direct eye contact with individuals as one spoke.

Moving upstairs, the polished concrete floors that flanked the central carpeted section afforded the creation of a wet area in which to work, and three different clusters of more formal table-and-chair arrangements. Other than when it was very hot, the students did not like
to sit on the concrete and they would create nests with beanbags in the corners if they used these floors at all.

Downstairs, the central section was covered in a medium brown floating wood floor that went from the base of the stairs to the sliding glass doors opposite. The students were quicker to sit down and spread out on this floor than they were on the concrete floor upstairs. On either side of the floating wooden floorboards, the floors of the smaller spaces were carpeted in the same dark brown carpet used on the stairs and the upper section. The furniture in these spaces was always arranged to accommodate those who preferred the carpeted floor in the centre.

Table 15 - The properties and qualities of various floors

<table>
<thead>
<tr>
<th>Properties</th>
<th>Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpet</td>
<td>It was rich chocolate brown, practical but not dull and relatively soft to the touch. Flanked by concrete flooring on two sides, it was a comfortable place to sit and work. But its texture made it a poor choice for those working on large sheets of paper.</td>
</tr>
<tr>
<td>Concrete</td>
<td>Hard, polished and cool to the touch, the concrete floors provided a surface for wet work and a large smooth surface for artwork that did not fit on a table. But in cooler weather it was hard, cold and uninviting.</td>
</tr>
<tr>
<td>Wood</td>
<td>Smooth and continuous but not cold, it provided an alternative to the concrete, and students often spread out to work on it when using large sheets of paper. However, in combination with the lower ceilings, it did produce more acoustic feedback than the carpet, but less than the concrete floors.</td>
</tr>
<tr>
<td>Ascending stairs</td>
<td>Deep enough to work at, but not so deep as to be uncomfortable to sit on - they provided carpeted space to gather without being in the way, and connected the upper and lower sections.</td>
</tr>
</tbody>
</table>
### Properties of materials in processes of flow

<table>
<thead>
<tr>
<th>Material</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver beading</td>
<td>The simple beading that held the carpet to the concrete floor helped to visually demarcate the centre.</td>
</tr>
<tr>
<td>Unfurnished</td>
<td>Floor spaces left unfurnished attracted groups because they were open and unconfigured. People moved into them far more easily than they did into arrangements of hard desks and chairs.</td>
</tr>
<tr>
<td>Shared</td>
<td>The central section was the home base for the entire group, not any single home class. It made lectures, assemblies, collaborative group work, art, dance, Science Fairs, construction projects, robotics, movie making and drama possible, for a single group of 181 students.</td>
</tr>
<tr>
<td>Zoning</td>
<td>The use of alternating or continuous flooring created divisions in the large open plan space, which either contained or connected activity.</td>
</tr>
</tbody>
</table>

In discussing the properties and qualities of flooring, it is interesting to note how they affect the ability of inhabitants to read boundaries, which is important in open environments without walls. Understanding that the legibility of a space can be improved by subtle changes or intentional (dis)continuity in the choice of flooring is more than a question of style. Used wisely, floor surfaces with different material properties support different qualities of learning activity. What is more, the affordances of different surfaces attract or discourage certain types of activity, and can therefore be used to passively shape learning activity. Framed within a holistic analysis, there ought to be space to make such claims, without falling into a material determinism. As a failure to apprehend the effects of the material qualities of something as simple as flooring on learning activity is wasteful, because all learning spaces have floors, and floors fall within the purview of design. In the Zone, the central carpeted section (UC), together with the stairs, acted as the heart of this learning environment. If this space had been fitted with
hardwood flooring or left as bare concrete, this would arguably not have been the case.

**Case study 3: The red plus shaped ottoman**

![Image of the red plus shaped ottoman](image)

**Figure 25 - The red 'plus' shaped ottoman**

Standing at knee height, the red ottoman was supported by an open stainless steel frame. The resulting gap between the floor and the seat provided a space for students to either tuck their knees under it or stretch their legs out underneath it, while working. The ottoman offered a centre equal in size to its four ‘arms’ that extended at right angles, forming the shape of a plus sign – hence the name.

Upholstered in hardwearing but soft-to-the-touch red fabric, it was a comfortable but firm place to sit and work. Used by groups and individuals, working alone or alongside others, it supported an extraordinary array of different working configurations. At its most conventional, it provided raised seating that accommodated three comfortably when focused on an external point of shared attention. Any more than three meant the latecomers had to kneel or bend awkwardly to maintain a shared visual orientation.

Working groups arranged themselves around the centre, some up and some down, focused by a shared interest or locus of attention.
These configurations dissipated over time, giving way to another familiar formation: a single student lying across the middle and two arms, and the other students falling into the returns created by the arms, with the object of shared attention being relegated to the floor. When this happened, it usually signalled the end of time on task together, and a return to individual work.

Table 16 - The properties and qualities of the red ottoman

<table>
<thead>
<tr>
<th>Properties</th>
<th>Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raised surface</td>
<td>Informal seating for those at the back of large groups in the open centre, or used as a surface by those who wanted to sit on the carpeted floor and work.</td>
</tr>
<tr>
<td>No back support</td>
<td>Did not impinge on direct line of sight when not in use, and made it possible for students to use it as a communal work surface.</td>
</tr>
<tr>
<td>Open stainless steel frame</td>
<td>Made it possible to kneel up close, or tuck one’s legs under it in a way that would be difficult if it had been solid. It also made it easier to move and reduced its visual dominance in the space.</td>
</tr>
<tr>
<td>Moderately firm surface</td>
<td>Comfortable enough to sit or lie on, but firm enough to work on or support an artefact of shared attention.</td>
</tr>
<tr>
<td>A square centre</td>
<td>Equal in size to each of the four arms, but not so easy to access or sit on, creating an open centre into which, and around which, activity tended to gravitate.</td>
</tr>
<tr>
<td>Four ‘arms’</td>
<td>Radiating out or drawing students in, the four ‘arms’ invited formal and informal co-location. There was a qualitative difference to the activity of students drawn to the ottoman in working groups and those who preferred it as an individual working environment. Its design supported both equally well.</td>
</tr>
</tbody>
</table>
Four returns
Of significant value and easily overlooked, the four negative spaces created eddies in a sea of activity. Sitting on the floor, back to the shared centre it provided a backrest and a sense of seclusion.

Heavy but movable
Had this piece of furniture moved with the bodies that circulated around it, it would not have been used with such regularity. Furthermore, the fact that it was easier to slide across the carpet than to drag it across concrete meant that it tended to remain within a certain range in the open shared space.

Red fabric cover
Red was used sparingly in the Zone as an accent colour. As such, it was appropriate that this special piece was upholstered in red, making it easily visible in the large volume of the upper section. The choice of soft but durable fabric gave it a surface the students were happy to sit or lie on, and its close flat weave meant that it did not easily catch on things.

Only one, to be shared
Its large footprint supported disproportionately few students, making it impractical to replicate. But the fact that there was only one made it special.

This case study provides insight into how apparently negative qualities, such as the lack of back support and the weight of the ottoman, can provide diversity with positive outcomes. This single piece of furniture provided seating, a work surface, safe space for an object of shared attention, a surface to lie on and alcoves in which to tuck oneself away. It is described in use in Vignette 5, and in Vignette 2 it plays a central role in re-establishing order, after a change in the physical orientation of home bases.
Case Study 4: The Task Card

Bush Medicine

Nature Smart – Understand

Goal of Task:
Create a PowerPoint Presentation from researched information about ‘Aboriginal Bush Medicines’.

Things needed to complete task:

- Website ‘Healing Secrets of Aboriginal Bush Medicine’ (on the Portal)
- Matrix task book for organising information.

Steps: (in order they should be completed in order to produce a ‘quality matrix task’):
1. Research information from the website ‘Healing Secrets of Aboriginal Bush Medicine’ (link on Portal) as well as your own research.

2. Using the exemplar on the Portal to ensure you complete the task correctly, create a PowerPoint of at least 6 different types of Aboriginal Bush Medicine, ensuring that you have:

   - Told me a bit about the plant
   - A heading for each plant.
   - A picture of each plant.
   - Have information in your own words with correct spelling and punctuation.
   - Have included a Bibliography, including your own websites accessed when researching.

Bibliography:

Power point slide exemplar: Teacher created resource, March 2012


(Date accessed 30th March, 2012)

Outcomes: CCS3.1 Explains the significance of particular people, groups, places, actions and events in the past in developing Australian identities and heritages; UTS3.9 Evaluates, selects and uses a range of equipment, computer-based technology, materials and other resources to meet the requirements and constraints of investigations and design tasks; CSS3.6 Examines how cultures change through interactions with other cultures and the environment; SSS3.7 Describes how Australian people, systems and communities are globally interconnected and recognises global responsibilities, cultural influences and their contribution to Australian identities; CSS3.8 Describes different cultural influences and their contribution to Australian identities.

Figure 26 - A task card

References to the task card punctuated conversations throughout the day: ‘Have you checked the task card?’, ‘Try following the link on the task card’, and ‘Do we HAVE to do it the way it’s laid out on the task card?’ Task cards ordered activity by providing online access to all project-based work, and many units of independent numeracy and literacy. Each had originally represented a cell with the Matrix, a thematic term-based unit of work.

Before the rollout of the bring your own device programme (2011) and with only three personal computers per classroom, staff had printed and laminated sets of task cards for students to use, reserving
desk based computers for Internet research. Students in the Zone during 2012 would have been familiar with both formats; however, by then the task card was no longer physical but digital.

Essentially a word document accessed via Internet login to the student LMS, task cards were accessible to all, anywhere. Laid out over one or two A4 pages, each contained a clear heading (Bush Medicine), a reference to its location with the matrix (NATURE SMART – UNDERSTAND), the goal of the task, things needed to complete the task, recommended steps for completing it successfully, a bibliography and hyperlinks to Internet based resources, and in a footnote, the state-mandated outcomes it satisfied. Most were kept clean in appearance, included an image, and made use of different fonts to direct attention.

Students often downloaded task cards as PDFs. In this form they could quickly reference them offline, rather than go through the process of accessing them via the Internet. Setting up a new task, students could be seen toggling onscreen between MS Office applications, a web browser, the LMS and the task card. When they worked collaboratively they tended to distribute functions across a number of laptops, a distribution that often mirrored the allocation of roles. This local deployment of roles across laptops helped facilitate an even distribution of effort and was not clearly understood, or even appreciated. After structuring tasks in MS Office, the student’s reliance on the task card diminished and they only returned to them (if it all) to check the requirements of the task, against their work and the marking rubric, before submitting their work online.

Table 17 - The properties and qualities of the task card

<table>
<thead>
<tr>
<th>Properties</th>
<th>Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital</td>
<td>Stable transferrable record, capable of being replicated as either a PDF or MS Word document.</td>
</tr>
<tr>
<td>Available online</td>
<td>Accessible to all anytime, anywhere, via a unique login to the student LMS.</td>
</tr>
</tbody>
</table>
Clear, written instructions

As a single point of reference for each task, they were designed to scaffold independent work, freeing teachers to offer specific needs based assistance in a way that would not have been possible if they had been responsible for managing the details of each and every task, for all, on an ongoing basis.

Hyperlinks to online resources

Directed students out into the WWW, starting with at least one recommended resource, but encouraging further independent exploration.

Identifies state-mandated outcomes

Not much was made of this in class. However, parents, anxious about the apparent ‘lack of control’ within this new way of learning, were comforted by its presence. On the odd occasion that I did hear references to them in class, it was with reference to requests for permission to alter the structure of a task, and the student was being asked to consider how their proposal would demonstrate their learning. The fact that the references were made to learning and not outcomes was interesting. For, in subtle ways, conversations were always steered towards taking responsibility for one’s learning, despite what others may want, think or demand.

REFLECTIONS ON QUALITIES AND PROPERTIES

Shape, weight, dimensions, texture, colour and relative firmness are important. They produce effects within flows of activity, which are peculiar to certain things and possess relative degrees of stability despite a changing landscape. The semi-permanent surfaces of whitewalls invite the articulation of half formed ideas, hold certain variables constant while others are negotiated, and provide legitimate shared spaces in which to share a poem, a message or a protest. The presence of empty carpeted floors offers comfortable unstructured space in which to
gather, and by its colour and unique shape the red ottoman draws visual attention, without obscuring line of sight.

Apprehending all of this is more than understanding utility, or what things can do for us. If knowledge is understood as an increased sensitivity to cues in the environment - rendering as skilful those who learn to match their movements to perturbations in the environment without interrupting the flow of their actions (Ingold, 2011) - then how we provision spaces for learning is important. Understanding how their material qualities influence learning activity is a fundamental precursor to identifying elements of the set design that are open to alteration. Moreover, given the inherent human desire to shape one's environment and that opportunities for co-creation and co-configuration abound within the set dimension, then taking a holistic view of learning environments allows one to offer selection and adaptation in one dimension, where it may not be so easy to do so in others.

**PHOTOGRAPHIC ESSAY**

In outlining the ACAD framework in Chapter 3, I noted that activity at learn-time shapes the environment in powerful ways. These acts of co-creation and co-configuration are at the heart of learning. Whilst one might design, anticipating that learners will engage with the environment, the shape of this engagement is never certain. These acts of design-in-the-doing are the focus of the photographic essay that follows. In it I pay particular attention to how the students assembled and shaped their learning environment both in anticipation of, and through, learning activity.
Properties of materials in processes of flow

A computer becomes a light box

In the image above, a student uses the backlit screen of his computer to trace the outline of an airplane. The task is to calculate the surface area of a plane - any plane. Some students make paper planes. Others draw them freehand. But this student draws one with the help of his laptop and a friend, who holds the page of a workbook that kept falling over his hand, impeding his progress. Nobody suggests his method is ‘incorrect’ or that tracing is cheating.

On apprehending the qualities of his backlit screen, its connection to the Internet, and the ready supply of any number of planes to draw, this student finds an image he wishes to measure and does not measure it on the screen, probably because this would be tricky, but also because the task required that he demonstrate his working. Nor does he print it, cut it out and stick it into his workbook. Instead, he traces it directly into his workbook before measuring the surface area it presents. The task is defined but the means of completing it are open ended and the tolerance for, and acceptance of, this type of creativity is common in this space.
Properties of materials in processes of flow

WHEN A PHONE BECOMES A COMPASS

Figure 28 - When a phone becomes a compass

The student in this image has drawn a map of the Zone and needs to reference north. There is general consensus about where north lies, but she is having trouble placing the N, for north, on her drawing. She knows that in reality north is not at the top of her page. Standing, facing north with her paper in hand, she swivels the paper and then rotates her body but nothing seems to help. However, the impromptu addition of a teacher’s smartphone with compass application open allows her to rotate the drawing to ascertain the direction of north on her page.

This configuration of learner, tools and task draws deeply on system 2 type thinking or thinking slow (discussed in Chapter 3, p. 58), and presents an example where representational thinking about cardinal points confronts embodied, or non-representational ways of knowing. In this example, both the problem and the solution are tied up with the properties of the paper. The problem relates to conventions of use; the top of the page accommodates the ‘top’ of the drawing and ‘North.’ The solution is a result of the addition of the phone with GPS capabilities, Internet connection and compass application, creating paper with super-powers, but it also relies on being able to rotate the paper in space.
A truly interactive white (board) wall

Figure 29 - A truly interactive whitewall

In this image, we see a computer and a whitewall coupled simply and powerfully by two students who, in all likelihood, have never been subjected to teaching by IWB. The same student we saw in the first image can now be seen recording a short video with a friend. The task is to record a ‘how to’ video on long multiplication for younger students and it involves revision for them, but they have unlimited freedom in the scripting and editing of their video. These two have chosen to use the whitewall, a chair, and the camera on one of their laptops to record a worked example of a long multiplication problem.

Dotted around the Zone that week I saw others completing the same task, but they used piles of coloured match sticks on the concrete outside, friends’ fingers and hands or songs, and more than one group worked with buckets in the sandpit. Having chosen their tools, space, and script they recorded, edited and either uploaded their videos to YouTube or saved them to external drives in order to share them with the year four students. This was so much more than simple revision.
An on-board camera reverses a handwritten code.

Figure 30 - A camera used to reverse a code

In this image a student is creating a handwritten code on a sheet of paper. In an attempt to make the code more difficult to decipher, he uses the on-board camera on his computer, not as a camera, but as a mirror to reverse the images he has drawn. On another sheet of paper he draws the reversed images and checks that he can ‘decipher’ it by reading it on the screen of his laptop. To do this he uses the FaceTime (communication) application and not the Photo Booth application (camera), because what he is after is a mirror and not a picture.

This activity was very purposeful and one of many interesting instances of paper being used in conjunction with the properties and qualities of the students’ laptops. Many of these examples were both unexpected and unanticipated by their teachers. The freedom these students had to experiment with their tools, and the open-ended nature of many of their tasks invited this type of interpretive work. What is more, it appeared to encourage them to explore problem-solving strategies to make tasks more, and not less, complicated. I would argue that this quality of activity is probably rare in less accommodating learning environments where time for experimentation is in short supply.
THOUGHTS AND WORK DISTRIBUTED ACROSS MULTIPLE SURFACES

This pair, working side-by-side, often completed tasks together. On this occasion one of them has drawn a black line on the stainless steel table. The message is clear: ‘my side’ and ‘your side’. On the whitewall in front of them you can see evidence of how they are storyboarding ideas for the task they are working on. The paper stuck to the wall is not theirs but relates to work sitting on the windowsill. In the image below are some additional details: a Task list of three items with checkboxes, the name and location of a teacher, and more ideas sketched on an A5 whiteboard that sits on top of the black laptop case. The work itself is carefully being detailed in pencil on the white sheet of paper. The writing tools in use include a single pink pencil and a black semi-permanent marker. At this point the laptop remains in its case.
In the first image I show what can be seen with the naked eye. In the second, I have superimposed icons of some of the digital tools in use in the Zone during 2012. The contrast is instructive and gives an indication of the skills these students developed as they learned to navigate this environment. This image only hints at the qualitative changes these materials have brought to this learning environment. A third image could illustrate digital connections to teachers, peers, parents, friends, content creators and content curators ad infinitum.
Creating private eddies in which to work was something I noted with interest. I came to think of this pair as 'bower birds' because of their skill in creating personalised spaces. In the first image they have repurposed studio chairs as parallel workstations. In the second, they can be seen working, but tucked away behind a couple of art screens.

On the following page are three images illustrating the creation of different degrees of privacy. Most of these acts of seclusion were about visual masking rather than a withdrawal from active work. The students in the window seat (Figure 37) enjoy a sense of separation through elevation, which in turn affords a different quality of visual connection with the teacher who rests her elbows on the ledge where they sit.
Properties of materials in processes of flow

Figure 35 - On my own

Figure 36 - On our own, together

Figure 37 - On our own but still connected
CONCLUSIONS

Walls covered in white paint that hold thoughts, empty carpeted floors that invite activity, an ottoman that rests on an open stainless steel frame making it possible to tuck one's legs underneath it, and a digital file (task card) that is both stable and mobile providing structure to independent learning - all qualities, which fall within the purview of design. Learning to see the nuanced qualities of things should make us better designers. However, understanding how they participate in practice will make us better curators of open learning environments. What is more, the task of apprehending the magnitude of change precipitated in this physical learning environment, by the qualities and properties of its digital counterpart, has hardly begun.

For the knowledge that all students within the Zone had access to the same level of detail for each task, from wherever they chose to work, without the need to orchestrate more than a single digital device, freed up space and time that would otherwise have been allocated to the management of an assortment of other learning materials, replicated in full for each student. However, to simply view the task card as the online equivalent of a textbook would be to miss the crucial fact that access - by 181 students, to an assortment of interest and competency based tasks, housed as single relatively stable digital records, accessed via personal digital devices, connected to the Internet – changed everything, by creating new opportunities for design across all three dimensions of the framework.

Contrary to what many fear, these (im)material qualities did not distance these learners from their learning environment, but freed them to move, manipulate and master all manner of materials in the service of learning. Moreover, it was through their active engagement with this environment that they became accustomed to taking responsibility for their learning. And in their animated engagement - walking, talking, building, performing, recovering from misadventure, and learning to preserve their dignity whilst recalibrating over-extended expectations - they became examples of the many and varied ways in which human
beings learn, to their peers, their teachers and to the visitors to this space.

What is more, following the histories of things (Hodder, 2012; Ingold, 2011; Shove, Watson, Hand, & Ingram, 2007) and noting how their material qualities change or persist over time (Shove et al., 2012), gives us insight into the processes of change in learning and teaching practice (Hine, 2000; Sørensen, 2009). The task card, in its relatively stable digital form, not only precipitated changes in physically situated learning, but in new ways of curating information online. Viewed as an object of instruction, the task card fits within an educational economy of transmission and consumption. Viewed as a material, a thing caught up in processes of flow, it plays a role within an educational economy of participation and growth – or production.

References to the task card were frequent and students selected tasks after scanning what was available, as described on the task cards. Teachers would sometimes go through the requirements of a compulsory task, or one that they noticed students were having difficulty with - very little independent work was completed without them. As such, I was surprised to discover that references to them were almost completely absent in my descriptions of learning activity in the vignettes. It was only when I created turn-by-turn lists of actions for detailed analysis, in Chapter 5, that I was forced to record the presence of the task card. This highlights, for me, the need for detailed analyses of learning activity with a focus on how different tools are used because the very unassuming task card, housed online and accessed via the Internet, was arguably the lynch pin of this system. It balanced guidance with independence, mobility with stability, and diversity with inclusion.

In Chapter 5, which follows, we begin the task of examining not only the set but also the social and epistemic dimensions of the ACAD framework, bound up in the learning activity of the inhabitants of the Zone.
CHAPTER 5

THE ENTANGLEMENT OF THINGS IN LEARNING

Figure 38 - Learning entanglement in numeracy

Developing an appreciation for the material qualities of things is only the beginning. Material flows and flows of consciousness collide in a myriad of ways, and those points of connection are facilitated and shaped by things caught up in learning activity.

Tim Ingold (2013) describes things that convert thought to action in the doing, as transducers. This concept adds depth and texture to our understanding of materials and how they shape lines of activity through flows of things and thought. But in doing so, it focuses our attention on the activity of the individual working with a single tool. In this chapter, I want to draw our attention from the individual to the group, to look at activity in the Zone from a broader perspective. In doing so, I draw on the work of archaeologist Ian Hodder (2012) whose theory of entanglement gives us a way of talking about that something, which, ‘endures beyond ... flows, networks and systems’ (p. 212).

Hodder (2012) questions the value of purely relational accounts of matter on the grounds that they fail to appreciate the object nature of
The entanglement of things in learning activity

Things. He uses this term to stress the importance of the material properties of things and not their functional role to humans, arguing that their enabling and constraining effects go far beyond the construction of social meaning. Through an exploration of the temporality of things, he illustrates their role in debts, duties and investments (social). He reminds us that getting things done often includes waiting for things and processes to be completed, and that there is usually a measure of contingency involved in getting anything accomplished (material). What is more, in focusing on things caught up in activity, he notes that a reversal in the direction of co-movement is often not possible; choices can be limiting. Therefore, entanglement has directionality that leads to further complexity, and an ever-increasing rate of change in the overall entanglement.

A detailed explanation of Hodder’s theory of entanglement follows, before it is used to analyse two periods of learning activity.

THE RELATIONSHIP BETWEEN HUMANS AND THINGS

Describing the efforts of others to examine the increasing complexity of human life in terms of networks, meshes, mixes, chains and engagements, Hodder (2014) observes a tendency for archaeologists to speak in terms of the enchainment of humans and things, and for sociologists to speak of interpersonal relations. In contrast, those working under the banner of Actor-Network Theory (Knorr Cetina, 1999; Latour, 1988; Law, 2002) reveal how things - such as engines, measuring instruments and laboratory probes - are enrolled in the structuring of social relations. This work has affected a widespread shift towards relationality more generally (Latour, 2007; Law & Hassard, 1999). As a consequence, the dualisms of agency and structure, the human and nonhuman, knowledge and power, before and after, and the material and the social are no longer taken as given or fixed, but as the effects or outcomes of assemblages. This shift has been so marked that ‘it is now accepted that human existence and social life depend on material things and are entangled with them: humans and things are relationally produced’ (Hodder, 2014, p. 19). However, Hodder remains critical of purely relational approaches because they often demonstrate a cultivated
lack of interest in the very things they study, their relations to other things, and the ecologies of things within which they interact.

Hodder (2012) cautions against the risks associated with reducing the world to a series of relational networks of effects, and thereby losing sight of one of the fundamental drivers of change in human existence - the object nature of things. Things are finite. They are unstable in and of themselves and in their relations with other things. They change according to natural cycles from the daily, to the decadal, to the millennial, and through processes of decay and depletion. Things have qualities and affordances that persist from one context to the next, creating potentials and constraints on human activity – not to mention unforeseen and unintended consequences. Moreover, it is because of our deep entanglement with things that we are forced to respond to these material changes.

Rather than networks or meshworks, Hodder (2012) proposes a dialectical tension between enabling dependence and constraining dependency, resulting in what he calls ‘sticky entrapment’. This is a state in which choices, once made, limit the range of subsequent opportunities for future action. This ‘sticky entrapment’ is a function of asymmetrical rather than symmetrical relations between humans and things, and it is this relational dependence that is at the heart of Hodder’s (2012) theory of entanglement presented in summary as,

Entanglement + fittingness + conjunctural event → problem → fixing → selection → E’ (total entanglement)

In what follows, I explore each aspect of the equation before using it to analyse two periods of learning activity in detail.

**ENTANGLEMENT**

Hodder (2012) defines entanglement as the sum of four types of relationship between humans and things:
The entanglement of things in learning activity

- humans depend on things (HT),
- things depend on other things (TT),
- things depend on humans (TH), and
- humans depend on other humans (HH).

Therefore, entanglement is the sum of (HT)+(TT)+(TH)+(HH).

Hodder (2014) acknowledges that, whilst this is still a relational account of humans and things, it differs from others because it focuses on relations of dependence that are produced by the expression of the material properties of things in use - by the object nature of things. Hodder (2012) distinguishes between relations of dependence that are enabling and those that are constraining. He uses dependence to describe reliance on, and dependency to describe relations that are limiting due to co-dependency. Entanglement is therefore presented as ‘the dialectic of dependence and dependency between humans and things’ (Hodder, 2014, p. 29).

From this perspective, humans and things are therefore both relationally constituted and relationally dependent, and these relational dependences are hard to predict and are often beyond our control. Things, made from materials, are always in flux; they are not inherently stable. Rocks decay, banks erode, the roof springs a leak and the car needs servicing. If we depend on the bank for shelter then it depends on us to maintain it in a certain form, as with the roof. The apparent stability of our material world is a function of the different temporalities over which things decay and all the invisible work that goes into maintaining the things that we rely on, for example the power supply and the milk in the fridge. Our perception of material stability is also a function of scientific thinking, which is changing exponentially faster than our theories. There is work that attempts to bridge this divide (Barad, 2003; Brown, 2001; Capra & Luisi, 2014; Coole & Frost, 2010); it is in the same spirit that Hodder (2012, 2014) makes his contribution.
The entanglement of things in learning activity

**Fittingness**

Despite an emphasis on dependence and dependency, Hodder (2012) argues that ‘the determinative factors in human action are neither material nor ideal. What is determinative is the entanglement itself the totality of the links which hold and produce individual events, things, humans’ (p. 112). It is within these entanglements that humans and things have attributes that fit - or come into play - in specific historical contexts.

*Fit* can be used to describe how something is adapted to a particular end or design - its adaptive fitness or function. It can also be used to describe the harmony or coherence of an assembly with respect to its cultural context or meaning. These differences have been divisive in interdisciplinary debates, and it is Hodder’s intention to use both to illustrate their interdependence. He notes how any human or thing has a finite number of properties that can be listed and defined and how these properties only have value or are seen as useful for human action, within certain contexts. As such, these properties can be said to afford different types of actions that achieve specific ends, within specific historical or cultural contexts. But for Hodder, affordance is only one type of *fittingness*.

Coherence is another, and it speaks to the appropriateness of something within the total entanglement. Coherence is more about external links to current historical contexts, and less about internal functioning. What is more, affordances and functions are tied to abstractions (ideas, thoughts, words, feelings and senses) that are hierarchical and nested, and operate across multiple domains of human activity and experience. Hodder suggests that it is because of this and our need to seek coherence within different realms of experience, that generalised abstractions applied in more than one domain of activity create new forms of entanglement. These new entanglements are often based on ideas, philosophical coherence and the use of analogy or metaphor. These metaphors arise from the known in the realm of the material, and are used to describe the known within the realm of the
ideational. As a result, metaphors often work across domains in creating resonance or dissonance, and their effects can be intuited and are often registered somatically. Therefore, a thought can be said to physically feel right, in as much as any action or thing can be said to feel right.

Making a case for cross-domain coherence grounded in the body and not in intellectual abstraction, Hodder introduces the notions of synaesthesia and resonance. He references a study in which students were asked to assign one of two words (takete or maluma) to two drawings (one angular and one rounded). Ninety per cent assigned the word takete to the angular form. In a general review of this type of experiment, Berlin (2006) explained this as synesthetic sound symbolism, which is a phenomenon through which a cross-modal mapping occurs that unites the sounds of speech with one or more of the other senses (sight, touch, smell, taste). Hodder (2012) proposes a second type of cross-domain coherence that is invoked through cultural stereotypes that are not a question of style, but dependent on what one can or cannot do in specific social settings. Action, therefore, depends on the tautness of dependences and on the affordances of any given entanglement.

Thus far, we have considered the dialectic of dependence and dependency and fittingness. The next step is to consider how things come together in ways that challenge the status quo or precipitate change that presents a problem, which necessitates fixing that, requires selecting a solution from what is to hand, which in turn alters the total entanglement.

**The conjunctural event**

Drawing on the work of Achille Mbembe (2001), who sees time as an interlocking of pasts, presents and futures, and Sarah Nutall (2009), who describes the non-linear characteristics of time wherein past failures are revisited and retrospectives abound, Hodder (2012) concludes that time is not an evolving series, but is imbued with social,
political, economic and religious contexts such that its connections seem unfathomable. The car we drive depends on the invention of the wheel, the discovery and production of rubber, and networks of roads and petrol stations. This is not to mention the legislative frameworks policed by the officer on a motorcycle and the automated speed camera that relays the image of a speeding car to a central hub and then to an individual’s postal address or inbox.

Despite this complex web of dependence and dependency, Hodder (2012) repeatedly illustrates our tendency to forget the history of things, noting instead that we use ‘them as we find them, working with them on the day-to-day, blind to the complex entanglements that have great historical depth’ (p. 102). This *forgetness*, as he describes it, is important because it is one of the factors driving the sticky entrapment of entanglement. Understanding why and how we forget things is an important part of understanding entanglement. The fact that we don’t need to know how something works, in order to use it, fosters our non-reflective use of things. We can manage quite well without theorizing or appreciating the histories of things, and this *forgetness* only increases when their inner-workings are concealed from us. Strings of entanglement are long and often too complex to comprehend, let alone monitor or predict. They abide by different temporal rhythms of decay and their transformation often results in obsolescence.

Understanding the scale and complex nature of entanglement requires an appreciation of history, power, beliefs, values and material practices. However, Hodder (2012) does not suggest that these aspects ought to be included in the study of complex systems. Rather, he calls for the study of complex systems to be ‘located within wider social and historical theory that deals with the interpretation of human skills, perceptions, and engagements and is sensitive to the practical holes into which we dig ourselves’ (p. 108). Hodder distinguishes between studies of entanglement, and studies of society, culture and economics that take a systems or structural approach. He does this on the grounds that studies of entanglement are heterogeneous, shaped by material qualities, beliefs, and values. In contrast, systems or structural approaches are
human-centred or agent based, and tend to assume universal rationalities. Furthermore, he notes how studies of entanglement are not complete but open-ended, whilst still particular to specific historical contexts, and their value lies in their ability to deal with the very practical, the real and the imagined. Entanglements are always in motion producing events that are unexpected, multiplied along complex heterogeneous pathways, and often result in unintended consequences. Things happen.

But things can just as easily act as the catalyst for change. A fence constructed to keep cows contained could precipitate a boundary dispute that leads to war. Things can accelerate or precipitate change without changing themselves, something a chemist would describe as catalysis, derived from the Greek to annul or untie. Things are therefore implicated in the tying up and in the untying of entanglements and, during the process of untying, there is always opportunity for change. However, outcomes are often uncertain and may precipitate a backlash: ‘What results is always very contingent – it depends’ (p. 166). Furthermore, these moments of untying can be non-events, the result of no longer caring to maintain something. In this case, things may simply fall into disuse. This tension between the tying-up and the untying is constant and there is a spatial component to both. Repair happens more often at the centre, and disaggregation happens on the periphery where entanglements are less dense and subject to less regulation.

In theories of complexity, change is often described as random and non-directional. Hodder (2012) differentiates between descriptions of the historical nature of evolutionary progress, and saying that the processes of change are directional. Despite the inherent dangers of teleology, or in explaining long-term changes by their final goal, Hodder makes a case for change that is historical but not teleological. This directionality, he says, is produced not by the intention of going somewhere, but due to the difficulty we experience in trying to go backward. Things happen due to the combination of certain circumstances; events are conjunctural.
P R O B L E M  T H AT  R E Q U I R E S  F I X I N G

It is easy to describe the sequence of actions necessary to complete a simple task such as lighting a fire; however, this simple task may be subject to change (contingent upon) the direction of the wind, the availability of dry wood and the ability to operate a lighter with fingers that are numb from the cold.

S E L E C T I O N  O F  A  S O L U T I O N  A N D  E'

Therefore, in practice we do what is necessary (make contingency plans) to light the fire, drawing on what we know about what is to hand. This does not happen in a closed operational or functional sequence, but in an open, complex and discontinuous entanglement. Hodder (2012) challenges the notion that increasing scale and complexity results in entanglements that are less easy to alter, illustrating that increasing entanglement is often accompanied not by inflexibility, but by an exponential increase in the rate of change. He attributes this to the open, complex and often discontinuous nature of entanglements.

E N T A N G L E M E N T  S U M M A R I S E D

Entanglement (HT, TT, TH, HH) + fittingness + conjunctural event → problem → fixing → selection → E' (total entanglement)

Entanglement starts with the dialectic between dependence and dependency, between humans and things, where the sum of all dependences between humans (H) and things (T) in their many forms (HT, TT, TH, HH), is described as giving rise to entanglement. Fittingness is described, not only in terms of function or affordance, but also in terms of fit or the coherence of the whole. The centrality of time, and the effects of order and sequence are acknowledged in human-thing entanglements. Combinations of circumstance give rise to conjunctural events, which create problems that require fixing, and solutions are
selected from what is to hand and contextually appropriate, resulting in an alteration to the entanglement of the whole.

Hodder (2012) proposes that his theory of entanglement has far broader application than in archaeology alone. The ‘foregrounding of material stuff, not just as material meanings and social processes but also as matter that affects us, is a key part of an adequate social theory’ (p. 211). I would argue that there is not only room for, but also an urgent need for, a non-deterministic theory of things in educational research. Materials do not determine human action either by material necessity or by the practical connections between things. But by focusing on flows of matter, energy and information and human-thing dependences, we render visible entanglements that are heterogeneous and not materially determinative. Moreover, having untangled our small bit of the world, we should remember that the aim is not to pull things apart but to ‘explore entanglement itself, engaging in thick, rich, contextual analysis’ (p. 218).

It is therefore fitting that we now turn to two particularly rich moments of learning activity. A close reading of Vignette 8 is necessary before engaging with the analysis of Entanglement 1.

**ENTANGLEMENT OBSERVED**

In the case studies of Chapter 4, I focused on individual things, identifying their properties and describing their qualities. In this chapter, I offer two case studies of entanglement where the focus is on the qualities of their properties caught up in complex, contingent and connected learning activity. Following things in use, I have identified phases of learning activity. In Entanglement 1, each phase is briefly described and discussed with reference to Hodder’s work and the ACAD framework. In Entanglement 2, I develop this method of analysis by

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6 I reported on this analysis in a paper at the Networked Learning Conference in Edinburgh (Yeoman & Carvalho, 2014).
tracing not only the entanglement of things, but also the coherence of the relationships between the dimensions of the ACAD framework.

Both periods of learning activity are illustrated using two techniques for mapping entanglement (see Figures 39 and 40). The dominant sequence in each is the behavioural chain that charts learning activity over time, which is not presented as a traditional cascade, but tracking across the three dimensions of the ACAD framework. In the set dimension, above the behavioural chain, is a tanglegram (Hodder, 2012) in which each element of the set pertinent to this entanglement is named and the dependences between them are mapped as either single or mutually dependent relationships. Both the conjunctural event and the subsequent contingent actions are linked by dotted lines to the tools recruited in resolving these problems.
provides a bridging period, accommodating movement into and out of the group as each student establishes where they should be.

**Phase 2: Planned activity** starts with tasks prepared in advance for the workshop. Ms Talbot draws a number line on the large static whiteboard, sits down and asks, ‘What would half be?’ The students guess and within the context of the earlier game this is not surprising. In response, Ms Talbot points to the number line - a visual clue - and explains what she is looking for. She asks another question but the students are still muddled. Rather than explain a second time using her own words, she selects an alternate tool, one that affords a different representation of the epistemic content of the task. Playing the YouTube video on the communal screen, she pauses it to comment on the external tutor’s strategy, and when he is finished she leaves his completed example visible on the screen. Sitting down, she asks another question inviting the students to have a go at verbalizing their understanding of the problem. This time she is met with, ‘What was the question?’ The students are not being disingenuous; some of them really cannot remember the question. This marks the end of what had been planned and the beginning of a contingent strategy using the tools to hand.

**Phase 3: Contingent activity** starts as Ms Talbot reaches for the A5 whiteboard on which she writes the number problem. Holding it up for all to see, she verbally repeats the question. Participation increases but accuracy is still low. She wipes the board clean and writes another; as she does this, some of the students help themselves to A5 whiteboards on which they work at solving the problem. Many of the students have both their PDDs and workbooks on the floor with them, and there is a box of scrap paper to the left of the large screen. However, the only writing that happens is on the A5 whiteboards. Of those working on the whiteboards, some work alone, others spontaneously work in pairs, and others watch and listen. When Ms Talbot asks for answers, a few more put up their hands and she selects an individual to respond. The answer given is correct but, from where she sits, she can see multiple boards with errors. She does not call on those who have made mistakes, but initiates another change in strategy.
Phase 4: Fluid entanglement mirrors Phase 3 but for one important change. When Ms Talbot calls for the answer, she asks those with whiteboards to hold them up to reveal their answers in unison. Her manner and tone make this an extension of the call-and-response of earlier verbal exchanges. Acknowledging those who are correct and pointing to an error that is common to a few boards, Ms Talbot re-assembles the learning materials in a new configuration on the floor. This action has the effect of altering the social organisation of the students as they draw closer to the boards, to identify and discuss the common error before attempting the next question. Ms Talbot repeats this sequence a number of times using the same method and materials until the end of the learning session.

Phase 5: Reflection: Ms Talbot leads the group in a shared reflection. She starts by acknowledging that they have found the concept difficult to master, and follows with an invitation for them to physically demonstrate their feelings. Using the thumb-o-gram, she gets them to contrast how they felt at the beginning of the workshop with how they felt by the end. This light-hearted reference to the act of ‘liking’ was a moment in which the digitally mediated social interaction of Facebook (or Edmodo) was reflected in their physically shared present.

In Phases 1 and 2, we see the environment in action in which fittingness relates to what is acceptable in this environment. As the students enter, they expect to be allocated to a group according to their learning needs. This efficient but gentle sorting is accommodated by the game, which gives everyone time to find his or her place. Maintaining a conversational tone, Ms Talbot draws a diagram and poses first one question and then another. Gaining no traction but undeterred, she recruits the help of an external tutor (YouTube). Everything she has done thus far has been focused on deepening her students’ understanding, and there is a satisfying coherence in the way her actions point to what is valued in this environment. Moreover, her use and selection of different tools underscores how their material qualities or affordances scaffold learners’ progress in different ways.
Phase 2 describes the **conjunctural event** in which people (both near and far) and things (both digital and physical) come together in a mismatch that gives rise to a **problem**. The students, struggling with the concept, find it difficult to remember both the problem and the method for solving it without support.

In Phase 3, we see Ms Talbot **fix** the problem by **selecting** another tool that is a better fit in terms of function, given the altered circumstances. The small whiteboard provides a surface that temporarily holds a written trace in a static form that is visible to the group. Her improvisatory move is emulated shortly thereafter by some of the students, who note the ease with which she writes, erases and rewrites questions in a form that persists long enough for them to follow. The difference is that the students use them to note the problem, work the solution and volunteer an answer. Both adjustments resolve the same constraint, but the physical properties of the boards serve slightly different immediate needs - communication in the case of the teacher and calculation in the case of the students. The students do not hesitate to help themselves to shared resources. This freedom to self select and move to where the boards were kept before resuming their joint activity unsanctioned should not be overlooked. These actions have coherence across the three dimensions of the ACAD framework, and they have resonance across domains (material and ideational) for these students. And, despite being relatively uncomplicated, they have a profound effect on independent learning activity in this space.

Phase 4 is an **altered entanglement**, which loops back into activity until it concludes due to time constraints. Whilst this specific sequence is brought to an end in Phase 5, the practice was not. I continued to observe it in circumstances where the affordances of these small whiteboards were fitting - to mark destinations, hold instructions for individuals or groups, to name parts of a sequence that could then be physically reordered, to suggest alternate arrangements of furniture and to leave messages in a form that was more permanent and public than a post-it but more transient and informal than an email.
In the analysis that follows, I begin the task of drawing together the theoretical arguments I have made thus far. From the properties and qualities of materials as presented in Chapter 4, to things in use presented in Entanglement 1, to the coherence of relations between the dimensions of the ACAD framework that follows in Entanglement 2. You will need to read Vignette 9 at this point, if you have not already done so.

**Learning Entanglement 2: Edward & Isobel develop a method**

![Diagram of Learning Entanglement 2]

*Figure 40 - Learning Entanglement 2*

In the analysis of Learning Entanglement 2 (see Table 18), I use the notion of correspondence (C) to indicate a particular quality of learning activity. Introducing the notion of dissonance (D), I distinguish between moments in which correspondence leads to a continuation of activity, and moments in which correspondence calls for an alteration in course due to temporary dissonance, in which the emergence of improvisatory skills (I) in the learner is often witnessed.

---

7 Analysis presented in (Yeoman, 2015).
**Table 18 - Tracing correspondence, dissonance and improvisation**

<table>
<thead>
<tr>
<th>Phase</th>
<th>ID</th>
<th>Learning activity</th>
<th>Set</th>
<th>Epistemic</th>
<th>Social</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I</td>
<td>Selects partner</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E &amp; I</td>
<td>Select task</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E &amp; I</td>
<td>Select location</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Selects tools</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>2</td>
<td>E</td>
<td>Holds rulers</td>
<td></td>
<td>D</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>Jumps</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Tries to measure</td>
<td></td>
<td>D</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>Repeatedly jumps</td>
<td></td>
<td>D</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Fails to accurately measure</td>
<td></td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>PY</td>
<td>Notes activity and moves closer</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Mr O</td>
<td>Notes movement</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>Jumps</td>
<td></td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Rejects Method 1</td>
<td></td>
<td>D</td>
<td>C</td>
</tr>
<tr>
<td>3</td>
<td>E, I &amp; PY</td>
<td>Select alternate tool (wall)</td>
<td></td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>Jumps</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Marks height</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E &amp; I</td>
<td>Measure height</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>Creates list on wall</td>
<td></td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Consults task card</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Selects calculator app</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Completes calculation</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Calls out calculation</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>Echoes calculation</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>Initiates table</td>
<td></td>
<td>C</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>E &amp; I</td>
<td>Method 2 defined</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>4</td>
<td>Mr O</td>
<td>Observes and questions</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E &amp; I</td>
<td>Contemplate &amp; respond</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Mr O</td>
<td>Teacher jumps</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E &amp; I</td>
<td>Repeat Method 2</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Students</td>
<td>Watch</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Student</td>
<td>Joins the group</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Mr O</td>
<td>Leaves the group</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E &amp; I</td>
<td>Explain method to others</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E &amp; I</td>
<td>Repeat cycle with others</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Mr O</td>
<td>End of lesson</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>5</td>
<td>E</td>
<td>Work on the wall not transferable</td>
<td></td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>E &amp; I</td>
<td>Request photographs</td>
<td></td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>PY</td>
<td>Takes photographs</td>
<td></td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Removes SD card</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Copies files</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>E &amp; I</td>
<td>Submit work</td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
</tbody>
</table>
**Phase 1: Getting ready.** Movement and discussion characterize phase 1 as 120 students either resume work on an existing task or select a new one. They work upstairs with the help of three teachers who offer direction and assistance as they move through the learning environment. Edward and Isobel agree to work together, and select a task and the tools and location in which they will work. The last of these three choices is of particular interest. For, having chosen a task, which to their way of thinking involves jumping, they are free to make their way across the upper section to a corner that is largely unfurnished and is seldom occupied.

At this point, there is a high degree of correspondence across the dimensions of the framework. The teachers had carefully structured a unit of independent online tasks of varying degrees of complexity (epistemic), for students who were loosely streamed according to ability and independence (social) and were free to choose both the tools and location in which they would work (set). Focusing in on Edward and Isobel in this large, open, flexible and digitally connected learning space, we see two students equipped with personal digital devices and a couple of rulers, who are free to select an appropriate location in which to work. The presence of these materials, and their permission to assemble them as they wish to complete the task, are the necessary preconditions for what follows. However, the richness of what is to come emerges out of the complex interplay of all three dimensions of the ACAD framework: the social, epistemic and set design.

**Phase 2: Experimentation** starts with Edward, on the floor, struggling to hold two 30 cm rulers together to measure the height of Isobel's jumps. He uses one hand to create a single 60 cm ruler because he wants to use the other to mark the height of her jump – as she jumps. He is unable to hold them together, mark the height jumped, and read the measurement with any accuracy. It is their combined movement that catches my eye from across the room; it is qualitatively different against a dynamic landscape. Edward eventually rejects their method and, scanning their environment for help or inspiration, the pair note my interest and attempt to draw me in as a source for an alternate solution.
A nod towards the whitewall is all I reluctantly offer and they quickly interpret and implement the implied suggestion without further assistance. Had I not been there they would either have looked to others for help or a teacher, cued by their activity, would have helped refocus their efforts. It is worth noting the role of visibility within and across this space and how it supports independent learning activity and facilitates choice. Limiting choice or the freedom to move would have resulted in lost opportunities for learning, and a decrease in autonomy in this space. Edward and Isobel’s inability to measure height jumped with two rulers is the first moment of dissonance. The response to the task is open ended (epistemic). They have successfully allocated roles (social), but the rulers (set) are not fit for purpose. However, this simple moment of task-tool dissonance can be characterized as positive, for it precedes a moment of improvisation, followed by an increase in confidence and improvisational skill as the students develop a working method.

*Phase 3: Developing a working method* starts with their interpretation of my suggestion (nodding towards the whitewall) and their improvisatory use of the marker and whitewall to record height jumped. In this phase, there are two slightly less obvious moments of improvisation using the wall. The first is when Edward, having marked and measured the height of Isobel’s jump, reports it to her verbally and then, amidst her mild mannered questioning of its veracity, he turns and writes it – as reported - on the wall. Without further debate, they move to where Edward’s computer sits and access the online task card, which leads them to a hyperlinked resource detailing the calculations necessary to convert this measurement to moon height. Using a calculator app, Edward completes the step and returns to the wall where he replaces the original earth-height with the newly calculated moon-height. Standing at the wall, pen in hand and contemplating the next step, he gives the measurement a number 1, labels it as Isobel’s and gives the newly established list a heading ‘moon height.’ The second moment of improvisation using the wall occurs as Isobel, finding she has insufficient room to list weight next to height, relocates their data to a newly created table to the right of some unrelated administrative information.
This progression from list, to two lists, to the compound table was a fluid response of these learners to the tools and task on that day. If their use of the two rulers had resulted in dissonance, their use of the wall promoted a cascade of correspondence, which can be described as skilful improvisation. Hidden within this account is a second layer of correspondence between the materials themselves. For the laptop provided access, structure and guidance as planned for in advance, and the wall afforded – in the moment – a surface fit for function, jointly owned and visible to all. This responsive correspondence establishes the preconditions in which the students skilfully improvise a method leveraging the affordance of one medium to compensate for a lack in another. Moreover, had they not been at liberty to seek out help from others or to write on the whitewall, or if they had been accustomed to seeking out the single correct method or answer, they would have been less likely to engage in this type of improvisatory problem solving activity in the first place.

Phase 4: Expanding collaborative activity starts with the arrival of Mr Osborne who measures his words, carefully noting the student’s responses before making a judgment about the productivity of their actions. He questions both Edward and Isobel in turn, looking them in the eye to gauge their grasp of the problem. Having explored their understanding ‘on the fly’, he increases the complexity of the problem by adding his weight as a factor in their predictions. The convivial nature of his questioning draws the attention of a few students sitting nearby. Predictions made, he jumps and the pair measure, do the calculations and discuss the results in relation to their predictions as they write them into their table. At no point does Mr Osborn take control of this activity. His questions are designed to challenge, and he lets the activity speak for itself before quietly slipping away. As a small group gathers, the list and table are used to explain their method to the new participants. The externalization of their thinking, which had been an aid in their work, now scaffolds others’ engagement with what is not even their task of choice. This expanding shared activity is not censured by anyone.
The correspondence evident in Edward and Isobel’s activity flows from their improvisatory use of the wall (set) through to their skilful explanation of their method (epistemic) and their willingness to allow others to participate in the task (social). At any moment, this fluid conversation between the task, tools and people present could have been disrupted. Mr Osborne or one of the other teachers could have deemed their initial activity inappropriate and insisted that they remain seated with their numeracy group (social), where there was insufficient space to jump (set), or the task could have been less open ended (epistemic). The ease with which these students and teachers weave multiple elements together across all three dimensions - in productive learning activity at multiple scale levels - belies the complex collaboration involved in the doing of this task in this space, on that day. Moreover, this degree of social and epistemic manoeuvring would be hard, if not impossible, to accommodate in an environment that did not ‘see’ or value the nuanced role of materials in learning.

Phase 5: End and submission are precipitated by the realisation that the learning session is drawing to an end and their work is not in a transferable form. The whitewall (tool) that had initially served to support their learning activity, now worked against the requirement to asynchronously demonstrate their learning (task) through the electronic submission of a completed task. This task-tool dissonance could so easily have led to the perception of failure. But it quickly gave rise to an improvisatory move in which they recruit me, as a resource, to photograph their work.

The quality of this second moment in which I am recruited is markedly different from the first. The students act with autonomy and I am the one trying to navigate the tools, task and social niceties of an adequate solution. Accustomed to transferring images from my camera via USB cable, which was at home, I anticipate problems transferring the images to them in time for them to submit their work. However, working with dexterity and skill, the students quietly and confidently resolve the issue by questioning me on the functionality of my camera. After helping to remove the SD card, they locate and negotiate the use of a laptop that
will accept it, before downloading the correct images, emailing them to themselves, inserting them into a PowerPoint presentation and submitting the completed task. This online submission was sent to their numeracy teacher, Ms Bailey, who had not witnessed the turn-by-turn details of their activity. Knowing her, I am certain that she will have taken note of their movement, and seen first my move towards them and then Mr Osborne’s. But at no point was I aware of her presence. This speaks to her confidence in the online structure, her teaching peers and her students’ growing ability to navigate their learning landscape with skill.

*Phases 1 through 5: continuity and growth.* There are two notable aspects of tool use that build in complexity across the five phases of learning activity that pertain to the material qualities of the tools to hand (set), the rules of social engagement (social) and the structure of the task (epistemic). The first is the improvisatory enrolment of the wall in learning activity in the following progression.

1. To mark the height of the jump.
2. To fix or formalize the vaguely contested height of the jump.
3. To list the height of a number of subsequent jumps.
4. To organise their collaborative activity, resulting in the table.
5. To use the table as a teaching resource.
6. To later photograph, as evidence of work completed.

Each of these moments of set-enrolment mitigates a dissonance between elements (tools, task or students) of the three dimensions (social, set and epistemic) in the active doing of the task. This highlights the importance of things in learning.

The second aspect of tool use, best understood when traced across all five phases, is the gap between the intended use of the computer and its actual employment in practice. The presence of the laptop in this learning environment afforded these students an unusual degree of independence. However, due to its material qualities, it was placed out of harm’s way, which meant that the instructions were a little
removed from where the students were working. Therefore, despite design intentions, the mobile digital device became decoupled from the working students, and it was the presence of the whitewall and the social norms governing its use, which filled this gap in orchestrating learning activity. What is more, the need for some-thing-else to scaffold this learning activity was increased by limitations inherent in the laptop. The laptop provided a single, small, but powerful screen on which multiple applications were running and through which Edward had to toggle mentally ‘carrying’ what was necessary between views. Arguably, it was the unencumbered digital access offered by the laptop, coupled with its physical working constraints in the presence of the whitewall and the freedom to use it, which facilitated this fluid activity – or correspondence - between the task, the tools and the people present on this day.

Entanglement starts with things - how people use them and become dependent on them. It is compounded by the fact that these things (YouTube, whiteboards and whitewalls) require other things (power, internet connectivity, a screen, speakers, a computer, and a whiteboard marker) and other people (the external tutor, the local teacher and one’s peers), which leads to greater degrees of entanglement. What is more, these lessons would not have taken this form had the students not been part of a larger whole, a network, in which people, objects and messages travelled - connecting learners, teachers and parents to learning communities and learning resources both near and far. Therefore, Hodder’s theory of entanglement, in conjunction with the ACAD framework, supports our understanding of how connections between things and humans are made. They do this by enabling us to explore the influence of place, task and social organisation on activity in this primary school context. This reveals that one absent the others is only part of the story and that our inability to adequately describe complex, computer mediated learning networks, dispersed over time and space, has perhaps impoverished our ability to participate in the design of productive learning networks that meaningfully engage with the physical, the social and the epistemic.
Moreover, an appreciation of the object nature of things, the way they afford or 'stand-in-the-way' of certain activities, opens a window into a complex learning network in which the physical and the digital merge in entanglement. Mobile technologies have untethered the learner. Learning can and does happen anywhere and at any time. The set - the dimension of the ACAD framework that has to this point been woefully under-theorised - can now no longer be ignored or viewed as the stable, immutable backdrop provided by institutions. Rather, I argue that learning environments should be considered the co-configured medium in which learners are immersed. Furthermore, if learning is bound up in the refining of skill, it is – from an Ingoldian perspective - about the development of agency in the learner, immersed in an environment, which consists of both humans and things caught up and carried along in entanglement.

CONCLUSIONS

Initially I traced Edward and Isobel’s learning activity in this manner (Table 18) to illustrate that with each move there were multiple considerations at play, each arising out of a different dimension of the design. I was curious to see if some activity could be attributed to elements in only one of the three dimensions, or if there were moments when a single dimension had primacy over the others. But as I considered each in turn, it became clear that for every action there was an underlying influence that could be traced to aspects of all three dimensions of the ACAD framework - the social, the epistemic and the set design, on multiple levels.

Starting with Edward and Isobel’s choice of location - working together (social) - they selected a task (epistemic), which required space (set) in which to move. Moving up a level – see Table 19 - we see a task design (epistemic) that demonstrates a commitment to collaborative (social) group work, carried out in a flexible, digitally enabled learning environment (set). Moving up to a third level, we see a school leadership committed to innovative, research based practice (epistemic), in which
teachers are encouraged to work in teams (social), in a flexible, adaptive physical and digital environment (set).

**Table 19 - High-level analysis of correspondence in Vignette 9**

<table>
<thead>
<tr>
<th>SET DESIGN</th>
<th>EPISTEMIC DESIGN</th>
<th>SOCIAL DESIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tools</td>
<td>Task</td>
<td>People</td>
</tr>
<tr>
<td>Philosophy</td>
<td>Learning is physically situated</td>
<td>Learning is socially situated</td>
</tr>
<tr>
<td>High-level form</td>
<td>Allocation and use of space &amp; place</td>
<td>Pedagogical intention of stakeholders</td>
</tr>
<tr>
<td>Mid-level form</td>
<td>Buildings &amp; technology</td>
<td>Task (something worth doing)</td>
</tr>
<tr>
<td>Operational strategy and tactics</td>
<td>Artifacts, tools, texts</td>
<td>Selection, sequence &amp; pace</td>
</tr>
<tr>
<td>Design-in-advance</td>
<td>UNDERLYING VALUE</td>
<td>DESIGN</td>
</tr>
<tr>
<td></td>
<td>Of shared space, variously</td>
<td>independent in-class,</td>
</tr>
<tr>
<td></td>
<td>appointed to accommodate</td>
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In these examples, at every level, there is correspondence within the elements of each dimension, and across all three dimensions. Dissonance too, can be experienced at all three levels. But a distinction must be drawn between positive dissonance, as experienced in learning activity within a coherent whole, and negative dissonance that arises from a misalignment between dimensions - for example, between epistemic design and either the current social norms or the existing setting.

If, having considered materials deeply, we deem them worthy of inclusion in our theories of learning, we should then re-consider how our notions of design and teaching ought to shift in response. Tracing entanglement through the ACAD framework gives us a good place to start, because it draws our attention to those aspects of the epistemic, social and set design that are open to design-in-advance, and it highlights negative dissonance. However, there are aspects of complex learning environments that are open to design-in-the-doing, where improvisational correspondence is a skill to be learned in dialogue with
the tools, the task and the people present; we would be remiss if we did not value, design for, and accommodate this more widely.

Having examined things and traced entanglement, the following chapter builds on and rounds out this theoretical exposition of materials with an inquiry into the nature of emergent wholeness in complex learning environments.
‘But it is more than the sum of its parts,’ is often invoked as the phrase of last resort by those trying to describe the ephemeral but specific qualities of a thing, place or person that sets it apart from others of its kind. It underscores the difficulty we have in grasping the whole, accustomed as we are to reduction, classification, and artificial reconstitution. For, whilst these methods may have served us well in the past, they often fail to take into account the full breadth and depth of human experience. What is more, they have a tendency to blind us to things caught up and carried along in flows of materials and consciousness; thrown into sharp relief at one moment, and obscured from our gaze in another, only to reappear, altered, at some future point in time.

Mathematician and architect, Christopher Alexander (1979, 2002, 2003, 2004, 2006; Alexander et al., 1977) has dedicated his life to understanding and explaining what it is that makes one building feel more full of life than the next. Alexander is not alone in calling for new

A general condition which exists, to some degree or other, in every part of space: brick, stone, grass, river, painting, building, daffodil, human being, forest, city. And further: The key to this idea is that every part of space – every connected region of space, small or large – has some degree of life, and that this degree of life is well defined, objectively existing, and measurable (p. 77).

According to this hypothesis, every part of a building - the structure (windowsill), the furnishings (chairs), and the spaces between things (chair and wall) – possesses a certain degree of life and is connected across scale levels. Alexander acknowledges that this hypothesis is not easily quantifiable and requires subtle methods of analysis. What is more, understanding his method for analysing spatially distributed systems requires a deep understanding of the remaining two terms: wholeness and centres.

For Alexander (2002), wholeness is what characterises a good space; it is what we notice and what we remember about a space, and it derives its strength from the coherence of the spatial centres from which it is constituted. Alexander is deeply convicted that that we are no longer capable of apprehending wholeness. Moreover, it is our distorted perception or incomprehension of what wholeness is that is responsible for so many of the built structures that violate the landscapes in which they sit and alienate their inhabitants. This inability, he says, results ‘from our conception of what matter is’ (p. 8) and a mechanistic, rather than holistic view of the world.

This explanation of wholeness is partial and rests on understanding how he uses the third of his terms, centres:
When I use the word center, I am always referring to a physical set, a distinct physical system, which occupies a certain volume in space, and has a special marked coherence [Italics in original]. Even when the center is a social or cultural center, it is still ultimately spatial as well: it occurs in space, and always has a spatial locus. (Alexander, 2002, p. 84).

His preference for thinking of coherent entities, not as wholes but as centres, has a mathematical foundation. He illustrates this with the simple problem presented by the task of spatially defining a fishpond, which raises the question about where the fishpond ends. Where, within the spatially distributed elements that comprise ‘fishpond’, do we draw the boundary? The concrete base - but what then of the ground that supports it? The air above it – but where does the air that is pond end, and what of the pipe that supplies the water that makes the pond a pond, and what of the algae, plants, insects and fish?

Alexander notes that there is no ‘right’ way to draw this boundary, which leaves us to conclude that: (a) there is no single entity called fishpond or (b) that our methods for defining the single entity called fishpond are inadequate. As he can see, feel, hear and smell the fishpond, Alexander opts for the second because defining it as a centre acknowledges that the pond exists,

as a local center of activity: a living system. It is a focused entity. But the fuzziness of its edges becomes less problematic. The reason is that the pond, as an entity, is focused towards its center. It creates a field of centeredness. But, obviously, this effect falls off. The peripheral things play their role in the pond. But I do not need to make a definite commitment about the edge, and what is in and what is out, because that is not the point. What matters in the existence of the pond as a coherent entity is that the organisation of the pond is caused by a field effect in which the various elements work together to produce this phenomenon of a center. This is true physically in the actual physical system of the pond: water, edge, shallows, gradients, lilies – all help in the formation of the pond as a center. And it is also true mentally in my perception of that pond. (Alexander, 2002, 84, italics in original).

Alexander (2002) argues that what is true of the pond is also true of the window, chair and wall. Each is a spatially distributed collective with indistinct ends that produces field like effects within space. His second reason for choosing to define these spatially distributed systems
as centres, and not wholes, is that as an architect his job is to design not a window, chair or wall but a house or school. In doing so, he is responsible for asking, 'What is the proper relationship among these elements?' (2002, p. 85). If one thinks of the window as a whole, one thinks of an isolated entity. If one thinks of it as a centre, one thinks of it relationally.

The same is true of all the entities which appear in the world. When I think of them as wholes, or entities, I focus on their boundedness, their separation. When I think of them as centers, I become more aware of the relatedness; I see them as focal points in a larger unbroken whole and I see the world as a whole. (2002, p. 85).

And therein lies the heart of the matter; each centre is self-sustaining but is not cut off from the whole – which is the world itself. What is more, centres are not only spatial but biological and social as well. The ones we notice are explicit; however, there are many that are latent and yet still influence our activity. Alexander would have us look and see, not centres made up of parts, but parts emerging from wholeness. Much like the formation of a whirlpool in a river, the vortex is induced by a particular configuration of river, rocks and banks; the vortex did not exist along with the river, rocks and banks but was induced by the action of the whole.

I argue that our inability to interpret, engage with and create wholeness shares a common heritage with our inability to grasp the object nature of things. What is more, Hodder's (2012) entanglement and Alexandrian (2002) wholeness are descriptions of the same thing from different perspectives. The principle difference is that entanglement follows lines of activity out and on and through a world-already-in-motion, whereas Alexandrian wholeness describes repeating patterns of structure and behaviour that support coherence and resonance – or wholeness. The one traces what is, and the other looks for the nuance in structure or organisation that creates resonance, with an eye to replicating its salient characteristics for the benefit of those who come after us. As such, Alexander's notion of wholeness is a fitting inclusion in this study, one that affords us the opportunity of exploring learning
activity in the Zone from a third level of abstraction - from the qualities of things, to the dependences of things in use, to wholeness induced by the configuration of the parts and the action of the whole.

Alexandrian wholeness is a nuanced concept. It is not the same as saying that something is equal to the sum of its parts. If we use the example of the whirlpool to illustrate the ‘sum of its parts’ argument, we might expect to create a whirlpool simply by accumulating any rocks, any river and any banks. But to understand wholeness we need to do more than assemble the parts; for in talking about the life within any given spatial arrangement, it is the quality of the vortex induced by the configuration of the parts that Alexander references. When we understand wholeness, we understand that it is through the action of the whole and the qualities of the parts that the vortex of the whirlpool emerges. What is more, different configurations caught up in motion produce different qualities of vortices depending on the ambient qualities of the day.

This line of thought finds its counterpart in Hodder’s (2012) work, where he distinguishes studies of entanglement from studies of systems on the grounds that entanglements are defined heterogeneously rather than homogeneously. In other words, entanglements are the sum of their dependences (HT, TH, HH, TT) and fittingness (function, coherence and resonance) within a given historical context (conjectural event), continually re-established through alterations that result from fixing problems as they arise, which, in turn, alter the total entanglement. I argue that singular, deterministic accounts of learning environments - be they material, social or ideational - will never describe the emergence of wholeness that arises from the heterogeneous action of spatially defined systems. Therefore, understanding the heterogeneous nature of wholeness and entanglement is crucial to understanding, designing and working in complex learning environments.

In making his case, Alexander (2002) starts with our experience of those moments in which we recognise - at our core - that something, some assemblage of things both organic and inorganic, has life. Over the
course of a lifetime, through observation and deduction on his own and in the company of others, he came to the conclusion that a single assumption differentiated their work from the work of others - which was that human feelings evoked by our surroundings are very often shared. I argue that this shared response must find its roots in the type of research Hodder (2012) references in his discussion on resonance and coherence seeking across sense registers and domains of human experience - material, social and ideational.

In what follows, I digress momentarily from the work of Alexander to explore the notion of cross-domain resonance seeking because it is fundamental to understanding much of his work. In doing so, I return to Hodder's description of the experiment in which students were asked to ascribe the names takete or maluma to either an angular or organic shape. Where he notes that the high degree of similarity in student responses - angular shape with sharper high frequency sounds and organic shape with warmer low frequency sounds - was explained by Berlin (2006) as follows: ‘The representation of ... lip and tongue movements in (our) motor brain maps may be mapped in non-arbitrary ways to certain sound inflections in auditory regions (of the brain) and the latter, in turn, function as non-arbitrary links to an external object’s visual appearance’ (Hodder, 2012, p. 124). As such, it must be acknowledged that our inclination towards certain forms and our instinct to establish cross-domain resonance may be less arbitrary than we once thought, and therefore open to mapping in ways that could productively inform design.

Others have argued that synaesthesia is an elementary form of meaning making, and that there is a central mimetic controller that looks for associations across domains and senses (Donald, 1991). Moreover, they argue that the blurring of the senses described as synaesthesia could ‘be regarded as our primordial preconceptual experience of the world’ (Tilley, 2004, p. 14), and that ‘the information conveyed by one sensory channel is often closely intertwined with that conveyed by another’ (Clarke et al., 2010, p. 43). Hodder (2012) suggests that ‘it is possible that there is some form of process by which at a non-discursive
level coherence occurs across domains in historically specific contexts’, (p. 126) and this is what he refers to when he speaks of resonance. Furthermore, he proposes that this underlying resonance seeking across domains and sense registers powerfully shapes entanglement over time. Bringing these perspectives together with results from studies in cognitive neuroscience on the presence of convergence zones or mirror neurons, gives credence to this sense of shared feelings (Immordino-Yang, 2008). For we now know that learning is far more than ideational; it is governed through neurological responses to our social and emotional experiences (Immordino-Yang & Damasio, 2007) of our embodied existence (Osgood-Campbell, 2015; Roth & Jornet, 2013). Learning is therefore powerfully material as well.

The point I wish to make is that we are only beginning to understand some of the complexity of how we perceive and make sense of the world and, for those tasked with the responsibility of designing, creating and managing the learning environments of others, grappling with these issues is not a minor undertaking. For, if we learn through bodily immersion in our environment, and our sense experiences connect powerfully with our emotions, and our emotions regulate how and what we learn then, surely, we ignore at our peril the properties and qualities of our environments and the feelings they invoke in us?

Having considered life that exists to some degree in any spatially distributed system, wholeness that is the observable quality of a good spatially distributed system, and the relational centres from which the whole is made, we can begin to explore what makes a good centre. For without a clear understanding of how strong centres aid in the emergence of wholeness, we will be unable to design environments that can be described as full of life. In The Phenomenon of Life, Alexander (2002) describes fifteen properties of wholeness, and how the presence and strength of each determines the coherence of the whole and the power of local centres. Simply put, these properties describe the manner in which centres ‘help each other come to life’ (p. 145).
In what follows, the fifteen properties of wholeness are described in Alexandrian terms, some are illustrated with images from my observations. A number are then used to analyse the learning activity described in **Vignette 2** - the annual rotation of home bases.

**THE FIFTEEN PROPERTIES OF ALEXANDRIAN WHOLENESS**

In describing each of the fifteen properties, Alexander relies on a wealth of photographic images - artefacts, buildings, natural land formations and organisms - to illustrate the veracity of his claims (Alexander, 2002). In the interests of space I have limited my use of images, and where they are included it is to illustrate a property expressed in a particular spatially distributed system of learning activity in the Zone. In doing so, I skip from the properties of spatially distributed systems in the built or natural environment to spatially distributed systems that include human activity. It is not that Alexander does not do this, or discuss the wholeness of peopled environments; quite the opposite, it was his desire to understand the properties of the environment that gave rise to a quantifiable sense of wholeness - in us - that drove his work. Moreover, he illustrates, time and again, how social and cultural centres are always grounded in a spatial locus. Rather, that my strategy risks making this step too soon, but I chose it above presenting only a subset of the fifteen properties.

In what follows, each property is first described in Alexandrian terms. Those that play a central role in the analysis of **Vignette 2** are also discussed in relation to learning activity in the Zone. These short discussions include references to the subtle interplay of the three dimensions of the ACAD framework, to further illustrate the generative power of coherence or resonance across the three dimensions.

**1. Levels of scale**

Many of Alexander's examples of *levels of scale* are beautifully crafted objects and, in his examination of them, he insists that changes in
levels of scale are not detail for detail’s sake, but act as regions of transition - adapting the local to the regional to the whole. He notes that where variation in scale is overly dramatic the transition disrupts the whole, and where it is too small the change is imperceptible and does little to amplify the centre it is designed to support. However, ‘having levels of scale’ is not simply about providing diversity - it is not a mechanical thing – but ‘It arises properly only when each centre gives life to the next’ (p. 146). In discussing the relative size of rooms within a house, Alexander (2002) notes that where there is no variation in size, a house tends to feel ‘rather stale’ (p. 150). In contrast, a house with one large room and a number of smaller rooms offers a range of spaces in which people can gather for different activities. That is to say, levels of scale support the emergence of wholeness.

Figure 42 – Levels of scale

The image I have chosen to illustrate levels of scale (Figure 42) was taken on the carpet in the upper section (see insert). The location itself is part of a nested hierarchy of spaces. But I chose this image because it demonstrates how the inhabitants of this space ordered themselves across different levels of social connection, from the individual to multiple small groups to the larger group and each can be said to support the next. The student reading rests against the ‘green blob’, which supports the back of the student behind her as he works on
his computer, and the two together have attracted another who works alone but along side them. In the distance the larger group on the red couches discuss something and the smaller group on the floor listen as they work on their computers. To their left is an individual who kneels at a table, a little distant but still connected. However, the presence of diverse furnishings does not itself give rise to wholeness. In this instance, whilst the set design certainly supports degrees of connection, it is the fundamentals of the social (self selection of group size) and epistemic (starting the day together with quiet reading) designs that established the conditions within which wholeness can be said to have emerged.

2. Strong centres

Alexander notes that strong centres are fundamental elements, rather than properties, but he presents them here because it is their strength that he focuses on and not merely their presence. Referencing an image of a Persian carpet, he notes that good examples of its kind invariably have a strong centre. It need not be geometric but is always a strong centre of attention, and the measure of its strength lies in the fact that even when it is obscured from view it does not disappear because the entire design has been created to support it. That is, each aspect of the design points both towards and away from the centre, setting up a vector field in which the strong centre emerges. Strong centres occur at every scale level and are recursive, made up of many other centres. Most possess a principal centre - ‘the resting place, the middle, the most important place’ (p. 156) or ‘an undulating series of minor centers’ (p. 156). When it comes to the built environment, Alexander (2002) references the imperial inner city of Beijing:

It is a layered system of nested domains which lead, one by one, to the inner city, and then to the inner sanctum of the inner city. The hierarchy of layers creates the deep feeling and intensity of the center: the deep center arises at the heart of the inner city, because of the field effect generated by the nesting. We pass through a series of zones of increasing intensity as we go into the building: the gradient of increasing intensity creates a center in the middle (pp. 154-155).
Alexander describes how challenging it is to create this hierarchy of centres in modern buildings and suggests that this is because we no longer know what belongs at the centre. He argues that activities such as watching TV and eating a quick meal together cannot carry a strong centre in a home that is itself not centred. In contrast, he examines homes designed around a strong centre - be it a kitchen, studio or library - which acts to draw people in and supports connected separation in a nested hierarchy of spaces.

Figure 43 - Strong centres

I chose this image (Figure 43) because it illustrates multiple centres of learning activity within the structural centre of this space. The upper central section (UC) is the strong centre around which a series of smaller centres is grouped. In its unfurnished state, it accommodates the entire community as a single whole, or an assortment of independent small groups and individuals. If one were to apply Alexander’s test of a strong centre here, by imagining the carpeted central section obscured from view, then one would see that it ‘does not disappear’ for the whole design amplifies or points toward it. Alexander notes how strong centres often create focal points in urban environments, which is something this strong centre does well for this community. Moreover, as a space (set) for both group and individual (social) learning, this strong centre
accommodates many different types of knowledge work (epistemic) and this adds to its strength – and the emergence of wholeness.

3. Boundaries

The purpose of a boundary is to focus attention on the centre, and to unite what is surrounded with what lies beyond. Therefore, boundaries need to be both the same and different, similar to what is external and different from what lies within. A centre bound up and differentiated in this way becomes more intense. An effective boundary is whole within itself, creating zones of mixing and separation, which serve to amplify the functioning of the major centres bounded. The examples Alexander uses to illustrate boundaries include window frames, tiled boarders, alcoves, window seats, galleries, arcades, and promenades.

Figure 44 - Boundaries

The image I have chosen to illustrate boundaries (Figure 44) is taken in the lower centre (see insert). In this space, there are multiple structural boundaries: folding glass doors, walls, different ceiling heights, various floor surfaces, and the stairs. All these elements are centres in themselves, with varying degrees of strength. But, in this case, it is the circular seating that defines the boundary of this centre of learning.
activity. Everyone is either on the couches or within the circle they create. The focal point moves from the teacher, to the screen, and back to the teacher as she joins the circle to discuss the task with her students. The circular seating (set) physically orders this group of students (social) in a way that supports their current work (epistemic). It is a flexible but effective boundary, which differentiates what lies within from what lies beyond, without obscuring lines of sight or separating them from the larger group. Moreover, the way in which they physically build this shape focuses their attention inwards on what is to come. In this image, and its explanation, we begin to get a sense of how the fifteen properties of centres act together to give rise to wholeness, for this example of boundaries is also an example of a strong centre, which exhibits different levels of scale.

4. Alternating Repetition

One of the most effective ways by which centres intensify one another is through repetition. Repetition of physical forms produces a rhythm, which creates a field effect that is intensified through further repetition. Alexander is at pains to point out that repetition should not be interpreted as the repetition of sameness, but of alternating sets of sameness interlocked in parallel, one intensifying the other. Moreover, alternating repetition should not strive for exactness, because it is the subtle variation in the whole that alternating repetition so often accommodates. Alexander describes interlacing county and city landscapes, pathways and places to pause, and buildings and roads as good examples of alternating repetition.

5. Positive Space

Alexander describes positive space as space which swells out propelled by internal growth, much like corn on a cob where each kernel expands until it meets the ones alongside it. Each is therefore different, but positively shaped by the space in which it grows. In the built environment, positive space is created when things are placed in such a way that what remains is given as much thought as what is placed. What
he means by this is that every placement is also a displacement, and the act of creating positive space entails giving as much thought to the shape that is created by this displacement, as that which is given to the thing that is placed. In this way, every space takes the size, shape and character necessary to make it useful, leaving no leftover, use-less or unloved spaces or spaces of neutral character (passages and storerooms), which act to reduce the life of a building. Moreover, the fashioning of positive space happens over time in places that are shaped by people who care about them, and this cared-for shape reflects both meaning and purpose that in turn acts to strengthen centres.

Figure 45 - Positive space

In the image I have chosen to illustrate positive space (Figure 45), I ask you to look at the empty floor surfaces that remain after the furniture has been placed, and see the activity that they invite. The placement of this furniture does not overwhelm, nor does it leave an assortment of fragments. Rather, it facilitates circulation, differentiation in activity type, and it creates empty but useful space for those who prefer to work on the floor. Here, we see a set design that sensitively accommodates certain epistemic values. Furthermore, both the set and epistemic design are supported by a social design that accommodates freedom to choose the task, the tools and one’s working group.
6. Good shape

*Good shape* is made from the simplest of figures and includes both positive and negative shapes. It is the regularity and repetition of these simple triangles, rhombuses, hexagons, arrowheads and parts of circles that facilitate the creation of multiple complex and ambiguous relationships across a form. To illustrate this point, Alexander deconstructs two artefacts (a simple tea pot stand and s-shaped Panton chair) showing that the shapes from which the exemplar (tea pot stand) is created are all 'good shapes', whilst the less satisfying artefact is created from ill-defined shapes that are hard to replicate across multiple levels of scale. *Good shape* is, therefore, another property in which the recursive rule is evident - where the elements of a *good shape* are always *good shapes* themselves. Alexander (2002) lists some of the properties required to make a *good shape* as follows: a high degree of internal symmetry, bilateral symmetry, a well-marked centre, positive adjacent spaces, distinct from that which surrounds it, relatively compact, and a feeling of being complete (p. 183).

![Figure 46 - Good shape](image)

This image (Figure 46) illustrates two of the strongest and most commonly occurring *good shapes* in the Zone - the circle and the triangle. People, engaged in collaborative activity, tend to arrange themselves into circles or triangles. The circle is easy to see and is supported by the seating arrangement. The triangle can be seen in the small group in the
middle, and in the groups around the periphery (triangles have been added to highlight these). This combination of small triangles within and around circles was evident in almost every space in the Zone. Very often, it was the teachers who created distributed triangular configurations in space, as they led whole group discussion or made their way through groups of students working independently. But what characterised the Zone was the emergence of learning circles created by students actively engaged in questioning, planning and making. Circles tended to form around shared centres of activity or attention, easily accommodating interested others. Their shape facilitated the departure of those whose needs had been met without collapsing the whole and, for those who were still finding their way, the outer edge of a circle provided a safe place from which to observe the learning activity of others.

7. **Local symmetries**

Local symmetries are implicit in the notion of strong centres; however, this requirement is often interpreted as a need for uniformity across the whole. On the contrary, according to Alexander, local symmetries act to bind the whole by working with and not against local conditions to create coherence - in a way that overall symmetry seldom does. It is this ability to accommodate the asymmetrical forces at play in balancing the requirements of location, context and function that results in the creation of spatially distributed centres, which are well suited to local conditions and, as such, are full of life.

Alexander uses the floor plan of the Alhambra, which is not globally symmetrical but is an excellent example of wholeness created by multiple smaller, overlapping local symmetries to illustrate *local symmetry* - "the glue that makes the design "whole"" (p. 192). Another example he gives is the construction of a fence on rough terrain using wood that is square and vertical. With the first step being to construct a roughly symmetrical fence, and the second to accommodate variation by making 'patches' from the same material. Therefore, the accommodation of variation is achieved through materials and orientation that provides *local symmetry*. 
I chose this image (Figure 47) to illustrate *local symmetry* because it highlights how different arrangements of similar types of furniture were used to accommodate local variation in the Zone. In the foreground, a mix of ottomans, couches and desk chairs are pulled up around a table of the sort that would traditionally be accompanied by desk chairs. Not only did this configuration support learning activity, it did so in a way that made the best of an awkward space. Moreover, the freedom these students had to re-configure their learning environment and create these *local symmetries* – in shapes that facilitated learning – acted as the glue that bound the three dimensions of this environment together in productive learning activity, in a way that could be qualitatively described as ‘whole’.

### 8. Deep interlock and ambiguity

*Deep interlock and ambiguity* act to bind centres at every scale, in a way that makes them hard to disentangle from the whole. In some cases they are inherent in the functional structure of the whole, as in the dovetailed joint. In others, the interlocking element serves to traverse two centres uniting them, such as in the arcade, gallery or veranda. In the example of the veranda one clearly sees how the structure - whole in
itself - connects interior and exterior centres. Very often, the interlock stands in graded contrast to the centres it connects, differing in colour, volume or light – hence the ambiguity.

![Image](image.png)

**Figure 48 – Deep interlock and ambiguity**

I chose an image of the stairs (Figure 48) to illustrate *deep interlock and ambiguity* because not only did they connect the upper and lower sections, they provided a desirable destination in which to work that often brought the two halves of this community into a shared zone of transition. In any given lesson, the upper and lower sections could be used for different types of directed learning activity, whilst the stairs were often set aside for those who had mastered the concepts being taught and were working independently. This raked destination of transition provided students with a height advantage (set) and, looking out and over working others (social), gave students a sense of being separate but still connected to a large group of learning others, who could often be seen comparing notes and working in parallel (epistemic).

9. **Contrast**

*Contrast* or the presence of the opposite - the centre against the not centre – is fundamental to the creation of life within a structure. It is achieved through placing black against white or a solid next to a void, by alternating spaces that are empty with spaces that are full, or by punctuating the sounds of activity with the sound of silence. It is more
than variety of form - high-low, soft-hard, rough-smooth. It is the deliberate placing of true opposites, which when overlaid essentially neutralise each other. For it is in hearing the clap of hands that we note the silence that was, and in perceiving the ‘not centre’ that we perceive the centre. Difference brings things together, rather than driving them apart, through modulation - public vs. private - thereby acknowledging and allowing for the different dimensions of human experience.

The image I have chosen to illustrate contrast (Figure 49) shows the upper section emptied to accommodate an immersion day simulation. In it, one can see evidence of contrast in flooring, ceiling height, emptiness and fullness. Moreover, being together on the carpet in the emptied upper section served to powerfully focus the attention of this group towards a centre of shared attention, within the strong centre. On any other day, contrast was evident in soft and hard furnishings (set), in students’ varied responses to tasks (epistemic), and in terms of the balance between independent and collaborative group work (social).

10. Gradients

Gradients are a function of the fact that conditions change, and in response the qualities of strong centres shift in subtle ways across the whole in size, spacing, intensity and character. Alexander describes how
the quality of daylight changes from the top story of building to the bottom, and how window and ceiling height should change accordingly. It is this subtle variation in response to change that forms gradients, which in turn become centres in themselves. For it is their field-like character and their orientation towards changing conditions that they point towards the centre of the centre.

11. Roughness

Presence of life is often accompanied by a roughness that is not accidental but results from careful attention to local conditions, ‘it comes about as a result of paying attention to what matters most, and letting go of what matters less’ (Alexander, 2002, p. 211). As a property, roughness cannot be deliberate, for then it becomes contrived. To give something life requires an egolessness that does what is essential, rather than imposing an arbitrary order on local conditions. Creating a sense of life is a result of this type of adaptation – of paying attention to the global, only where necessary. In his presentation of this property, Alexander expresses his sadness that we have come to see roughness as inferior. In the images he uses to illustrate this property, he contrasts a modern brick wall with a dry stonewall. The first is indifferent to changes in scale and place within the whole, whereas the latter is carefully constructed with each stone chosen and carefully fitted within the whole.

12. Echoes

This property is hard to define, precisely because it speaks of familiarity rather than formality. It lies below the surface and can be seen in the pitch of a roof that reflects the contours of the local landscape. Alexander notes that where functional considerations (for example, the weight of winter snow on the pitched roof of a house built on a slope) are properly considered, the resulting structure usually follows familiar geometric rules. The repeated application of these rules is what creates the familiarity he describes as an echo, and the structures they create is therefore well adapted to local conditions in terms of slope, sun, and drainage.
13. The Void

Alexander argues that it is the presence of a void at the heart of a centre that defines the most profound of centres. For Alexander, the void is the very essence of centre, and it is more than the presence of strong contrasts - emptiness against fullness or stillness against activity.

The need for the void arises in all centres.... A painting that is a mass of color rests on some quiet unbroken field of color, less differentiated, and concentrating the quiet to itself. In a building, a large living room, not cramped – a large hall, not cramped – in ornaments the same. They cannot be all fuss; there must be a balance of calm and emptiness with the delirious detail. It is the way a large empty centre brings life to a mass of smaller centres (Alexander, 2002, p. 225).

The presence of a void within a spatially distributed system acts to draw attention in, rather than to throw things into sharp relief or highlight contrast. Examples he uses to illustrate this property include The Cairo mosque and Vermeer’s ‘Woman in Blue Reading a Letter.’

14. Simplicity and Inner Calm

Simplicity and inner calm describes a state where anything that is extraneous - does not serve to support other centres - is removed. It is the point at which only that which is essential remains, and this creates a sense of deep calm. Alexander uses examples of Shaker furniture to illustrate this property, listing a number of their qualities as typifying simplicity and inner calm, such as: simple shapes, sparse ornamentation, unusual proportions – long or elongated, surprising functionality – two beds sliding under one, and colourful – with paint worked into the wood in a colour that was coded to its function. But above all the exemplars of this style had a stillness to them.
15. **Not separateness**

Centres that resonate are those that are connected to all that lies around them. They are not separate. Moreover, there is a softness to them that reflects the attitude with which they were conceived. They are not made to dominate and in many instances they possess fragmented or incomplete boundaries. Alexander lists spaces connected to their surroundings both natural and built, and those that accommodate the old and the young – as demonstrating this property.

This concludes the introduction to the principles of Alexandrian wholeness. In what follows, I consider a number of them in relation to the annual rotation in home bases, as detailed in Vignette 2.

**ALEXANDRIAN PROPERTIES OBSERVED**

When putting the properties to work in analysis, design or construction it is important to remember that what we perceive as a living or productive environment is the result of wholeness, and not the function of the individual underlying properties themselves. I have chosen to explore Alexandrian notions of wholeness through an analysis of Vignette 2, a close reading of which is necessary before proceeding any further.

The annual rotation was a carefully considered course of action that weighed the affordances of the built environment against the activity-based benefits of the social relationships that it housed. It was a single global action that served no particular individual but worked to ensure the good functioning of the whole. Moreover, it was evidence that this particular learning community was subject to the design of unseen others, and it revealed aspects of their thinking about people, pedagogy and place.

From an Alexandrian perspective, the rotation was an alteration to six local sub-wholes that resulted in changes in the regional whole. If we are to take the notion that position within the whole is important
Wholeness induced by the details of the configuration

because sub-wholes are adapted and modified in shape and size by their position within the whole, then this rotation in home bases - to leverage certain affordances of space for some and ameliorate their effects for others - is more profound than it appears. What is more, it served to differentiate time over the course of the year in a way that acknowledged the development of skills, and reasserted shared values about learning.

The discussion that follows is shaped to reflect Alexander’s basic pattern structure: context, problem and solution, and it hints at what is to come in Chapter 7 - an exploration of patterns and pattern languages.

The context. In describing the Zone, I could start with the first of Alexander’s fifteen principles, levels of scale, but it was not the first thing that I noticed about this space. My untrained eye went straight to the void, the carpeted central portion of the upper section that was supported by the stairs. The way this empty carpeted space drew people in fascinated me from the very beginning. It offered emptiness amidst fullness, and unscripted space alongside more formally scripted space. But it was not merely the presence of the void that shaped the heart of this learning environment. It was the intentional way the teachers used it, as a place to gather before dispersing, that gave it its central role in modulating the rhythms of the day.

Moving into the upper carpeted centre (UC) at the start of a learning session, teachers would triangulate their bodies across the space in which the students were gathering and initiate a conversation amongst themselves. These discussions hinted at what was to come, but were always genuinely conversational in tone. I had the distinct impression that everyone enjoyed them, and they gave loose structure to activity as students gathered in this large, strong centre. As I became accustomed to how this ritual played out, I would pause, waiting for the students to settle because it was never very long before one of the adults would quite naturally venture ‘outside’ of this triangular conversational space with a question. Sometimes this was general and asked of the group, and sometimes it was directed at a single child who had been
observed visually tracking the conversation. From there, the conversation would swell, reach a peak and just as quickly abate, not into nothingness, but into the learning activity of the day.

As an outsider looking in, trying to grasp the measure of this environment, I would listen, watch and sometimes - just to be certain – I would record the total time elapsed, which was always less than five minutes. Always surprised, I would pause to consider the value of these five minutes that could so easily have been spent in disarray, characterised by the repeated issuing of instructions by those who were tired of speaking to those who did not care to listen. Maybe the fact that this is what I noticed first is instructive in itself, for Alexander is clear that in the most profound of centres there is housed within, a void. Here, there is a contrast of stillness against activity, which functions not merely to amplify difference, but to bring balance to the smaller centres surrounding it, and thereby draw people in.

In unpopulated moments, the central carpeted space was empty and its rich soil-coloured carpet stood in contrast to the adjacent concrete flooring - dark against light and warm texture against cool reflective polish. The increased height of the ceiling above this expanse created a volume that was distinctive and unbounded by windows, which lay instead along the outer perimeter. Well supplied with natural light from multiple directions, the students worked in an environment that did not occlude the passing of time or the changing of seasons. Moreover, these clear lines of sight connected this group to the wider school community, taking in views of spaces set aside for both its oldest and youngest members.

Filled with moving learning bodies, this space accommodated its community well - it was neither too large nor too small. The spaces around the central carpeted area were mostly strong centres in their own right and served to ground this openness. Four of the six home bases shared a common boundary with the strong centre, and the remaining two enjoyed lines of sight up the stairs and into the void above. I’d often wonder at the thin line that separated one space from the other, the

PART 1, THEORETICAL EXPOSITION
silver beading that kept the central carpet pinned to the floor. There was nothing else that marked the central carpeted space from the formal workspaces that flanked it. But it was here, where the carpet was secured to the concrete floor, that the contrast of emptiness against fullness could be felt. Furnished with seating and desks of varying heights and materials, each of the smaller spaces shared similar qualities, except for one - Upper Left (b).

**SKETCH OF THE ANNUAL ROTATION OF HOME BASES IN THE ZONE**

![Figure 50 - Annual rotation of home bases](image)

**THE PROBLEM.** Upper Left (b), seen in Figure 50, was demarcated to the north by an unmarked boundary on the mid point of the uniform concrete flooring that separated it from Upper Left (a). To the south, it shared a glass wall that looked into a soundproof room reserved for video recording and robotics. To the east, it ended where the central carpet began and to the west, it ended where personal storage cubes were housed against the glass wall. In general, Upper Left (b) had good light, ventilation and for the most part similar furnishings. Yet – at least from April to December of 2012 - it was the destination of last resort, the least desirable space in the Zone.
As I watched, I often wondered if a bit of black tape stuck to the floor to mark this invisible boundary would have helped to keep the desks from bunching up or spreading out and bleeding across what ought to have been a path to the door or into the adjoining learning space. I also watched to see what use was made of the art installation inspired by Yayoi Kusama, which was housed in the corner between the robotics room and the western glass wall. The installation had provided a point of interest at the start of the year. The idea had been that, over the course of the year, this assemblage of familiar artefacts, anonymised with white paint, would become a mass of colour through the application of coloured sticky dots given as merits. It was a tired idea, given a novel twist, but by the time I arrived in April it seemed to have lost much of its original appeal. Moreover, its colourful and slowly degrading presence occupied the only structural anchoring point available to those in Upper Left (b), with the result that those who spent time in this space had to work very hard to create a shared sense of place.

Furnished with six, six-seater tables of uniform height, size and material, it was difficult to create anything other than an arrangement of rows, and the absence of carpet or soft furnishings rendered the floor undesirable in its own right. Unlike the furnishings in other spaces, this uniformity offered no visual contrast, good shapes or levels of scale and left very little useable or positive space. On the odd occasion, a U-shaped assemblage did emerge but these arrangements never seemed to last. For, in the absence of a strong point of shared attention, the placing of the open-end was always problematic; facing the carpet provided inadequate differentiation and facing the western wall made access awkward. This is not to mention the difficulties associated with visual orientation created by the backdrop of general activity on the central carpet, and by the strong afternoon sun from the west.

There was some local symmetry in terms of function: a large screen, a teacher’s storage caddy, student storage cubes and a portable storage cabinet complete with built in whiteboard. However, in practice, these echoes were insufficient to give life to this space. The large screen remained disconnected and unused, as did the portable storage cabinet.
that stood empty with its whiteboard back facing the window much of the time. The only exception was that the students in this space made good use of their storage cubes, which was notable in that no other group in the Zone used theirs in quite the same way. This arrangement was arguably the only weak centre in Upper Left (b). It provided a convivial space in which students exchanged greetings and information as they packed things away or went looking for something they needed. But a place to leave things, when not in use, is insufficient to create a strong centre.

In my description of these two spaces - the centre unfurnished, well loved and well used, and Upper Left (b) variously furnished, unloved and underused - there are hints of why the second is less successful. I could see the art installation lose relevance and silently occupy the corner of what was an awkward space, bounded by unmarked pathways and multiple doorways into other spaces. Whilst these observations are accurate, on their own they do not speak to an architecture of good space. However, placed within the context of Alexander’s theory of order, there are some very clear explanations for the absence of life in Upper Left (b). The most obvious were the absence of effective boundaries, levels of scale, contrast, positive space and a strong centre. Taken together, the lack of these properties made it hard to initiate self sustaining independent learning activity in UL (b). Nowhere was this more discernable than in the difficulties experienced by Mr Hughes and his group after the annual rotation of home bases.

Mr Hughes’s group had relied heavily on the large screen and whitewall in Lower Right (LR) to orient themselves in space and time. At the start of the day, they would make their way through what was timetabled for that day, what was coming up and other general administrative matters. This involved switching between PETE, Edmodo, Mr Hughes’s records of who had done what, and sundry other bits and pieces. As they did this, Mr Hughes would record helpful details on the wall before the students dispersed for the day (Figure 51). Throughout the day, students running into problems could be seen returning to their home base to reorient themselves in their activity by reading the wall.
This act of reorientation was not reserved for, or limited to, those in Mr Hughes’s home class, and on more than one occasion, I saw others stand and move with purpose into this space to read from the wall before returning to their work. Over time this practice became familiar and I often heard Mr Hughes respond to questions with, ‘Have you checked the wall? Come back and ask me if you still can’t figure it out.’

Figure 51 – Mr Hughes’s whitewall

In their new space, there was no easy way to replicate this centre of attention and activity due to the presence of the art installation and the awkwardness associated with using the large screen on wheels. Power and Ethernet dependent, the screen hovered around the post that housed the power points, but was seldom plugged in. For it to have been functional it would have to have been placed in a way that separated Upper Left (b) from the central carpeted space - and nobody chose to do this. Instead, it sat awkwardly at the corner taking up space, but it was seldom positioned in a way that blocked the lines of sight into the centre and out of the western windows, or against the window into the robotics room.

Downstairs, Mr Hughes had always been good at creating a centre of shared attention, despite the fact that his students tended to drift out towards the walls where they would bump up against them and then sit down on the carpeted floor, focusing on either independent work or the activity of the group. Upstairs they were without boundaries,
had no carpet, whitewalls or functioning screen of their own, and it was therefore not surprising that they quickly gave up trying to ‘get established’ in the corner without edges. Instead, they relied on the soft furnishings of the central carpeted space to create cohesion during time spent together.

The act of bumping up against the edges is interesting and, in terms of boundaries, it highlights the importance of being able to identify the point or zone of distinction. In the absence of clear boundaries, groups would slide towards an external point of resistance or restrict their use of space to only a fraction of what was available. In other smaller centres, both hard and soft boundaries were visible and relatively stable. In many instances, it was the green and red upholstered couches that marked a gradual transition from one space to the next. They were heavy enough to stay where they were placed, but light enough to move if desired, and they supported both collaborative and independent work.

**The Adaptive Solution.** Downstairs, Mr Hughes had relied on both circles and semi-circles - the good shapes that he created with the help of circular, semi-circular and triangular seating - and the presence of positive space on the carpeted floor. Using the properties of these elements, he had created centres of shared attention that supported learning activity in a way that included everyone equally. It was therefore not surprising that, as attention began to drift on the first morning after the move, his initial instinct was to call for the formation of a circle on the central carpet. It was this powerful use of physical presence and shared visual, auditory and kinaesthetic attention that served to ground this group, by echoing the once familiar rhythms of their days downstairs.

Mr Hughes and his class never did establish a centre within Upper Left (b). Instead, they relied on soft furnishings arranged on the boundary of the central void, their growing independence at navigating their online spaces, and Mr Hughes increased vigilance to maintain group cohesion. However, he did go out of his way to preserve one of the arrangements I created on the edge of the central carpet. I suspect that
Wholeness induced by the details of the configuration

his insistence on recreating it was a function of his awareness of what was missing in Upper Left (b), and his sense that he was better able to create a working solution on the boundary of the central carpeted void.

Ms Talbot’s group of year fives did not experience quite as many difficulties in the transition, which may be attributed to the qualities of the space they moved into (UR), and the knowledge that the furnishings they had inherited were soon to be replaced. Notably, they too used a portion of the central carpeted section when looking for informal space in which to gather. Upper Right was smaller than Upper Left (b) but it possessed three clearly defined boundaries (the glass walled staffroom, an exterior whitewall with high windows and the art supply cupboard). These boundaries served UR and the upper section simultaneously and therefore created distinction without separation. The fourth boundary was marked by the presence of the central carpet and couches, which created a permeable boundary.

It is also worth noting that, in contrast to Mr Hughes group in UL (b), there were those in Ms Talbot’s group (UR) who experienced the absence of walls as a positive change. In Ms Talbot’s group, there were a number who found daily transitions difficult, and the presence of walls to bump up against seemed to compound their problems downstairs. Upstairs, they were quite literally housed in a greater volume and the absence of enclosing walls meant that they had space to expand out before choosing to move towards a person, activity or thing. Upstairs, Ms Talbot managed to create a fragmented boundary through furnishings and practice - in moments when containment was deemed counterproductive, she would relax the boundary and move with a few of her students into the carpeted centre, leaving those who had settled within the established centre provided by their home base. In this way, she preserved one centre and created another – the second temporary and less bounded on the carpet.

Alexander speaks of freedom. By this he does not mean a freedom to do whatever one pleases, but a freedom to do what one must. Mr Hughes and Ms Talbot’s management of the set, epistemic, and social
elements of this learning environment worked to enable and preserve this Alexandrian notion of freedom in the Zone.

**CONCLUSIONS**

Using Alexander's properties of wholeness to explore how materials participate in teaching and learning practices, reveals underlying structural elements that, working in concert, give rise to wholeness that is emergent. This knowledge, together with an appreciation of the qualities of materials and their situated contingent and relational dependences, aids in deepening our understanding of complex learning environments. Many of the properties described are open to alteration, and therefore to design; however, it must be remembered that wholeness itself is an emergent quality and therefore elusive.

In **Chapter 7**, a discussion of Alexander's original pattern language, and its subsequent use in education precedes the presentation of a number of shareable representations of valued designs in the form of high-level pattern outlines, patterns and a pattern scenario.
CHAPTER 7

THE VALUE OF REUSABLE PATTERNS OF ACTIVITY AND DESIGN

Figure 52 - Semi-permanent writable surfaces that move

Attentiveness to the material qualities of things, understanding their entanglement with humans and other things, and apprehending wholeness, brings depth of insight. What we do with this understanding is the central concern of this chapter. In a sense, I have employed Alexander’s progression from patterns to principles to wholeness – but in reverse - for it is here, toward the end, that I turn to the practice of pattern writing, derived from his original work in *A Pattern Language* (Alexander et al., 1977).

A pattern is the descriptive codification of a constructive response to a challenge in any given environment. Alexandrian patterns describe the context, problem and one type of productive response to that class of problem. Moreover, he notes the value of not one - but many - because a pattern amongst many becomes a language, a means of sharing the lived experience of successfully resolving common problems. In his original work on patterns, Alexander defined a pattern as something that describes a recurring problem in our built environment
'and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice' (Alexander et al., 1977, p. x).

Central to his work was a desire to identify that which was good in existing, well used and well loved, built environments. Having made progress toward this goal, Alexander set about finding a way of sharing these good designs with others, in order that they too might design and build similar structures for themselves. This resulted in a two-step approach: 1) identify what is good and why, 2) codify and share - a process that is intuitive and yet deceptively difficult to do. For with the introduction of value the process was no longer just about any things or humans, and their complementary and conflicting relationships, but about certain things and humans that came together in ways that were productive - creating places that were full of life.

I argue that it is this requirement - to acknowledge and describe the ‘subjective’ good - that has confounded even the most inspired attempts to replicate the clarity of Alexander’s original work. For in our drive to be more scientific and more objective in the analysis of our environments, we have diminished or rejected the time-honoured tradition of careful observation and honest description of shared human experience. Moreover, our inability to appreciate the material, trace our entangled existence, and apprehend the nature of wholeness has rendered us incapable of identifying the precursors to moments of deep learning that should be at the heart of all pedagogical patterns.

The problem is not new. Alexander himself struggled to find a way to talk about ‘the quality without a name’ (Alexander, 1979, p. 7). Much in the same way, good teachers find it hard to describe that moment in which a student suddenly ‘gets it’, or when a group finally realises that together they have produced something more extraordinary than any one of them could have on their own. The difference is that Alexander refused to be limited by his inability to define, measure and quantify ‘the quality without a name.’ Instead, he chose to start by referencing our shared experience of that deep instinctive response to
certain spaces that we sometimes encounter. He observed that ‘every place is given its character by certain patterns of events that keep happening there’ (Alexander et al., 1977, p. x) and that these patterns are connected to certain structural elements of the space which, when taken together, express qualities that are either life affirming, or not.

This cumulative effect of life-affirming patterns is something that we are now familiar with - for it is wholeness, as described in Chapter 6. However, in this chapter, we are not looking at the underlying structuring principles of wholeness per se, but at patterns generated ‘indirectly, by the ordinary actions of people’ (p. xi). Alexander argues that it is our inability to see and understand these life-affirming patterns that results in impoverished environments. He does not offer up The Pattern Language as a final solution, but as a way for us to become reacquainted with the shapes and qualities of form that have been shared amongst those responsible for building the places of our human habitation for centuries. His life’s ambition has been to re-learn the art of discerning deep patterns and, in sharing them, he hopes to reteach the skills associated with improving upon them through shared experience. For only in learning to recognize the feelings our environments generate in us, and in iteratively refining them, will we become better at identifying and shaping environments that are life affirming. Alexander describes communities in possession of a common pattern language as having the power to:

make our streets and buildings live, through our most ordinary acts. The language, like a seed, is the genetic system which gives our millions of small acts the power to form a whole... Within this process, every individual act of building is a process in which space gets differentiated. It is not a process of addition, in which performed parts are combined to create a whole, but a process of unfolding, like the evolution of an embryo, in which the whole precedes the parts, and actually gives birth to them, by splitting (Alexander et al., 1979 p. xiii).

Motivated by the need for shareable representations of valued design solutions, software developers and designers from across disciplines and around the world have adopted, adapted and reused Alexander’s work on patterns and pattern languages. Michael Mehaffy
(2012), an associate of Alexander’s, when speaking at a software convention, highlighted the difference between patterns that specify and patterns that generate - form or behaviour. Mehaffy notes that we have become very good at the former, but not the latter, and that while some problems can be solved through specifying linear systems, these tend to be found in mechanical systems and therefore represent only a single subclass of system in any particular environment.

Mehaffy (2012) argues that a singular mechanistic perspective artificially collapses levels of complexity, resulting in solutions that are sensible at one scale, but ridiculous at others. To illustrate the point, he draws on his experience as an urban planner, highlighting the at-scale absurdities inherent in a car dependant society, where walking the dog involves a drive to the dog park and where exercising oneself includes not only a drive, but a ride on the escalator to reach the stair machine. In these examples, we observe not only an absence of creative generativity at work, but also the perpetuation of a logic that is counter productive at scale. It is this unexamined generativity, or wilful blindness to the consequences of our actions across scale levels, that brings us back to the question of value that lies at the heart of pattern languages.

In software development, value can be measured in efficiencies and return on investment, but in education there is something less easy to quantify at risk. The boundary between what can, and what cannot, be designed within an educational context often lacks clarity, and for those tasked with the responsibility of designing good tasks, places and communities for learning, this distinction is vital (Goodyear & Carvalho, 2014b). So what do we value in teaching and learning, and how do we ensure that what we do reflects our values and influences our designs?

Pedagogical or technological neutrality is sometimes touted as a virtue, as if it were indeed possible for us to design something that did not privilege or occlude some types of activity and unintentionally perpetuate others. Distancing themselves from debates about neutrality, Goodyear and Retalis (2010) state that to take on the mantel of the ‘pattern-hatcher’ is to intentionally search for what is good. They
acknowledge the value of shareable representations of design, from
designer to designer. However, they stress that when it comes to *design
for learning*, it is the way the internal logic of patterns works to align
theory and practice that is critical (Goodyear, de Laat & Lally, 2006).
Pattern languages provide educational designers with a means of
sharing current valued practice in a form that is intentionally shaped
to connect current theory about learning with current learning practice.
And their structure forgivingly accommodates the expanding array of
tasks, digital resources, material spaces and social arrangements in
which learners learn (Goodyear & Retalis, 2010).

THE FORMAT OF AN ALEXANDRIAN PATTERN

In the Alexandrian form, each pattern has the same format, which is
illustrated in Figure 53 (Goodyear, 2004, p. 342), and is derived from
Alexander’s work on patterns (Alexander et al., 1977, p. x-xi).

| 1. Picture of an archetypal example of the pattern. |
| 2. Introductory paragraph (context and how it completes certain larger patterns). |
| 3. Headline *(essence of problem in one or two sentences)*; the problem statement. |
| 4. The body of the problem (empirical background, evidence for validity, the range of ways in which it can be manifested). |
| 5. The solution - the solution statement worded as an instruction *(describing the field of physical and social relationships that are required to solve the stated problem, in the stated context)*. |
| 6. A diagram, which illustrates the solution, complete with labels for each of the main components. |
| 7. Closing paragraph ties the pattern to smaller patterns, which complete, fill it out or embellish it. |

Figure 53 - The traditional form of an Alexandrian pattern

This format supports the internal coherence of a broader set of
patterns, or the pattern language, with each pattern setting the
preconditions for certain lower order patterns, and completing or
The value of reusable patterns of activity and design

embellishing other higher order patterns. Their structured, discursive format facilitates the rich but concise description of the essence of a particular problem, and the experience of using a particular solution to resolve it, in a given context. Patterns are used to communicate knowledge in a transparent and practical manner, so that those who reference them can understand their original context and make alterations to suit the new context without losing the essence of the original pattern (Alexander et al., 1977).

All patterns are given a name that tries to capture the essence of a shared problem, which is intended to make using the pattern language easier. In deference to the iterative nature of pattern writing, the team who wrote the original set of patterns chose to mark patterns which they believed represented ‘all possible ways of solving the stated problem’ (Alexander et al., 1977, p. xiv) with two asterisks. One asterisk indicated fair progress towards this goal; the absence of an asterisk was acknowledgement that further refinement was still necessary. The published volume of 253 patterns (Alexander et al., 1977) was a single pattern language, a context-specific set of solutions to a particular set of problems faced by a particular group of people.

ALEXANDRIAN PATTERNS IN EDUCATION

The Alexandrian form is distinctive but is not always used by those inspired by Alexander’s work (Goodyear & Retalis, 2010). Taking up pattern writing is often driven by a need to resolve pressing practical problems, and not because of a desire to become a perfect pattern writer - a fact that should not diminish the value of a well-written pattern, when faced with a complex shared problem. In what follows, I briefly introduce three ways in which Alexander’s work has been used to share valued designs amongst those who teach technical subjects in higher education (Bergin et al., 2012), those who conduct research into technology-enhanced learning (Goodyear & Retalis, 2010), and those engaged in shaping the physicality of learning environments (Nair, Fielding, & Lackney, 2013).
The pedagogical patterns project (PPP)

The PPP was a collaborative effort to collect, edit and share patterns of successful teaching techniques in an online repository for those tasked with teaching technical subjects, who often had no formal teaching qualifications. It can still be found online at The Pedagogical Patterns Project (http://www.pedagogicalpatterns.org). But the activity it once generated has largely been subsumed within the much larger Pattern Languages of Programming Conference (PLoP) communities around the world. An example of which can be found at Europlop (http://www.europlop.net).

Whilst their original online patterns were less faithful to the Alexandrian form, they have since been rewritten (Bergin et al., 2012) to facilitate their integration with patterns in the original form. In a short guide for pattern writers, Joseph Bergin (2013) lays out the structure he uses for more technical patterns as follows: Name, Context, Problem, Forces, Solution and Resulting context, with the possible addition of ‘Discussion’ and ‘Examples of Use’ to be included, depending on the subject matter. Bergin also notes that the Alexandrian convention of an image following the name is helpful and that, where the subject matter or the audience is less technical, the introduction and conclusion may take a narrative form. This style is currently used by the members of a number of Pattern Languages of Programming Conference (PLoP) communities, around the world.

The patterns in the later volume (Bergin et al., 2012) are taken from five co-authored papers detailing teaching strategies concerned with active learning, feedback, experiential learning, gaining different perspectives and teaching from different perspectives. The patterns describe teaching strategies, and are not concerned with the form or shape of teaching and learning spaces, nor do they reference current educational research, making it difficult to cross-reference or examine the foundations of the methods they describe.
TECHNOLOGY-ENHANCED LEARNING

Goodyear and Retalis (2010) can also be found working at the confluence of learning and technology, and their adoption of a patterns based approach is premised on the need to understand, design and manage complex technology rich learning environments. As researchers, they call for a reframing of the patterns based approach in education, moving away from ‘folk theories’ of education towards intentionally embedding the best of educational theory in everyday teaching and learning practice. They note that, in times of accelerating technological innovation, one of the biggest challenges associated with research and design in technology-enhanced learning (TEL) is the ability to distinguish between what are superficial changes and what are enduring fundamentals. Their interest in learning is broad and encompasses the implicit, informal and formal; their correspondingly broad interest in technology is a function of its capacity to strengthen or slacken the connections between perceiving, learning, knowing and action. All of this is accomplished through different forms of scaffolding, or embedded into the design of artifacts that shape or elicit certain foreseeable responses from learners. This presents a considerable design challenge because these affordances are often only evident in use.

Given the pace, scale and far reaching effects of technological innovation, Goodyear and Retalis (2010) argue that educators need to be more design savvy if they hope to improve the learning outcomes of those for whom they are responsible. They note that TEL design is a complex task that ought to be shared, because it is time-consuming and requires a broad range of expertise. Their adoption of a patterns-based approach stems from their conviction that good TEL designs can be shared through patterns that:

1. Connect recognisable problems with tested solutions.
2. Manage design problems at any scale level, and connect solutions across scale levels (micro, meso and macro).
3. Supplement know-how with research-based evidence.
5. Demonstrate wide application but can be locally adapted.
6. Improve design performance and educate the designer.

Moreover, Goodyear and Retalis (2010) note that patterns bridge the distance between design-activity and what actually happens at learn-time, because they are action-oriented and provide scaffolding for decision-making, teach general lessons about design and education, and maintain coherence across interest groups. They acknowledge that the sharing and re-use of learning resources amongst teachers is a practice with a long history, but caution that the exponential increase in available ‘Learning Objects’, accessed via the Internet, belies the complexity of good design for learning. For the educational designer is required to do more than just decide on content and select tasks, they need to specify task sequences within complex learning environments, whilst maintaining an internal pedagogical coherence. The pedagogical pattern is well suited to all of this, because it documents the designer’s tacit knowledge and experience, offers examples in a form that others can apply in local contexts, and connects practice with current learning theory.

In a later edited collection of patterns for teaching and learning with technology, Mor, Mellar, Warburton, & Winters (2014) present a number of design narratives, patterns and scenarios, each of which serves a slightly different purpose. A narrative describes a specific experience of developing a design, a pattern presents reusable elements of design from a narrative, and a scenario presents a number of patterns from a pattern language in an imagined teaching context.

**The language of school design**

The Language of school design is a patterns manual written by three architects (Nair et al., 2013), who specialise in designing school based learning environments. Their work is inspired by Alexander (Alexander et al., 1977) and their book, a collection of what they call diagrammatic patterns, was born out of the frustration of navigating between the requirements of innovative education in terms of research,
and the reality on the ground when taking design briefs. The book is peppered with questions like 'Why do schools look the way they do?' and 'Why is there a chasm between widely acknowledged best practice principles and the actual design of a majority of school facilities?' (Nair et al., 2013, p. 13). Their considered response is that these problems can be traced to the absence of a shared language amongst those involved in the design of schools.

Nair and colleagues (2013) deviate from the Alexandrian form, because they feel that the diversity of stakeholders involved in school design warrants the change. In their opinion, images are a better form of communication than textual descriptions; therefore they aspire to create a graphic language that all stakeholders can interpret and use to create design solutions to the problems they face. They feel too much is lost in translation from the textual form to the built form and in their opinion the graphic form resolves this issue. Referencing the often overwhelming experience of taking a design brief, where everybody has something to say about the design of a learning environment, they note how those with the most control frequently have the least to offer in terms of design expertise. I would add that those with the design expertise, and the oversight of facilities management, usually lack the requisite insight into the relationship between learning activity and the learning environment. Moreover, the practitioners on the ground are often under-resourced and ill prepared to manage the wholesale transition from one style of teaching to another that results from dramatic changes in the built environment (Sutherland, Sutherland, Fellner, Siccolo, & Clark, 2014; Woolner et al., 2012, 2014).

Having explored the format and use of Alexandrian patterns in general, with specific reference to teaching and learning, in what follows, I consider how we might conceive of pedagogical patterns within the ACAD framework. For, in as much as pedagogical patterns seek to connect practice with theory, the ACAD framework seeks to connect the design of the learning environment (social, set and epistemic) with emergent learning activity.
PEDAGOGICAL PATTERNS WITHIN THE ACAD FRAMEWORK

The ACAD framework (Goodyear & Carvalho, 2013), discussed in Chapter 3, proposes an architecture for productive networked learning that helps designers conceptualise, but not compartmentalise, the three critical aspects of any given learning environment: the set, the epistemic, and the social design. What is more, it stresses the importance of understanding how these dimensions relate to the emergent activity of learners in acts of co-configuration and co-creation. In applying this framework to a number of case studies, the task of analysing productive networked learning environments has begun (Carvalho & Goodyear, 2014b). However, the focus of much of this work has been on digital learning environments. As such, it may have been easier to focus on designed tasks, designed environments and designed social arrangements. This is because there is, from the outset, a distance in space and in time between tasks, set, learner and instructor. I argue that networked learning environments in which learners are physically present - where their activity is shaped by (a)synchronous interactions and in person cues – requires not only the codification of patterns of productive form, but also the codification of patterns of semi-structured social interaction (Yeoman & Carvalho, 2014; Yeoman, 2015). What is more, because these patterns connect epistemic and set designs in productive ways, their absence may result in unproductive combinations of certain epistemic and set designs, at learn time, in complex learning environments. As such, I make the case for the iterative refinement of networked learning environments using both the ACAD framework and Alexandrian inspired pedagogical patterns (Goodyear & Carvalho, 2013; Goodyear et al., 2006; Goodyear & Steeples, 1998; Goodyear, 2004).

Patterns of semi-structured social interaction or productive behaviour may fall within the ambit of social design, but require far more than merely documenting that a task should be carried out in pairs or alone. For example, stipulating and implementing argumentation (Dillenbourg & Jermann, 2010) in an online environment is, at present, an arms length epistemic design transaction. There is a spatial and
temporal distance between the learner and the teacher at learn time. However, in place-based learning networks the teacher is physically co-present and may choose to act in ways that facilitate a closer coupling of design intention and learning activity (Dillenbourg, 2013).

This is not the same as saying that it is possible to design what students do – their learning activity – for what a learner chooses to do with any given task is subject to interpretation (Goodyear & Carvalho, 2014b). Moreover, at learn time there is much the teacher does that is neither planned for nor intentionally designed, and we would do well to learn from those who intuitively work well in open digitally mediated environments. This is because their use of the environment, in conjunction with patterns of productive social interaction, would benefit others who find themselves tasked with the oversight of learning in place-based learning networks. In what remains of this chapter, I examine the fundamentals of good pattern writing as described by Goodyear and Yang (2009), after which I return to Alexander’s original framing of pattern languages, before beginning the work of outlining a pattern language for place-based network learning myself.

Based on a review of pedagogical patterns at the time of their writing, Goodyear and Yang (2009) summarised the necessary and desirable attributes of pedagogical patterns as follows:

- Patterns should always capture an invariant property of an existing practice – not just state a good idea. A pattern should describe something that already solves an existing problem. What is more, good solutions reconcile competing forces and deep patterns help us see how things we often take for granted, actually work.

- When writing a pattern, it is important to get the level of abstraction right. Too concrete, and it is hard to see how the solution relates to a broader problem. Too general, and it is hard to apply the pattern to a specific problem.

- A good pattern provides insight into why a solution actually
works. Good patterns encode specific value systems and therefore the pattern writer needs to explicitly state what is valued and why.

- Good patterns are part of a pattern language, and making the links between individual patterns is as important as the patterns themselves. Therefore, each pattern plays a structuring role in helping others find appropriate solutions. What is more, when working recursively within an explicit value system, toward a complete design, this structure is generative.

- The pattern and its presentational form are representations and, whilst forms may differ, their core should remain constant: problem statement, solution statement and rationale. Finally, pattern names are important and a well-chosen name may take on a life of its own.

Having detailed the fundamentals, they note that even when all these requirements have been met, ‘The leap from pedagogical patterns to actual student activity can be enormous’ (Goodyear & Yang, 2009, p. 175). This is a problem that is only compounded by the ever-increasing rate of technological change, the expanding range of possible learning activities, and the variety of available learning environments. All of this makes the task of mentally weighing design choices against the physically situated learning activity of any number of students a cognitively demanding challenge, where the diminished opportunities for ‘backtalk’ often leads teachers to make premature design commitments. Given these challenges, Goodyear and Yang (2009) make a case for using patterns, written at the correct level of abstraction, to assist those involved in task design. Because patterns give the designing teacher time to try out and reflect on a number of different designs, ensuring that the final solution adds to, rather than detracts from, the resonance of the whole.

The final point Goodyear and Yang (2009) make that I wish to emphasise is the difference between patterns with a performance orientation and those orientated towards understanding. The reason
they highlight the difference is because people are quick to see the value of patterns that enhance performance, but their role in facilitating deep understanding is often neglected. Mehaffy (2012) makes a similar point when he differentiates between patterns that specify, and patterns that generate either form or behaviour, noting that specifying an operational sequence is quite different from establishing the preconditions within which activity gives rise to valued outcomes. Both views resonate with Tim Ingold’s writing on the qualitative difference between successional (predetermined) and processional (responsive) ways of being in the world (Ingold, 2011, 2013), as discussed in Chapter 1.

In bringing together the theoretical threads presented thus far (things, entanglement, wholeness and patterns) with a focus on the underlying principles of learning and teaching that are supported, extended and reinforced by the material qualities of learning environments, we must do more than reproduce things and their associated patterns of use. We need to get to the heart of why some places of learning ‘sing’ whilst others ‘stufey.’ To this end, Goodyear and Retalis (2010) suggest that we should identify, cross-reference and map through careful observation, the dispositions (exploration, discovery and collaboration), activities (writing, watching, listening, building, communicating, debating, synthesising and sharing) and tools of productive networked learning. This is so that we can understand existing patterns that productively meet teaching and learning needs, before moving into the role of designer where, using what we have learned, we can design productive environments for networked learning.

A PATTERN LANGUAGE FOR LEARNING ENVIRONMENTS

According to Alexander (Alexander et al., 1977), first order patterns conceptually order scale, shape and connection across time and space. They are the broad-brush strokes, the context within which a design is specified. They are what defines a community, and cannot be built in a single act, but through the cumulative acts of all. Second order patterns define individual things, groups of things and the spaces between them.
They can be built in a single, sustained effort under the control of individuals or small groups, and are complete designs in themselves. Third order patterns tell you how to build things; they specify the detail of second order patterns and can be built in a single act under the control of an individual. They are the details of a complete design.

### Table 20 - The three levels of Alexandrian patterns

<table>
<thead>
<tr>
<th>Level I patterns (global)</th>
<th>Level II patterns (structure)</th>
<th>Level III patterns (detail)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>THE REGION</strong> (HIGH LEVEL PHILOSOPHY)</td>
<td><strong>THE SHAPE</strong> (STRATEGY)</td>
<td><strong>THE DETAIL</strong> (TACTICS)</td>
</tr>
<tr>
<td>Global patterns that conceptually order scale, shape and connection defining a community.</td>
<td>The high level patterns that define things and groups of things and the spaces between them.</td>
<td>Patterns that tell you how to build things, they are the detail for level II patterns.</td>
</tr>
<tr>
<td>Patterns built through the cumulative acts of the community over time.</td>
<td>Patterns that can be built in a single sustained effort under the control of individuals, or small groups.</td>
<td>Patterns that can be built in a single act, under the control of an individual.</td>
</tr>
<tr>
<td>Patterns that detail the broader context for the design.</td>
<td>Patterns that are a complete design.</td>
<td>Patterns that provide the details of a complete design.</td>
</tr>
</tbody>
</table>

**Examples from Alexander’s work:**
- THE DISTRIBUTION OF TOWNS, and WEB OF PUBLIC TRANSPORT
- HIERARCHY OF OPEN SPACE, and SITTING CIRCLE
- ORNAMENT, and DIFFERENT CHAIRS

In order to begin the task of adapting a language written for the built environment to one designed for networked learning environments, I tabulated and cross-referenced Alexander’s levels of scale (region, shape and detail) with three levels from Goodyear’s (1999) original pedagogical framework (high level philosophy, strategy and tactics) - see Table 20. In the process of doing this I renamed the levels to make the differences between them clearer in this context: Level I patterns are global, Level II patterns are structural and Level III patterns provide the detail of higher order patterns. Working through catalogued photographs and notes on interesting forms of practice, I listed practices I had not yet had the opportunity to discuss. Using this list I populated three tables with possible pattern names, one for each level (Tables 21, 22 & 23). I then ordered the patterns named using the three dimensions of the ACAD framework (set, social and epistemic design), and clarified the invariant properties of practice I wished to document. Having done this, I found myself looking at an unusual list of possible patterns, and further analysis revealed a series of patterns that worked within zones of transition, coupling one dimension with another. As such, I consider this...
particular collection of named patterns crucial to the good functioning of open and digitally extended learning environments.

Tables 21, 22 and 23 are presented differentiated by scale level and the dimensions of the ACAD framework. The zones of transition between dimensions have been named and highlighted. It should be remembered that many of the patterns listed in Tables 21, 22 and 23 are only suggestions for patterns at each level. The key pattern in each level is highlighted in bold, and the patterns in red are the ones for which I have created high-level pattern outlines (see, Tables 24 to 34). Two of which (Tables 25 and 31) have been worked into full patterns, and they are located in sequence after the corresponding high-level pattern outline. In concluding this work on patterns, I use a number of the patterns named in Tables 21, 22 and 23, in a future orient pattern scenario (Mor et al., 2014) to illustrate COLLABORATIVE LEARNING IN THE OPEN.

**Table 21 - Level I patterns**

Level I patterns are the global patterns that conceptually order scale, shape and connection in a way that defines a community. They are built through the cumulative acts of the community over time. They are the broader context for the design.

<table>
<thead>
<tr>
<th>ACAD dimension</th>
<th>Pattern Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social design</td>
<td>DIGITAL FREEDOM WITH RESPONSIBILITY</td>
</tr>
<tr>
<td></td>
<td>PERMISSION TO CHOOSE</td>
</tr>
<tr>
<td>Transition Zone</td>
<td>FREEDOM TO REPURPOSE</td>
</tr>
<tr>
<td></td>
<td>COLLABORATIVE LEARNING IN THE OPEN</td>
</tr>
<tr>
<td>Set design</td>
<td>DIGITALLY EXTENDED LEARNING NETWORK</td>
</tr>
<tr>
<td></td>
<td>COMMUNAL LEARNING RESOURCES</td>
</tr>
<tr>
<td></td>
<td>JOINTLY OWNED LEARNING SPACES</td>
</tr>
<tr>
<td></td>
<td>A MIX OF PERSONAL &amp; SHARED TOOLS</td>
</tr>
<tr>
<td></td>
<td>EMPTY SPACE</td>
</tr>
<tr>
<td>Transition Zone</td>
<td>PERMEABLE BOUNDARIES</td>
</tr>
<tr>
<td>Epistemic design</td>
<td>TRANSITIONS</td>
</tr>
<tr>
<td></td>
<td>A BROAD TASKSCAPE</td>
</tr>
<tr>
<td></td>
<td>A MIX OF INDEPENDENT &amp; COLLABORATIVE TASKS</td>
</tr>
<tr>
<td></td>
<td>GENEROUS UNITS OF LEARNING</td>
</tr>
<tr>
<td>Transition Zone</td>
<td>THE LEARNING WHOLE &amp; THE LEARNING INDIVIDUAL</td>
</tr>
<tr>
<td></td>
<td>ESTABLISHING A LEARNING CULTURE</td>
</tr>
<tr>
<td>Social design</td>
<td>FREEDOM TO FAIL</td>
</tr>
<tr>
<td></td>
<td>FRAMING KNOWING IN FEELING</td>
</tr>
</tbody>
</table>
Table 22 - Level II patterns

Level II patterns are the high level patterns that define things, groups of things, and the spaces between them. They can be built in a single sustained effort under the control of individuals, or small groups. They are a complete design.

<table>
<thead>
<tr>
<th>ACAD dimension</th>
<th>Pattern Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social design</td>
<td>RESPONSIBLE FOR YOUR OWN LEARNING</td>
</tr>
<tr>
<td>Transition Zone</td>
<td>RESETTING THE LEARNING ENVIRONMENT</td>
</tr>
<tr>
<td></td>
<td>READING THE LEARNING LANDSCAPE</td>
</tr>
<tr>
<td>Set design</td>
<td>BYOD (Bring your own device)</td>
</tr>
<tr>
<td></td>
<td>ACTIVITY BASED ARRANGEMENTS OF FURNITURE</td>
</tr>
<tr>
<td></td>
<td>SEATING IN A VARIETY OF TYPES &amp; HEIGHTS</td>
</tr>
<tr>
<td></td>
<td>TABLES IN A VARIETY OF TYPES &amp; HEIGHT</td>
</tr>
<tr>
<td></td>
<td>UNIVERSAL ACCESS TO WI-FI</td>
</tr>
<tr>
<td>Transition Zone</td>
<td>MONITORING THE AUDITORY ENVELOPE</td>
</tr>
<tr>
<td></td>
<td>IDENTIFYING THRESHOLDS OF DISENGAGEMENT</td>
</tr>
<tr>
<td>Epistemic design</td>
<td>NAVIGATE THE TASKSPACE</td>
</tr>
<tr>
<td></td>
<td>MIX THINGS UP</td>
</tr>
<tr>
<td></td>
<td>TEAM TEACHING</td>
</tr>
<tr>
<td></td>
<td>DAYS DIVIDED INTO FOUR</td>
</tr>
<tr>
<td>Transition Zone</td>
<td>MANAGING THE HERE-AND-NOW VIA THE ANYWHERE-ANYTIME</td>
</tr>
<tr>
<td></td>
<td>BEING AWARE OF ZONES OF INFLUENCE</td>
</tr>
<tr>
<td>Social design</td>
<td>ACKNOWLEDGING LEARNING TRAJECTORIES</td>
</tr>
</tbody>
</table>

Table 23 - Level III patterns

Level III patterns are the patterns that tell you how to build thing, they are the detail for level II patterns. They can be built in a single act, under the control of an individual. They are the details of a complete design.

<table>
<thead>
<tr>
<th>ACAD dimension</th>
<th>Pattern Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social design</td>
<td>OVERSEEING</td>
</tr>
<tr>
<td></td>
<td>OVERHEARING</td>
</tr>
<tr>
<td>Transition Zone</td>
<td>CENTRES OF ACTIVITY</td>
</tr>
<tr>
<td></td>
<td>MAINTAINING LINES OF SIGHT</td>
</tr>
<tr>
<td>Set design</td>
<td>PDDs (personal digital devices)</td>
</tr>
<tr>
<td></td>
<td>SEMI PERMANENT MARKERS</td>
</tr>
<tr>
<td></td>
<td>CIRCULAR SEATING</td>
</tr>
<tr>
<td></td>
<td>TRIANGULAR TABLES</td>
</tr>
<tr>
<td></td>
<td>WRITABLE WALLS (SURFACES)</td>
</tr>
<tr>
<td>Transition Zone</td>
<td>DOING-THE-ROUNDS</td>
</tr>
<tr>
<td>Epistemic design</td>
<td>CENTRES OF ATTENTION</td>
</tr>
<tr>
<td></td>
<td>TAKING THE TEACHING LEAD</td>
</tr>
<tr>
<td></td>
<td>SUPPORTING TEACHING ACTIVITY</td>
</tr>
<tr>
<td></td>
<td>EXPANDING VERBAL PING-PONG</td>
</tr>
<tr>
<td>Transition Zone</td>
<td>JUST-IN-TIME WORKSHOP</td>
</tr>
<tr>
<td></td>
<td>ASK BEFORE JUDGING</td>
</tr>
<tr>
<td>Social design</td>
<td>CELEBRATING EACH OTHER’S SUCCESS</td>
</tr>
<tr>
<td></td>
<td>SMALL ACTS OF KINDNESS</td>
</tr>
</tbody>
</table>
The following single-page, high-level pattern outlines (Tables 24 to 34) are based on the critical components of good patterns (Goodyear & Yang, 2009), the need to embed current theory in ongoing practice (Chatteur, Carvalho, & Dong, 2010; Goodyear et al., 2006), and the three dimensions of the ACAD framework (Goodyear & Carvalho, 2014a). The discipline required to write each on only a single page was something I found useful when writing alone. Most patterns are written collaboratively, or are at least subject to revision by others. In my case, it was the constraints of the template and the limit in length, which demanded iterative revisions and added discipline to the process.

In each high-level pattern outline I note the problem, the solution and its rationale, and the dimension of the ACAD framework to which it corresponds. To each of the ACAD dimensions, I then attributed one of the following classifications: context, value or intention. These classifications, in conjunction with the use of the IF, THEN, THEREFORE structure, reveal the explicit value of each invariant property of practice. Identifying the invariant property of practice is the key to good pattern writing. But value does not operate absent context (Kumpulainen & Renshaw, 2007). Moreover, it shapes underlying intentions that in turn shape activity. Teasing these notions apart with the help of the ACAD framework has been instrumental in revealing what lies at the heart of each of these patterns of productive learning activity.

To aid in cross-referencing practice with current educational research I have tried to include at least one closely related or more general background reading in each of the pattern outlines. Whilst the patterns of learning activity these outlines represent are present in much of the learning activity describe in vignettes 1 to 10, I highlight a few particularly good examples of each in the outlines and through footnotes in the vignettes. Only two high-level outlines (Table 25 and 31) have been worked into full design patterns, I offer the remaining nine as valuable formalism, well suited to identifying and sharing conclusions from observational fieldwork. As such, they do not represent incomplete work; rather, they encapsulate key findings and provide a point of departure for future research.
The value of reusable patterns of activity and design

Table 24 – L I pattern outline: FREEDOM TO REPURPOSE

<table>
<thead>
<tr>
<th>FREEDOM TO REPURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supports the following complementary level I (global) patterns: JOINTLY OWNED LEARNING SPACES, COMMUNAL LEARNING RESOURCES and PERMISSION TO CHOOSE.</td>
</tr>
<tr>
<td>Invariant property of practice: Aligning theoretical commitments to student autonomy with a practical acceptance of innovative and the often unexpected use of space and tools when responding to tasks.</td>
</tr>
<tr>
<td>Explicit value: IF open and flexible learning environments are designed to encourage autonomy THEN students and teachers should be free to engage in reconfiguring their learning spaces. THEREFORE freedom to repurpose should only be restricted within broad community based parameters.</td>
</tr>
</tbody>
</table>

Communicative power

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open learning spaces with flexible furnishings create an expectation that inhabitants may co-configure their learning environment. When communities make the transition into these spaces it is often hard not to limit this freedom.</td>
<td>Group rules should be agreed upon, and then all should be encouraged to use their environment to support their learning. Teachers can lead by example, experimenting and verbalising their choices with their students as they work.</td>
<td>High level commitments to autonomy and freedom need to be matched with a practical acceptance of their consequences on a day-to-day basis.</td>
</tr>
</tbody>
</table>

Set (context) | Social (intention) | Epistemic (value) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Designed to flexibly accommodate a high degree of independent learning.</td>
<td>To give students freedom to choose, try, fail and regroup without leaving them to flounder or engage in behaviours that disrupt the learning of others.</td>
<td>To provide students with opportunities to exercise autonomy in the co-configuration of their learning environments.</td>
</tr>
</tbody>
</table>

Is completed by the following lower order Level II (structural) patterns: MIX THINGS UP, SEATING IN A VARIETY OF TYPES AND HEIGHTS and TABLES IN A VARIETY OF TYPES AND HEIGHTS; and the following Level III (detail) patterns: CREATE CENTRES OF ACTIVITY and ASK BEFORE JUDGING.

Recommended background reading: On the value of allowing children to co-create contexts for collaborative activities (Kumpulainen et al., 2014), and a fascinating read about ‘a radical experiment in education’ (Burke & Dudek, 2010).

Excellent examples can be found in vignettes: 1, 2, 4, 5, 7, 8, 9 and 10.
The value of reusable patterns of activity and design

Table 25 – L II pattern outline: READING THE LEARNING LANDSCAPE

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completes the following higher order Level I (global) patterns: COLLABORATIVE LEARNING IN THE OPEN and THE LEARNING WHOLE &amp; THE LEARNING INDIVIDUAL.</td>
<td>Move, watch and be slow to curtail activity that involves trial and error, mess or collaboration. Weigh the needs of the individual against the rights of the group for a convivial learning space.</td>
<td>Get a feel for the rhythms of learning activity. Too quick to action may truncate productive individual activity, and too slow to action may result in overwhelmed individuals or in derailing productive cycles of learning within the community.</td>
</tr>
<tr>
<td>Supports the following complementary Level II (structural) patterns: BEING AWARE OF ZONES OF INFLUENCE and IDENTIFYING THRESHOLDS OF DISENGAGEMENT.</td>
<td>To give students freedom to choose, try, fail and regroup without leaving them to flounder or engage in behaviours that disrupt the learning of others.</td>
<td>To balance the learning needs of the individual against the learning needs of the group.</td>
</tr>
<tr>
<td>Invariant property of practice: To train one’s attention to productive patterns of learning activity and respond in ways that support and encourage it.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explicit value: IF we value participatory learning THEN we must learn to balance the often conflicting social, learning and resource needs of learning communities. THEREFORE teachers need to develop observational skills that will help them manage this highly complex task.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Communicative power

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing large groups of independent learners in open, digitally extended environments is challenging. Done poorly, it results in stress and diminished opportunities for learning, which may result in a retreat into styles of teaching not well suited to this type of space.</td>
<td>To give students freedom to choose, try, fail and regroup without leaving them to flounder or engage in behaviours that disrupt the learning of others.</td>
<td>To balance the learning needs of the individual against the learning needs of the group.</td>
</tr>
<tr>
<td>Set (context)</td>
<td>Social (intention)</td>
<td>Epistemic (value)</td>
</tr>
<tr>
<td>These environments can be overwhelming for both teachers and students. Managed sensitively they can provide extraordinarily rich learning landscapes.</td>
<td>To give students freedom to choose, try, fail and regroup without leaving them to flounder or engage in behaviours that disrupt the learning of others.</td>
<td>To balance the learning needs of the individual against the learning needs of the group.</td>
</tr>
<tr>
<td>Is completed by the following lower order Level III (detail) patterns: DOING THE ROUNDS, ASK BEFORE JUDGING, and JUST-IN-TIME WORKSHOPS.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Recommended reading: On the routine work of teachers during collaborative online work (Greiffenhagen, 2012). Excellent examples can be found in vignettes: 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10.
This pattern describes a class of observational strategy that supports teachers tasked with the responsibility for large groups of independent learners in flexible, open, and digitally enabled learning environments. Together they act to equip teachers to make good choices about what to pay attention to, and where to offer assistance. By nature they focus on learning and not on compliance. They work towards striking a balance between the learning individual and the learning community. What is more, they provide contextual feedback to inform both the individual teacher and the teaching team of the need for quicker or slower transitions into the next phase of learning.

It completes the following Level I (global) patterns: **COLLABORATIVE LEARNING IN THE OPEN** and **THE LEARNING WHOLE & THE LEARNING INDIVIDUAL**, and complements the following Level II (structural) patterns: **BEING AWARE OF ZONES OF INFLUENCE** and **IDENTIFYING THRESHOLDS OF DISENGAGEMENT**.

***

Open plan learning environments are designed to accommodate large convivial communities of learners. At the heart of these structural and social configurations is a desire to promote and support independent inquiry and collaborative problem solving. These aims are seldom achieved in the absence of certain epistemic practices that aid in alerting the group to a change of pace, helping those who need assistance as and when they need it, and refocusing those who have strayed past the point of constructive engagement.

In open, digitally extended learning environments where students work at their own pace through tasks they selected online, they spend much of their co-located time working on different tasks, using an assortment of different tools. This presents a number of challenges for teachers because everyone is not necessarily working on the same task. Where there is greater uniformity in student activity, difference indicates the student who is off task. Where students have the freedom to choose location, tools, and type of task response, it is difficult to distinguish productive learning activity from its less productive counterpart.

Insisting on uniformity or limiting freedom works against the productive affordances of these environments, and results in students either giving in to learned helplessness or working hard to subvert the rules. Neither of these responses is productive in a participatory learning environment (Daniels, 2014). On the other hand, too much choice or difficulty getting started may result in
Scanning a learning environment and taking in the various combinations of task, tool and social organisation is hard. However, when moving through working students it is possible to identify visual differences that pertain to learning activity (Greiffenhagen, 2012) - but these differences can be evidence of both productive and unproductive behaviour. Too still for too long could mean a period of intense focus, or an attempt to remain ‘invisible’ while doing something unrelated to work. A full lesson spent in conversation without putting pen to paper, or fingers to keyboard, could indicate productive collaborative work or a learner in difficulty.

The following readings offer insight into READING THE LEARNING LANDSCAPE: On the routine work of teachers during collaborative place based online work (Greiffenhagen, 2012).

Therefore:

As students move into a time of independent or group work, move away from where you were positioned to give direct instruction. Scan the learning environment, watching and listening for obvious signs of confusion. Make your way through working students, stopping only for short periods to ask questions, give assistance or show appreciation for work in progress. You may find a point from which to observe for a short time. However, ensure that you do not communicate ‘pejorative observation’ to the students. One way to avoid this is to mirror the working posture of your students from a short distance by finding a place to perch, or sitting on the floor, on a couch or at a table. The key to READING THE LEARNING LANDSCAPE is to focus on the learning: to find and commend that which is good, interesting, innovative, brave and an improvement on what went before – do not intentionally go looking for moments in which infractions are committed, for you will surely find them, and you will miss the many moments of triumph, frustration, slow but incremental progress, and the shared joy of hard won success. In the end, balancing the careful oversight of learners, within generous boundaries for learning, is more of an art than a science.

***

Patterns needed to complete this pattern include the following Level III (detail) patterns: DOING THE ROUNDS, ASK BEFORE JUDGING, and JUST-IN-TIME WORKSHOPS.
The value of reusable patterns of activity and design

Table 26 - L II pattern outline: BEING AWARE OF ZONES OF INFLUENCE

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>In times of both independent and shared activity students have different preferences for geographic co-location. Moving beyond this can indicate distress, distraction or disengagement.</td>
<td>Be aware of the individual, sub groups and the whole. Alter your position in space, your style of conversation or the focus of group attention to draw students back into the zone of constructive engagement.</td>
<td>Participatory environments are busy and sometimes overwhelming. Some students may disengage. Small adjustments can refocus and re-establish the invisible connection within groups.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Set (context)</th>
<th>Social (intention)</th>
<th>Epistemic (value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large open spaces full of activity often provide distraction and may precipitate withdrawal.</td>
<td>To ensure that those who need space but are still engaged have it, and that those who take it but are disengaged reconnect.</td>
<td>To acknowledge and accommodate difference, whilst sustaining learning activity.</td>
</tr>
</tbody>
</table>

*Is completed by the following lower order Level III (detail) patterns: OVERSEEING, OVERHEARING and SMALL ACTS OF KINDNESS.*

*Recommended reading:* I could not find a reference I was happy to recommend because many of the examples from the orthodox literature on classroom management miss the nuances of what I am trying to describe here.

*Excellent examples can be found in vignettes: 2, 4, 5, 6, 8 and 10.*
Table 27 - L II pattern outline: IDENTIFYING THRESHOLDS OF DISENGAGEMENT

<table>
<thead>
<tr>
<th>IDENTIFYING THRESHOLDS OF DISENGAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completes higher order Level I (global) patterns: COLLABORATIVE LEARNING IN THE OPEN, FREEDOM TO FAIL and TRANSITIONS. Supports complementary Level II (structural) patterns: READING THE LEARNING LANDSCAPE, BEING AWARE OF ZONES OF INFLUENCE and ACKNOWLEDGING LEARNING TRAJECTORIES.</td>
</tr>
<tr>
<td>Invariant property of practice: Learning to identify varying degrees of engagement, with specific attention to that point where natural oscillating rhythms of attention give way to disengagement.</td>
</tr>
<tr>
<td>Explicit value: IF we value independent learning in open environments THEN being able to identify students who have lost momentum is important. THEREFORE learn to identify various physical indicators of disengagement over time.</td>
</tr>
</tbody>
</table>

**Communicative power**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>In times of independent work, when students are working on various projects with different tools and at different points of completion, it is often hard to identify those who need assistance or help refocusing their efforts.</td>
<td>Learning to identify classes of productive and unproductive postures can help teachers identify whom they should ‘check-in’ with. Moreover, familiarity with students’ general working demeanour assists in knowing when to help.</td>
<td>Productive work is hard to identify at a distance when everyone is doing something different. However, certain postures and group formations can alert one to a slide into genuine disengagement.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Set (context)</th>
<th>Social (intention)</th>
<th>Epistemic (value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large open spaces full of activity may provide opportunity for students to disengage from productive work.</td>
<td>To learn to identify the slide towards disengagement and help refocus activity. To give students the benefit of the doubt and invite them to re-establish momentum.</td>
<td>To allow a certain degree of freedom to fail / struggle / contemplate. But to intervene before students disengage, which is unproductive for the individual and often disruptive of the whole.</td>
</tr>
</tbody>
</table>

Is completed by the following lower order Level III (detail) patterns: MAINTAINING LINES OF SIGHT, ASK BEFORE JUDGING, and ACKNOWLEDGING STRUGGLES.

Recommended reading: I could not find a reference I was happy to recommend because many of the examples from the orthodox literature on classroom management miss the nuances of what I am trying to describe here.

Excellent examples can be found in vignettes: 1, 2, 3, 8 and 10.
The value of reusable patterns of activity and design

Table 28 - L II pattern outline: MONITORING THE AUDITORY ENVELOPE

<table>
<thead>
<tr>
<th>MONITORING THE AUDITORY ENVELOPE</th>
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</thead>
</table>

Completes higher order Level I (global) patterns: COLLABORATIVE LEARNING IN THE OPEN and THE LEARNING WHOLE & THE LEARNING INDIVIDUAL. Supports complementary Level II (structural) patterns: READING THE LEARNING LANDSCAPE and RESETTING THE LEARNING ENVIRONMENT.

Invariant property of practice: To be aware of the relationship between the sounds of the individual (voice or tool) and the soundscape of the environment.

Explicit value: IF we value participatory learning in open environments THEN sound will surely follow. THEREFORE learn to monitor the effects of one’s own voice on the group and vice versa.

Communicative power

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large open spaces with lots of active learning have a tendency to be noisy. Learning to distinguish between productive and unproductive sounds is often challenging, and the sounds of someone else learning can sound like noise to everyone else.</td>
<td>Learn to moderate one’s own sound output in ways that honour the individual and the group. Use pitch, intonation, tone and posture – not just volume - to communicate. Encourage individuals watching online videos to use headphones, and monitor the effects of group viewing on other groups in the environment.</td>
<td>Collaboration, exploration, and discovery are inherently noise producing. Finding productive ways to work together is a better alternative than top down noise policing, and amplification of individual voices only exacerbates the problem where the technology is not sufficiently advanced.</td>
</tr>
</tbody>
</table>

Set (context) Social (value) Epistemic (intention)

| Open flexible spaces and tools to encourage participatory learning can lead to excessive noise. | To learn to conduct oneself in a way that does not impacting negatively on the learning community. | To promote participatory learning in open learning environments, in a way that respects others. |

Is completed by the following lower order Level III (detail) patterns: CREATE CENTRES OF ATTENTION, OVERSEEING and OVERHEARING.

Recommended reading: On understanding the difference between noise that is detrimental to learning and noise that is part of learning (Woolner & Hall, 2010).

Excellent examples can be found in vignettes: 1, 2, 3 and 8.
Table 29 - L II pattern outline: MANAGING THE HERE-AND-NOW VIA THE ANYWHERE-ANYTIME

<table>
<thead>
<tr>
<th>MANAGING THE HERE-AND-NOW VIA THE ANYWHERE-ANYTIME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Completes higher order Level I (global) patterns:</strong> DIGITALLY EXTENDED LEARNING NETWORK, A BROAD TASK SCAPE and PERMISSION TO CHOOSE. <strong>Supports</strong></td>
</tr>
<tr>
<td><strong>complementary Level II (structural) patterns:</strong> RESPONSIBLE FOR YOUR OWN LEARNING, BEING AWARE OF ZONES OF INFLUENCE and IDENTIFYING THRESHOLDS OF DISENGAGEMENT.</td>
</tr>
<tr>
<td><strong>Invariant property of practice:</strong> To maintain an in person connection using asynchronous online tools when students are working on independent online projects, in the same physical space.</td>
</tr>
<tr>
<td><strong>Explicit value:</strong> IF online independent learning is a valued part of in person learning THEN be aware that it reduces opportunities for serendipitous in person connection. THEREFORE use activity in asynchronous online environments to make in person connections during times of in person independent online work.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>As students become increasingly skilled at independent online work and large portions of the day are spent together but work is hard to see, it becomes difficult to initiate serendipitous work related learning conversations with students without interrupting their learning activity.</td>
<td>When students are successfully working independently online, use the time to track online submissions and manage discussion boards. Based on what you find ask clarifying questions of individual students, and respond to online questions in person. Do so in a regular talking voice.</td>
<td>To create a shared point of reference with individual students in a way that may prompt others to action. This strategy facilitates legitimate ‘interruptions’ and creates opportunities for relevant group administration, without being intrusive.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Set (context)</th>
<th>Social (value)</th>
<th>Epistemic (intention)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-located online work offers fewer opportunities to engage in serendipitous conversations about learning.</td>
<td>To maintain social connections, as online independence increases.</td>
<td>To be the one responsible for learning without interrupting the learning.</td>
</tr>
</tbody>
</table>

**Is completed by the following lower order Level III (detail) patterns:** CREATE CENTRES OF ATTENTION, ASK BEFORE JUDGING and PDDs.

**Recommended reading:** Social network sites with learning purposes (Thibaut, 2015), and technology in open-plan learning environments (Edwards, Deed, & Edwards, 2014).

**Excellent examples can be found in vignettes:** 2, 5, 6, 8 and 9.
The value of reusable patterns of activity and design

Table 30 - L II pattern outline: RESETTING THE LEARNING ENVIRONMENT

<table>
<thead>
<tr>
<th>RESETING THE LEARNING ENVIRONMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completes higher order Level I (global) patterns: JOINTLY OWNED LEARNING SPACES, FREEDOM TO REPURPOSE and COMMUNAL LEARNING RESOURCES. Supports complementary Level II (structural) patterns: READING THE LEARNING LANDSCAPE and ACTIVITY BASED ARRANGEMENTS OF FURNITURE.</td>
</tr>
<tr>
<td>Invariant property of practice: Establishing and maintaining a level of physical order that is ‘just right’ - not too ordered - but not too chaotic either.</td>
</tr>
<tr>
<td>Explicit value: IF we value participatory learning in open environments THEN a balance between chaos and order needs to be struck. THEREFORE establish a point in time and agreement on the point of maximum disorder, and then regularly return the environment to ‘normal’.</td>
</tr>
</tbody>
</table>

Communicative power

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participatory learning encourages acts of co-creation and co-configuration of the environment. In a space that becomes too disordered, students tend to stop improvising and, what had been evidence of engagement, then degenerates into clutter.</td>
<td>Select both a point in time and a threshold of general tolerance for disorder, whichever is reached first should initiate a communal ‘resetting’ of the environment back to the point of sufficient but not excessive order.</td>
<td>A degree of disorder invites participation, too much disorder results in object blindness, and stress in both students and teachers.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Set (context)</th>
<th>Social (value)</th>
<th>Epistemic (intention)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communal space, shared resources and the freedom to use them in creative ways can lead to a certain degree of chaos.</td>
<td>To acknowledge that shared resources are shared responsibilities, and that disorder affects everyone.</td>
<td>To give students the freedom to engage in independent participatory learning.</td>
</tr>
</tbody>
</table>

**Is completed by the following lower order Level III (detail) patterns:** ASK BEFORE JUDGING, SMALL ACTS OF KINDNESS and MAINTAINING LINES OF SIGHT.

**Recommended reading:** On the value of setting and maintain a certain degree of order in collaborative spaces (Doorley & Witthoft, 2012).

**Excellent examples can be found in vignettes:** 2, 4 and 10.
**Table 31 - Level III pattern outline: DOING-THE-ROUNDS**

<table>
<thead>
<tr>
<th>DOING-THE-ROUNDS</th>
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<tbody>
<tr>
<td>Completes the following higher order Level I (global) patterns: <strong>COLLABORATIVE LEARNING IN THE OPEN</strong> and <strong>TRANSITIONS</strong>, <em>and the following Level II (structural) patterns: <strong>READING THE LEARNING LANDSCAPE</strong>.</em></td>
<td></td>
</tr>
<tr>
<td><strong>Invariant property of practice</strong>: To identify moments in which to commend work in progress or assist in maintaining the momentum of productive independent learning activity.</td>
<td></td>
</tr>
<tr>
<td><strong>Explicit value</strong>: IF we value diversity and choice THEN co-located independent and small group work is highly heterogeneous. THEREFORE teachers need to be alert, active observers moving amongst learners.</td>
<td></td>
</tr>
<tr>
<td><strong>Communicative power</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Problem</strong></td>
<td><strong>Solution</strong></td>
</tr>
<tr>
<td>Participatory learning in open, digitally extended learning environments creates endless variation. Productive learning activity is not always easy to identify, and stalled learning activity can derail progress.</td>
<td>Learn to identify when to engage with students, to offer individual or group assistance. Draw attention to good work or effective strategies, demonstrating them when necessary.</td>
</tr>
<tr>
<td><strong>Set (context)</strong></td>
<td><strong>Social (intention)</strong></td>
</tr>
<tr>
<td>Students are free to access multiple online tasks from anywhere in the learning environment, and may use a variety of tools.</td>
<td>To support choices and redirect or refocus unproductive efforts, when students are working independently, without taking over.</td>
</tr>
<tr>
<td>Is supported by the following complementary Level III (detail) patterns: OVERHEARING, OVERSEEING, ASK BEFORE JUDGING and JUST-IN-TIME WORKSHOPS.</td>
<td></td>
</tr>
<tr>
<td><strong>Recommended reading</strong>: Teacher activity during collaborative in person and online work (Greiffenhagen, 2012; Stahl, 2012).</td>
<td></td>
</tr>
<tr>
<td><strong>Excellent examples can be found in vignettes</strong>: 5, 6, 7, 9 and 10.</td>
<td></td>
</tr>
</tbody>
</table>
This pattern describes a form of observational strategy that assists teachers tasked with the responsibility for large groups of independent learners in flexible, open, and digitally extended learning environments. It describes what being the 'guide on the side' looks like and, as such, details the role of the teacher during independent and collaborative online but co-located work.

It completes the following Level I (global) patterns: COLLABORATIVE LEARNING IN THE OPEN and TRANSITIONS, and the following Level II (structural) patterns: READING THE LEARNING LANDSCAPE.

***

When the teacher moves from directing learning activity to supporting it in open, digitally extended learning environments, their role is often ill defined. Those accustomed to directing learning from a fixed point in the landscape often experience difficulty knowing what is required of them, and how they should accomplish it – when nobody is paying them any attention.

DOING THE ROUNDS describes the activity of teachers, when they are not engaged in direct teaching or the facilitation of group work. It generally follows moments of direct teaching and is characterised by vigilance of the whole - attentiveness to emerging patterns of confusion or widespread errors in judgement. DOING-THE-ROUNDS enables teachers to assess students’ grasp of a topic at the point of engagement, offering assistance when and where it is needed most. Above all DOING-THE-ROUNDS is about moving, coming to rest to interact or consider progress without stalling productive work through unnecessary interruptions.

DOING-THE-ROUNDS is characterised by a number of positive strategies that should be used in response to careful observation of learning activity:

- ask lots of questions,
- model good listening strategies,
- listen for underlying misconceptions amongst students,
- identify clusters of students with similar misconceptions,
- reserve judgement but assert shared rules when necessary,
- learn with and from students,
- share students’ excitement and their frustration,
- help students to understand the role of failure in learning,
- teach students to respect the learning of others, and
keep watch for students who show signs of being overwhelmed.

The following actions and or attitudes are counterproductive to the essence of **DOING-THE-ROUNDS**:

- interrupting productive student work without just cause,
- offering too much help too soon,
- leaving students to struggle for too long,
- diminishing real struggles, and
- failing to hold all students accountable to the same rules.

The following readings offer insight into **DOING-THE-ROUNDS**:


Therefore:

**In times of self-directed work in open, digitally extended learning environments, assume an active and attentiveness disposition. Focus on learning and not compliance. Learn to balance the needs of the whole against the needs of the individual. Scan, move, pause, listen, connect, anticipate, reframe, refocus and, where necessary, restart stalled learning activity.***

Patterns needed to complete this pattern include the following Level III (detail) patterns: OVERHEARING, OVERSEEING, **ASK BEFORE JUDGING** and **JUST-IN-TIME WORKSHOPS**.

When read together with **READING THE LEARNING LANDSCAPE** (Level II – structural), **DOING-THE-ROUNDS** (Level III – detail) forms part of a sequence that helps to complete **COLLABORATIVE LEARNING IN THE OPEN** (Level I – global). This sequence is intended to help those teaching in complex, open and computer mediated learning environments during periods in which students are working independently. **COLLABORATIVE LEARNING IN THE OPEN** is described in the future oriented pattern scenario at the end of this chapter.
The value of reusable patterns of activity and design

**Table 32 - Level III pattern outline: CREATE CENTRES OF ACTIVITY**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too much uninitiated variety in available independent work can be</td>
<td>Initiate activity around a point of common interest. Engage in meaningful dialogue about it with other staff or students. Do this where there is space to form a circle allowing people to join in or leave without disturbing the group.</td>
<td>Joining in ongoing activity is often easier than navigating unlimited choice.</td>
</tr>
<tr>
<td>overwhelming. Once project based activity begins, it is often hard to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>stop and this results in less time for joint problem solving,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>reflection and personal connection.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Enter an unstructured learning space without intention leads to</td>
<td>To initiate moments of shared learning activity that fosters a sense of community.</td>
<td>To initiate and promote productive learning activity, and to model effective learning strategies.</td>
</tr>
<tr>
<td>diffusion of bodies and waning interest.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Is supported by the following complementary Level III (detail) patterns:* CREATE CENTRES OF ATTENTION, EXPANDING VERBAL PING-PONG and JUST-IN-TIME WORKSHOPS.

*Recommended background reading:* A nondeterministic account of situated learning activity (Nemirovsky, Rasmussen, Sweeney, & Wawro, 2012).

*Excellent examples can be found in vignettes:* 2, 4, 5, 6, 8, 9 and 10.
The value of reusable patterns of activity and design

Table 33 - Level III pattern outline: ASK BEFORE JUDGING

<table>
<thead>
<tr>
<th>ASK BEFORE JUDGING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completes the following higher order Level I (global) patterns: ESTABLISHING A LEARNING CULTURE, THE LEARNING WHOLE &amp; THE LEARNING INDIVIDUAL and FREEDOM TO REPURPOSE, and the following Level II (structural) pattern: READING THE LEARNING LANDSCAPE and RESPONSIBLE FOR YOUR OWN LEARNING.</td>
</tr>
</tbody>
</table>

Invariant property of practice: To touch base with students without short-circuiting problem solving or creativity. To scaffold productive learning activity where necessary.

Explicit value: IF we value learning in open environments THEN we should acknowledge different ways of working. THEREFORE, ask before judging activity to be unproductive or offering too much assistance.

Communicative power

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent, collaborative, online and in person work does not look the same from student to student. It is often difficult to judge the merits of student activity through observation alone.</td>
<td>Engage individuals in dialog, find out what they are doing and why. Compliment them on productive effort, assist and refocus where necessary and then leave them to it. Check in later if necessary.</td>
<td>False accusations of misconduct undermine trust, problem solving and creativity. Leaving students to struggle or drift past a certain point of engagement is detrimental to productive learning activity.</td>
</tr>
</tbody>
</table>

Set (context) | Social (value) | Epistemic (intention) |
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>High visibility makes variation in student activity easy to see, but assessing its productivity is difficult when relying solely on observation.</td>
<td>To prioritise learning relationships over compliance, because independence in open learning spaces requires a certain level of trust.</td>
<td>To offer help only when it is needed and to avoid making hasty or overly harsh judgements.</td>
</tr>
</tbody>
</table>

Is supported by the following complementary Level III (detail) patterns: DOING-THE-ROUNDS, OVERHEARING, OVERSEEING and CELEBRATING EACH OTHER’S SUCCESS.

Recommended background reading: This article explores ‘Pupils perspectives on the lived pedagogy of the classroom’ (Niemi, Kumpulainen, Lipponen, & HIlppö, 2014).

Excellent examples can be found in vignettes: 2, 5 and 9.
The value of reusable patterns of activity and design

Table 34 - Level III pattern outline: JUST-IN-TIME WORKSHOPS

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>High degrees of variation in levels of task difficulty and individual students’ skills, results in a situation where there is a wide range of immediate needs.</td>
<td>When common problems or misconceptions are identified, call a workshop immediately, alerting all students that specific help will be given in a named location (on the green couch). Remember that others, outside the group, may also be observing.</td>
<td>Not everyone needs the same help at the same time. When more than one or two need help, gather them together for a short workshop.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Set (value)</th>
<th>Social (context)</th>
<th>Epistemic (intention)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconfigured and jointly owned space facilitates the creation of on-the-fly small groups.</td>
<td>To group students with similar needs together.</td>
<td>To offer appropriate guidance at the point of real need without undermining independence.</td>
</tr>
</tbody>
</table>

*Invariant property of practice:* To give assistance after effort, but before a sense of being overwhelmed derails productive learning activity.

*Explicit value:* IF we value engaged participatory learning THEN we need to give students the freedom to try without abdicating our responsibility to guide. THEREFORE as problems become evident, offer sufficient, timeous assistance in order to maintain productive learning activity.

*Communicative power*

<table>
<thead>
<tr>
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<td>High degrees of variation in levels of task difficulty and individual students’ skills, results in a situation where there is a wide range of immediate needs.</td>
<td>When common problems or misconceptions are identified, call a workshop immediately, alerting all students that specific help will be given in a named location (on the green couch). Remember that others, outside the group, may also be observing.</td>
<td>Not everyone needs the same help at the same time. When more than one or two need help, gather them together for a short workshop.</td>
</tr>
</tbody>
</table>

*Recommended reading:* On the use of scaffolding in small group work (van de Pol, Volman, Oort, & Beishuizen, 2013).

*Excellent examples can be found in vignettes:* 2 and 5.
SCENARIO: COLLABORATIVE LEARNING IN THE OPEN

SITUATION

Team teaching in open learning environments has been the norm for a number of primary and middle school teachers for some time. Many of them teach in large, multi-purpose spaces that accommodate up to six groups of thirty students in mixed ability groups, which fluctuate according to current learning needs. Moreover, these students are in their care for two full years because they are grouped by Stage (two year bands) according to state-mandated requirements.

A new building is about to be opened, which will accommodate high school students in a mix of small and private, and large and public multi-purpose facilities. Many of the high school staff have tried to shift the balance of their teaching from direct instruction to more collaborative and participatory methods over the past two years. However, the spaces in which they have done this have often been minimally renovated traditional classroom. Moreover, the requirements of being responsible for older students, many of whom want to attend University, means that they have had to focus on preparing them to sit an exam designed to (a) assess content knowledge and procedure, not collaborative problem solving and originality, and (b) provide their answers hand written and with no access to computing technologies. The irony does not escape anyone. The new buildings are designed to accommodate 21st century teaching, but the requirement to attain a high score on an outdated mode of assessment - in order to access that future - curtails their day-to-day use in practice.

TASK

The task is to provide high school staff with guidance about how to make the most of the new learning spaces without diminishing the students’ ability to sit a timed, content based examination that will be hand written.
The conflicting dimensions are a desire to move towards increasingly autonomous student centred learning, whilst still ensuring that students acquire sufficient disciplinary content based competency to score highly on final exams. The two are not mutually exclusive; however, the risk of not preparing students for these exams is often the first obstacle presented when moving from teacher-centred to student-centred modes of learning. What is more, large sums of money have been invested in buildings to support this new way of learning.

Essentially the task is to: encourage staff to use more student-centred teaching methods and to make the most of the new buildings, while ensuring that requirements for University entrance are still met.

**PATTERNS**

The patterns that follow either support or complement **COLLABORATIVE LEARNING IN THE OPEN.**

**Level I (global) patterns:**

GENEROUS UNITS OF LEARNING – establishes an environment that allows for deep engagement in collaborative and individual tasks.

FREEDOM TO FAIL – is essential in establishing a culture where students and staff are willing to try new things. It does not glamourise lack of effort, but acknowledges that learning may be preceded by failure.

DIGITALLY EXTENDED LEARNING NETWORK – this pattern extends learning environments, ‘taking people’ out and ‘bringing’ others in.

**Level II (structural) patterns:**

**READING THE LEARNING LANDSCAPE** - suggests different strategies for teachers responsible for large groups of independent students, working independently in open environments.

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8 All patterns named are drawn from the pattern language sketched in Tables 22 to 24. Those in red have been worked into high-level pattern outlines seen in Tables 25 to 35. Those in bold are the key pattern in their level.
The value of reusable patterns of activity and design

MANAGING THE HERE-AND-NOW VIA THE ANYWHERE-ANYTIME - ensures that freedom to choose is managed through online checks and balances that track student progress through course work.

RESPONSIBLE FOR YOUR OWN LEARNING – suggests ways to shift teaching styles and student attitudes in order that everyone assumes responsibility for their own learning.

Level III (detail)

DOING-THE-ROUNDS - supports teachers during independent learning in open, flexible and blended learning environments.

CREATING CENTRES OF ACTIVITY - feeds natural curiosity, drawing students into learning activity, rather than speaking at them while they are motionless.

ASK BEFORE JUDGING - establishes and maintains trust, and promotes a willingness to try.

JUST-IN-TIME WORKSHOPS – provides help when and where it is needed.

SOLUTION

The Global pattern that gives shape to this shift in teaching emphasis is COLLABORATIVE LEARNING IN THE OPEN. By using the other three global patterns listed: GENEROUS UNITS OF LEARNING, FREEDOM TO FAIL and DIGITALLY EXTENDED LEARNING NETWORK, one alters critical dimensions of the set, epistemic and social design of any learning environment. Altering allocations of time gives students and staff time to explore problems in depth. Reducing the shame often associate with failure encourages risk taking in learning and begins the task of changing a culture where performance is prized over learning. The new open leaning environment will facilitate multiple groups across multiple ages, and will therefore introduce flexibility in how groups are rostered in time and space, no longer tied to specific subjects in designated classrooms – supported by open online learning. RESPONSIBLE FOR YOUR OWN LEARNING is an essential second step in moving towards student-centred learning, and READING THE LEARNING LANDSCAPE guides staff accustomed to motionless and silent students, as everyone become accustomed to more active learning environments.
COLLABORATIVE LEARNING IN THE OPEN is completed by the following Level II and Level III patterns: **DOING-THE-ROUNDS, ASK BEFORE JUDGING** and **CREATING CENTRES OF ACTIVITY**. By digitally extending the new learning environment, one allows students to seek inspiration, assistance and an audience well beyond the walls of the current learning environment. **MANAGING THE HERE-AND-NOW VIA THE ANYWHERE-ANYTIME** facilitates the integration of digital and physical environments and keeps track of student progress.

**DISCUSSION**

Arguably the single most important tool in ensuring that new, open, flexible 21st century learning environments live up to their potential to be vibrant, convivial places of learning – is their digital counter part. Because many of the challenges faced by earlier moves towards open-education can now be managed through mobile digital technology. This is not to say that new ways of organising, sharing and managing information do not come with their own challenges. Rather, that access to content knowledge, distribution and collection of set work, the monitoring of student progress, and communication with learners and their caregivers – is infinitely more scalable, accessible and time sensitive than ever before. Moreover, the autonomy these environments were designed to facilitate is exponentially multiplied through access to content knowledge that is no longer housed in single, discipline based text, but in online learning management systems that reach into museums, academies, scientific institutions and all manner of personal and professional learning networks. What is more, in participatory learning environments this access affords not only access, but the ability to engage in content creation, curation and sharing – and therefore the production and not just the consumption of knowledge.

This being so, these affordances are realised in physical environments that are home to people with different needs, wants and desires, and there is an acknowledged gap in the literature on productive strategies for student-centred teaching in complex, open and increasingly digitally
mediated learning environments (Blackmore, Bateman, Cloonan, et al., 2011; Prain et al., 2014). Moreover, there is increasing pressure to provide an education commensurate with an often exciting, albeit unknowable, future (Collins & Halverson, 2009; Facer, 2012; House of Commons Education and Skills Committee, 2007; Sutherland et al., 2014). This pattern scenario illustrates how findings, in the form of high-level pattern outlines and patterns, might begin the task of addressing this problem.

CONCLUSION

This imagined solution does not reach very far into the future. It does not consider how one might teach in co-located environments filled with ambient information. Sitting observing students at work, there were moments when I marvelled at how one might use ambient computing to make learning environments more, and not less, human. How simple feedback through colour (Dillenbourg, 2013), light, heat, texture and location (Morgan & Healy, 2012; Sørensen, 2012) could give researchers, teachers and students interesting information about how, where and why they chose to learn where they did, and what happens when they work somewhere else on a different type of task, in a different social grouping (Jermann et al., 2009; Nova et al., 2010).

Pattern scenarios have been used to illustrate the utility of a set of patterns or a pattern language (Derntl & Laurillard, 2014). This pattern scenario illustrates how the patterns proposed in this chapter could be combined to support learning activity. What is more, pattern scenarios are considered ‘a reasonable test’ (Kohls & Schummer, 2014, p. 150) of whether or not a group of patterns can be said to work well together to resolve a problem.

CONCLUSIONS

In this chapter, I moved from processing empirical observations through theory, to using theory and observations to identify reusable elements of design. I want to claim that the patterns presented in this
chapter are a useful way of distilling and presenting conclusions from observational fieldwork. That they take on a role that is analogous to the presentation of findings as mathematical equations - accounting for a certain percentage of variation in a statistical model, for example – or analogous to themes and principles crystallised from a quantitative study. I do not mean to imply that I have established a way of calculating the predictive value of these patterns. Rather, these patterns are presented using a formalism as a way to encapsulate findings from empirical research.

My intention, when conceptualising these design patterns, was to find a way of helping educators to abstract problems and their potential solutions in context – where context was satisfyingly well theorised and methods were shaped by this knowledge. Together these particular patterns (named, in high-level outlines, in full design patterns, and a pattern scenario) reveal a number of productive forms of social interaction that work with, and not against or in spite of, the learning environment. Therefore, they act to deepen our understanding of the relations between learning activity and complex learning environments. Patterns are by nature iterative and these patterns have not yet been tested. As such, there is an opportunity to refine them through future research.
CHAPTER 8
CONCLUSION

INTRODUCTORY RESTATEMENT

At the outset, I claimed that the role of materials in educational research was not well theorised, and was therefore not well understood (Czerniewicz, 2010; Friesen, 2009; Goodyear & Carvalho, 2014b; Oliver, 2011; Sørensen, 2009). I suggested that as a consequence of this, research examining the effects of educational tools, technology and space - on learning - had a tendency to be blind to the very things they claimed to study, and were often overly deterministic in their findings (Bulfin et al., 2013; Friesen, Feenberg, & Smith, 2009; Oliver, 2013). Moreover, this problem was not unique to educational research alone, but symptomatic of a shift in how we think about things, people and learning more generally (Brown, 2001; Capra & Luisi, 2014; Coole & Frost, 2010; Dudley, 2010; Ingold, 2000, 2011; Malafouris, 2013; Thrift, 2008), and in neuroscience more specifically (Clark, 2013; Immordino-Yang & Damasio, 2007; Osgood-Campbell, 2015; Sørensen, 2012). Throughout this work, I argue that these new ways of thinking about people and
things, and how they can be said to influence learning, ought to change how we research and design environments for learning more broadly.

Through the production of this thesis, I set out to learn to see things differently, and to document my findings in a way that would help others consider the value of a more holistic conceptualisation of what it means to learn, immersed in a world already in motion. Inspired by Estrid Sørensen’s (2009) work, I learnt to follow materials in motion, and to consider different forms of technology, knowledge and presence. In making sense of what I observed, I drew on theorists in anthropology (Ingold, 2007, 2011, 2013; Miller, 2010), archaeology (Hodder, 2012, 2014) and architecture (Alexander, 1979, 2002; Alexander et al., 1977; Boys, 2011). My reasons for doing so were twofold. First, I was convinced that the material qualities of our environs can and do powerfully shape our experiences of them, and therefore our learning in them; and second, there was very little in the educational research literature that provided a theoretically grounded way of analysing things in use.

I wanted to do more than say ‘things matter’, or ‘we need to expand our definitions of knowledge, space, technology and learning’. What is more, many of my questions about things had long been the concern of those in other disciplines. I found that researchers in these disciplines wrestled with many of the questions raised by the shift in our thinking alluded to above (Barad, 2003; Capra & Luisi, 2014), which calls for more than just ‘a sociomaterial turn’ (Brown, 2001). Whilst I do not suggest that representational ways of thinking are bankrupt, I argue that our theories and methodologies for studying learning ought to include non-representational ways of being and coming to know - most especially where environments for learning are being considered. How we do this convincingly is beyond the scope of this project. However, it has not stopped me from trying to inch forward, to consider not one or the other, whether this be the representational and the non-representational, the planned for and the intuitive accommodations in the moment, or the designed and the emergent correspondence of learning activity to the environment in which it occurs.
Starting with things in use and building on Estrid Sørensen's (2009) original research questions, I fashioned my own:

*How do materials participate in teaching and learning practice, and how do we account for their participation in learning activity?*

The difference is that I have focused on the relations between practice and activity, as opposed to Sørensen, who focused on practice and performance. Sørensen worked to name new forms of technology, knowledge and presence; I have worked to describe the reciprocal relations between materials and learning activity. This is a subtle but important shift in emphasis, which underpins my efforts to explore the relations between learning activity and learning environments as defined more broadly. This emphasis is shaped using the ACAD framework (Goodyear & Carvalho, 2014a), and is explored using three different theoretical lenses: material ecology (Ingold, 2011, 2012, 2013), entanglement (Hodder, 2012, 2014), and wholeness (Alexander, 1979, 2002). Moreover, it motivates my choice to present certain important observational findings in a series of high-level pattern outlines, inspired by the work of Alexander, Goodyear and others (Alexander, 1979; Alexander et al., 1977; Goodyear et al., 2006; Goodyear & Retalis, 2010; Goodyear & Yang, 2009; Goodyear, 2004, 2005).

The uneasy and often unexamined relationship between humans and things is the source of many complex and confounding problems (Shove et al., 2012) and is therefore a fertile site for research. However, joining the post-humanist theorists of learning should not, and does not, require us to put our humanity to one side (Sørensen, 2009). Rather, educational research that aims to understand complex learning environments must account for the social, the set and the epistemic if it is to begin the task of properly understanding the role of current learning environments in learning, before imagining and designing our collective learning future (Gatt & Ingold, 2013; Goodyear & Carvalho, 2014a). This work challenges educational research that fails to consider how materials participate in teaching and learning practice, and it begins the
task of finding productive ways in which to account for how materials participate in learning activity.

In exploring the literature outside of education, I have learned to see materials as more than a means to an end. This is important because it provides us with new ways of thinking about how we design and manage spaces for learning. What is more, when comparing my findings to those in the literatures of anthropology, archaeology and architecture, I was struck by the underlying sameness of human experience over time. This was both surprising and reassuring. The literature of educational research is often accompanied by a baseline of discontent that every so often reaches a crescendo, resulting in calls for reform that spill over into demands for revolution. These revolutions – breaks with the past - are often justified in terms of new things; and these new things, the things we pin our hopes on, are all too often the very same things we fail to make room for in our theories of learning. In what follows, I detail my contribution to knowledge.

CONTRIBUTION TO KNOWLEDGE

This thesis uses the ACAD framework to ground research that explores the material ecology of learning, in order to reveal how learning activity is shaped by the environment in which it occurs. It offers theoretically grounded ways of understanding emergence (persistent change in the learner), and explores what it means for learners to enjoy freedom to do what they must in order to experience this persistent change. In doing so, it strives to give an account of learning activity that is neither socially nor technologically deterministic, but systemic.

My contribution weaves together new insights enabled by close observation and theoretical reflection, and demonstrates a number of phenomena in action that can inform practical action as follows:

• It provides a diagnostic tool for complex learning environments based on the ACAD framework (Chapter 3).
Conclusion

- It illustrates the value of naming the properties of materials, and tracing their associated qualities in use (Chapter 4).

- It shows how case studies of specific materials can be used to trace relations between form and learning activity (Chapter 4).

- It demonstrates the value of mapping entanglement for a) iterative design work on tasks and alterations to the learning environment, and b) professional development (Chapter 5).

- It presents a number of key findings in pattern-outlines, patterns and a pattern scenario, which others may use and repurpose in other similar learning environments (Chapter 7).

In processing the literature discussed, in Chapters 3 to 7, through many hours of empirical observation (Sørensen, 2011), my contribution to the literature on learning spaces can be found both in how it reframes our thinking about things in environments for learning, and in the methods used to explore the material ecology of learning. It produces insights that are relevant for those who use and manage existing facilities, and those responsible for the planning and design of future spaces for learning. I trust that having explored this work, people will pause to think about how things help or hinder learning, and will be equipped to identify the often invisible social sanction that acts to limit how we use what we have, in more productive ways.

I am confident that practitioners will find in my rich descriptions useful examples of what is possible, and that my choice of patterns will help connect lived experience with broader philosophical questions and current educational research. Furthermore, those who manage complex learning environments will find the detailed accounts of situated learning activity informative. I hope that I have communicated the richness of this learning environment in such a way as to promote a willingness in others to experiment within their local contexts. For those who are involved in both instructional and architectural design for learning, this work describes an exemplar of current practice, and promotes a different way of thinking about how our habits shape our habitats. As such, it provides
a counter-culture narrative (Burke, 2014a) that should stimulate thinking about what is, what might already be possible, and what may yet still be – if only we create space in which our imaginings and experience are free to call forth, and answer to, a world already in motion.

This work is an interim milestone in my exploration of how things are caught up, are carried along, resist, inspire, and decay with use and for lack of use. It provides exploratory methods for thinking about the planning and management of complex learning environments, each of which would benefit from being incorporated into further participatory design-based research by those working in facilities planning, post occupancy evaluations, professional development, and instructional and architectural design.

The simple task of listing current materials and their properties and relating them to observable qualities of learning activity is an inexpensive and practical way of expanding spatial literacy and current learning repertoires. The mapping of learning entanglement could be used as a means for resolving an impasse, identifying constraints, imagining new ways of working creatively with what is to hand, and identifying possible additions to learning environments within fixed budgets. What is more, the act of creating one’s own pattern-sketches, pattern-narratives, patterns and design scenarios, or engaging deeply with those written by others, is a way of imagining new practices and reworking current ones in different ways.

Building on research conducted using visual methodologies (Blackmore, Bateman, Cloonan, et al., 2011; Burke & Grosvenor, 2007; Niemi, Kumpulainen & Lipponen, 2014; Wall, Hall, & Woolner, 2012; Woolner, Clark, & Thomas, 2008), these methods would add to current repertoires for gathering feedback from past, present and future inhabitants of learning environments under review or in construction. Moreover, in and of themselves, they provide teachers with tools for professional development and for developing their students’ spatial literacy in learning to co-configure environments to support independent and collaborative learning activity. This is something that should be
encouraged, if we are to incorporate what is known about different ways of coming to know, as it has been demonstrated that even limited guidance in using unfamiliar learning spaces results in increased learner autonomy (Kollar et al., 2014). This is a finding that may well be replicated by teachers learning to teach in new learning spaces.

**LIMITATIONS**

Whilst I have endeavoured to use theory to connect empirical observation, conducted at a single site, to broader questions within the literature, this study remains a study of a single site. If I were to have my time again, I might consider conducting observations at a second site. The challenge would be to choose between a second similar environment and a more traditional site. Two similar environments would have offered the opportunity to cross-reference the emergence of similar types of valued practice, strengthening my claims and extending the scope of future research. A contrasting pair may have offered the opportunity to confirm that many of the practices identified did not emerge in dissimilar locations, strengthening my claims, but still limiting evidence of their emergence to a single site.

As a single researcher, I was always aware that what I observed was only a fraction of what was happening, but I resisted the urge to make greater use of video recording technology. This was partly a practical consideration, due to the additional hours of observation that this would have entailed, and partly a methodological choice, as I was following materials in use, which have a tendency to travel, making capture on video difficult. However, video data of global activity – an eye in the sky, so to speak – would have provided valuable additional information.

Whilst this study examines a complex learning environment using the ACAD framework, and acknowledges the fundamental importance of the fact that learning is socially situated, it does not provide detailed analysis of the social aspects of learning activity. Furthermore, it does not engage with the finer details of task design - or
the epistemic aspects of learning activity. Both of these would be possible, using the vignettes as presented in Part 2, and would benefit from future analysis. However, the absence of interview detail would be a limitation in conducting this extended analysis.

Patterns are by nature subject to iterative alteration. The patterns presented in Chapter 7 have not been subject to review. A further piece of research could develop them in either a workshop setting or in an online forum, and multidisciplinary teams of educational designers could test them before recommending them for use in practice.

**FUTURE RESEARCH**

As a style of knowledge production, design anthropology differs from traditional ethnography in a couple of ways. Their use of theory goes ‘beyond analysis and description to the generation of design concepts’ (Otto & Smith, 2013). Working collaboratively, for extended phases, they generate and refine concepts (Drazin, 2013; Kjaersgaard, 2013) and explore a different style of knowing (Kilbourn, 2013) through the use of non-textual tools, such as perceptual synthesis, experience juxtaposition, and potential relationing. This work could be extended through its application in a number of shorter studies across multiple sites.

If one were to use ambient computing (sensors and RFID tags) deployed in complex learning environments, connected to mobile data management software and synchronised with digital video data, one could begin to explore these nuanced qualities of learning activity at scale. One particular avenue that I would like to investigate is the formation, persistence and dissolution of working-circles in open learning environments. Using video from overhead cameras, it would be possible to examine the size and shape of circles in relation to the spaces in which they occurred, along with information about the types of tasks learners were working on, and the rules of social organisation governing their learning activity. Tracking movement through space and time, using
Conclusion

RFID tagging and embedded environmental sensors, could add breadth to the depth of purely human observations.

Having collected and analysed overhead video, ambient environmental data and in person observation of ongoing learning activity, one could create material for training teachers. Practices that could be illustrated might include:

- the characteristic postures of active and engaged learners,
- tracing teacher observations of learning activity over time,
- the identification of patterns of activity that pre-empt distress or disengagement, and
- examples of co-creation and co-configuration using elements of the environment.

Both in my observational work at NBCS, and in the Design Studio at The University of Sydney (Thompson, Ashe, Wardak, Yeoman, & Parisio, 2013; Thompson, Ashe, Yeoman, & Parisio, 2013; Thompson & Yeoman, n.d.), I often noted how what appeared at first sight to be unproductive learning activity was in fact highly productive on-task learning activity. Finding ways to share this type of information with teachers, and exploring ways to help them sharpen their perception, would go some way towards alleviating the stress associated with being responsible for large cohorts in the open (Kollar et al., 2014). Moreover, early findings from Harry Daniels’ work (2014) suggest that where pejorative observational strategies are used to manage open learning environments, successful adaptation is often inhibited. In other words, a style of observation that is ever alert to transgressions, works against the emergence of productive, participatory learning. Therefore, research of this nature would make a valuable contribution to training those destined to teach in complex learning environments by increasing their teaching and learning repertoires and thereby reducing the anxiety associated with working in the open.

However, the value of gaining a nuanced understanding of the material qualities of things through in person observation of learning
activity, even before exploring it further through the collection of big data, should not be overlooked. For as noted earlier, people and things do not always participate as expected in learning activity, and misreading small actions at scale is costly, both in terms of missed opportunities for learning and in terms of spending on infrastructure. Online learning environments make it possible to analyse some types of learning activity at the level of keystrokes and clicks. From the perspective of central management, it might appear to be a good idea to use this information to inform future research and development of existing infrastructure, with an increase in activity used to justify further spending on institutional systems. However, in person observation and the careful articulation of the material properties of things in use might alert one to the fact that what appears to be a sizeable increase in traffic is only the tip of the iceberg, in terms of actual learning activity. This caution is based on my understanding of the properties and qualities of the Task Card (in Chapter 4) and how students tended to click on them once, and then download them to their local drives or store them on personalised cloud based applications like Evernote. The result of this was that ongoing interaction between the student and the Task Card happened outside of the LMS. This meant that a formal count of clicks would grossly underestimate the engagement of these 181 year five and six students with the 20 - 50 Task Cards in use, during the course of any given term.

A detailed observational study of a small cohort enrolled in a typical unit of blended learning, informed by theories of material ecology and using the ACAD framework, could be used to establish a realistic and meaningful baseline of clicks per student across both proprietary and open platforms. Correlating these findings with information on activity in purely proprietary systems, one might reassess the value of funding in house development and management of proprietary systems – something that is notoriously hard to get right. What is more, this type of study might lead one to consider ways of interfacing basic institutional systems with trending applications as used by learners on a day-to-day basis. An example of this type of ‘knitting spaces together using technology’ can be found in studies using GLUEPS-AR, in Barcelona.
(Hernández-Leo et al., 2011; Pérez-Sanagustín, Hernández-Leo, Nieves, & Blat, 2010).

Other nuanced measures that could be explored using small scale observational studies to inform large scale digitally extended observational studies include: acts of co-configuration using elements of the environment, the role of co-location on co-configuration, the role of gesture and gaze in directing attention across scale levels, legitimate peripheral participation, phases of disengagement over time, and the use of particular types of furnishings, tools and space. All of these measures could be mapped against phases of working intensity, types of learning activity and measures of learner productivity.

CONCLUDING RESTATEMENT

*How do materials participate in teaching and learning practice, and how do we account for their participation in learning activity?*

Conducted as ethnography, this study sheds light on how materials participate in teaching and learning practice in the following ways. Materials can be said to support, extend and impede learning activity through their properties; and their use is dependent, contingent and catalytic. Consequently, studying materials in use is more complex than reporting on anticipated use. What is more, where productive learning activity is understood as an emergent property of complex learning environments, the deficits of replication through acquisition are exposed. This is because deep and lasting change in practice requires far more than the acquisition of new tools, technology (Shove et al., 2012) and buildings (Woolner et al., 2012, 2014).

With regards to how we account for the participation of materials in learning activity, it can be said that the properties of materials can be mapped to qualities of learning activity, and each of these properties may, or may not, be employed productively in learning activity. However, being alert to this is only the beginning of preparing a productive learning environment, for there are very few constants in the material...
ecology of learning. Tracing learning entanglement across scale levels is a valuable analytical tool that can be used both prospectively and retrospectively. Understanding the principle elements of emergent wholeness provides one with tools for identifying aspects of an environment that could be improved upon, in a unified manner, across scale levels. What is more, developing a nuanced understanding of complex learning environments, using these methods, has been instrumental in identifying reusable elements of design without extracting them from their context, their value and the intentions of those who put them to good use.

This work raises more questions than it answers. However, it works towards refining questions, the answers to which will benefit instructional, architectural and interior designers, facilities planners and managers, furniture manufacturers, teachers and learners.
Through this ethnographic study of learning entanglement I sought to illuminate the role of the material in teaching and learning. In equipping myself, I had to look beyond traditional educational research in order to find theoretical frameworks that engage deeply with the material, and resist reductionist or overly deterministic conclusions. My search to find what may be said about the relations between learning activity and the environment in which it occurs reaches a temporary end, here, with a story. It is a story about another school that exists in what may as well be a parallel universe on the slopes of Mount Karisimbi, Rwanda, but whose teaching and learning practice is informed by, and informs, those who live and learn at NBCS in Sydney, Australia.

The school is located on the Rwandan side of Virunga National Park, a World Heritage site that is better known as one of the few remaining habitats of the mountain gorilla than it is for its educational prowess. The school consists of an assortment of rectangular structures built out of besser brick, wattle and daub and sheet metal. Each classroom has two small, shuttered windows, a door, and a well worn but cleanly swept dirt floor, and is furnished with a few desks and a rudimentary blackboard that is screwed to the wall.

Approximately 18 teachers teach 1,800 students in two shifts every day. At the invitation of the Anglican Diocese of Rwanda, teachers from NBCS have been visiting schools in the region since 2010. What initially started with a request for help to educate a generation of children born as a result of the systematic rape that accompanied the Rwandan genocide has turned into a mutually rewarding working relationship for many. The school in these images is not one of the boarding schools created to house the children of the genocide. However, falling as it does under the Anglican diocese in the region, they benefit from training offered locally.

The image that piqued my curiosity (Figure 55) was posted on Twitter by Mr Harris, the Principal of NBCS.
Clicking on the image in my Twitter feed, it was the string marking the edge of the grass that caught my attention. There could have been any number of practical reasons for its presence. But it looked too flimsy to keep out a hungry goat or roaming cow; I wanted to know more about who put it there and what they hoped to achieve by its presence. The story I was told was more heart-warming and instructive than I could ever have imagined. In its retelling, Mr Harris speaks with deep admiration for the Principal of this school, who had only recently completed a Masters of Education in Kampala, Uganda. Something he accomplished, over and above his duties, by attending weekend lectures that required a 10-hour journey by bus at the end of the school week and an overnight return on Sundays in order to be able to resume his duties first thing on Monday mornings.

The activity recorded, in Figure 55, is the interpretation and enactment of an idea that was shared with local head teachers during a professional development workshop run by a team from NBCS in the regional Cathedral a week earlier. The idea had grown out of the realisation that, despite the rudimentary nature of many of the local classrooms, the people of Northern Province lived in a very beautiful part of the world.
Conclusion

Figure 56 - Northern Rwanda

Because of this, they had been encouraged to think about how they could use the natural environment as an extension to their current classrooms.

Figure 57 - An example of a local classroom for 75 pupils

The group from NBCS visited this school a week after the training and, in retelling the story, Mr Harris remembers how uncharacteristically quiet the Principal was on their arrival, and how he had hurried them up the hill to the school building furthest from the road. Once there, Francis had flashed his characteristic broad smile and motioned to a number of
roped off grassed areas saying, ‘This is where we are going to grow the
garden.’

Figure 58 - View into the new outdoor classroom, and beyond

Within the roped off areas, two lessons were in progress (Figure 58). One involved students working out multiples of seven using hundreds of little pebbles, and the other was an English language lesson on colour. Both were conducted in what is a typical style of call and response, used in the retelling of African oral history. The language lesson was led by a teacher who initiated the sung dialogue with a question: ‘what colour is the sky?’ To which the children responded, ‘the sky is blue.’ ‘What colour is the grass?’ ‘The grass is green.’

In recounting the story, Mr Harris was struck by the magnitude of this simple translation of an idea into a working solution for ‘Suddenly there were so many more colours visible to the kids, than sitting inside the classroom’ (personal communication, May, 2015). In less than a week Francis had selected and roped off a series of outdoor teaching spaces, inspired his teachers to think about new ways of using what they had in creative ways, and together they had engaged the students in ways that made them ‘come alive.’ What is more, in taking the learning out of the classrooms, they had inadvertently extended the reach of their teaching - for, sitting on the other side of the string and watching on with interest, were a number of visitors from the local village, many of whom were illiterate (Figure 59).
My digression in telling this story was not an indulgence. Its inclusion serves as a reminder that, whilst this thesis is about things in use in a privileged school in the developed world, the lessons I have learned are not about a particular class of objects, whether buildings, mobile technology or special furniture. They are about the material qualities of anything, and how an appreciation of these qualities provides insight into how best to work within any learning environment. What is more, the learning through the exchange of ideas and practice between these two schools does not end here. In rounding out this story, Mr Harris talks about more recent visits in which ideas generated in Rwanda have guided professional development in Sydney, in 2015. And he wonders at what he will learn on his return to Rwanda in six months time.

The value of relationship is clearly highlighted in this example, as is the educational context within which it sits. However, it is the framing of things in use that I would like to focus on. It was, after all, the string that caught my eye in the first place, for convivial groups of people outside are not an uncommon sight in Africa. For the Principal, the string demarcated a new learning space, one that would never have walls - but a garden - that would mark it off from what lay beyond. In the language of Alexander (2002), Francis had created a boundary that encouraged
learning activity to expand out of the classroom and into the world outside, with qualities that afforded both the demarcation of formal learning spaces but also allowed informal participant observation for those passing by. Motivated by epistemic ends, he apprehended both a problem and a possible solution. In casting about for a way to implement the solution, he used what was to hand. What is more, in appreciating the material properties of the string within the local context, Francis planned to formalise the arrangement in the future by growing a living edge to these new classrooms.

When asked to explain 'the magic' of this encounter Mr Harris responded as follows,

I guess it’s about mindset, vision and hope ... we put those three things together for Francis and he contextualized them beautifully. The teachers got a sense of hope that their job was going to become more interesting, because they were in these different spaces and were allowed to be there, not told to get back into a 'classroom'. This was actually a classroom to them, and I think that is why, in this very rustic way, they put the rope there, because it defined a space which people were allowed to go into - which was interesting, because everything beyond this space was free as well (personal communication, May, 2015).

What I keep coming back to is that, when it comes to learning, humans share a drive to learn that is not irrepresible, but given the right mix and weighting of the three dimensions, it is remarkable what people will do. It is not so much about what educators can do for learners, but what they can lead learners to do on their own, given the right environment. This brings us back to those things which are open to alteration through design, for the magic lies not in what one does, but in how one provisions a space to set the tone for learning. In the presence of an appreciation of the material qualities of things, their multiple dependences, and the nature of emergent wholeness, things that you could never even imagine, happen - not because you did something directly, but because you provisioned a learning environment and
allowed learning activity to take its course. Moreover, everyone has the right to an education and, given the right mix of vision, mission and hope, it is achievable by all.

I trust that this work is sufficiently rooted in the past, satisfyingly well grounded in the present, and inspires all who read it to reach well beyond what they think is possible. But, above all, this is not the beat of a revolutionary drum. It is a reminder that, within us all, we have the capacity to make choices and to act in ways that promote wholeness, every day.
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Figure 60 - Locating the activity of each vignette

<table>
<thead>
<tr>
<th>No.</th>
<th>VIGNETTE</th>
</tr>
</thead>
</table>
| 1   | What does listening look like?  
On the role of gaze and gesture in open learning environments |
| 2   | Because this is what we do in the Zone  
On the conscious use of space and the value of intentional disruption |
| 3   | The brown-eyed blue-eyed experiment  
On the use of immersion experiences and framing stories in the life of the Zone |
| 4   | A lesson in 24 hour time  
On the appropriation of the environment in the service of learning |
| 5   | In the future I have a moustache  
About identity and the appropriate use of social media |
| 6   | Managing the here-and-now via the anywhere-anytime  
On the role of presence in blended learning environments |
| 7   | Making thinking visible  
About noticing what is lost when tools change |
| 8   | Ms Talbot’s workshop  
On the value of improvisation in the use of tools for learning |
| 9   | Edward & Isobel develop a method  
On the value of available space and appropriate tools, and the freedom to use them |
| 10  | On the getting and sharing of wisdom  
The role of the older students in establishing and maintaining learning culture |

Link to supplementary online material
VIGNETTE ONE

WHAT DOES LISTENING LOOK LIKE?

On the role of gaze and gesture in open learning environments

Vignette 1 describes a typical 75-minute learning session. In doing so it provides key insights into the fidelity of the relationships between teaching philosophy and teaching practice, and demonstrates how teachers balance the needs of the individual with the needs of the group. The activity described in this vignette takes place in the lower central section and the primary school playground, and it involves a group of 40 students and two teachers. Whilst Vignette 1 is not the subject of detailed analysis, it provides examples of many of the patterns described in Chapter 7, and has been included to describe the more social aspects of learning activity in the Zone.

31 MAY 2012 Learning session three was an extra maths lesson for those who did numeracy with Ms Montgomery and Mr Hughes. Today, Ms Philips is filling in for Mr Hughes, and the group of about forty consists of students from year five and a few from year six who found maths challenging. It did not include the small group of between ten and fifteen who worked with extra help behind the glass doors in the classroom downstairs (LL). The group had come to the end of a unit on direction using compasses and had completed the topic test, but were still experiencing some difficulty. Rather than remain inside, to repeat what had to this point not proved successful, Ms Montgomery had
planned an activity to get them outside, moving and thinking. Armed with two sets of instructions printed on white paper, she invites the group to follow her as she walks through the glass doors towards the shade sails in the playground.

As they gather under the shade sails Ms Montgomery briefly outlines what they will be doing, before handing one member of each working group a single sheet of directions. Many of those with instructions in hand start reading them out loud and, without prompting, those in their groups start counting out steps. There is movement in every direction. Some walk in step with their group, and others wander around looking lost. There is a lot of conscious physical orientation of bodies relative to where they are and where they are headed, which is established by waving and pointing and is followed by movement in response to the instructions as read by the group leader. Some call out ‘We’ve found it’ when they reach the end of the instructions as listed. They are dotted all over the primary playground and there are higher concentrations of students in some places, but no uniform destination or distribution of bodies.

Ms Montgomery brings them back to the amphitheatre under the sails, and asks how they managed to find their way around. There is a lot of pointing and she asks, ‘Where?’ Pushing for clarification, she says, ‘But where is there - behind the bushes?’ Scanning their faces, Ms Montgomery asks for the whereabouts of a particular group. On making eye contact with one of them, she says, ‘You girls just cracked me up because you ended up almost in the bushes over there.’ She walks to where they are sitting and points to the bushes. Most look to where she is pointing. Continuing in a conversational tone, she comments on something interesting she heard one of them say, and invites the student to repeat it. The student, speaking slowly, hasn’t quite made sense of the issue but is clearly thinking out loud when she says, ‘If everyone else started over there and we started here, well then we ended up in different places?’ Acknowledging the half formed question, Ms Montgomery throws it open to the floor, asking others what they make of
the problem. A student seated at the back is keen to add her thoughts and offers, 'I think people, well - our group ended up over there, but the people who were more there, well I think they were probably wrong because there were more people over there.' Both girls have noticed crucial things but Ms Philips wants them to take a step back, because not everyone is following. She asks, 'What made you think your group was going the right way?' I don't catch the student’s answer but they discuss the absence of a fixed starting point, and Ms Montgomery initiates the next phase by asking them to come to her and swap their old instructions for new ones.

They move quickly and many launch straight into the counting-out-of-steps even before their group leader has had time to orient themselves in space, in response to the instructions. There is clearly a difference in these instructions; they must include physical markers and so the students move, in separate groups, but en masse, towards the car park. Some groups are strung out, connected only by their voices. A pair of boys walks as a unit with one physically directing the other – his hands on the shoulders of his partner who reads the instructions, and a group of four girls step out in a straight line measuring their steps, which works - except for the shortest who has to double her efforts to keep up. It's not long before variation in pace and precision have some off course, climbing railings to complete the number of steps they have been instructed to take, before turning.

They ‘finish’ and Ms Montgomery calls them back to the seating under the sails. She laughs and says, 'I’ve given you two sets of instructions to get to our secret location but we still haven’t told you where the secret location is!' Some are indignant, thinking that having followed the instructions, they must have found the secret location, and insist that she has ‘Basically told them where to look.’ Ms Montgomery uses this as a segue into the revision she will do with them inside, on mapping and compass points, and they make their way back into the Zone. They have been outside for less than 20 minutes.
Inside, Ms Philips is writing on the whiteboard, and Ms Montgomery scans the now working students. There is a lot of talking and not many are watching what Ms Philips is writing on the board. Walking towards Ms Philips, Ms Montgomery engages the students in a discussion about cardinal points; they are busy drawing compasses in their workbooks. Ms Philips continues to take questions from the group, writing their answers on the whiteboard, while Ms Montgomery does the rounds answering questions and explaining errors to individual students.

She reminds them to glue their work into their workbooks and is having to talk over the sounds from upstairs, in order to be heard. As the volume across the Zone increases, the students respond by talking louder, adding to the problem. Ms Montgomery responds by stepping into the curve of students sitting on the semi-circular seating. She is normally an animated speaker, but now she is visibly working hard - using expressions, gestures and oscillating volume to focus their attention, and she uses a printed copy of the worksheet to direct their visual attention. Some have been quick to grasp what they had not earlier, whilst others are still battling with the mechanics of the task. There are lots of individually asserted needs and the noise from upstairs is, under these circumstances, making matters worse.

In response, Ms Montgomery consciously curtails both her movements and her speech. Standing relaxed, but absolutely still, she waits for quiet. A few notice and in response first one and then another put their right index finger to their lips and raise their left hand in the air. In acknowledgement, Ms Montgomery mirrors their move with her hands, meets their eyes with a steady gaze, nods, smiles and calls out their names, thanking them each individually. As she does this, more and more stop what they are doing, look to her, and follow suit. This is a ritual that they used earlier in the year to get the students mirroring the actions of the person next to them. It's a bit like a shoal of fish or a

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9 READING THE LEARNING LANDSCAPE
10 DOING-THE-ROUNDS
11 MONITORING THE AUDITORY ENVELOPE
On the role of gaze and gesture in open learning environments.

Mexican wave, except the aim is to get the students to stop what they are doing and look at the teacher. Once she has the attention of the majority, she continues, ‘If you are still gluing, that’s OK, just listen up.’ Those with their hands up put them down, watching and listening as she continues, ‘I’m just going to explain exactly what you’ve got to do. We’re going to do that very first page. When you look at it for the first time, it seems like it is asking you to do the same thing. But what we are doing with the compass is that we are moving north.’ She uses her hands to indicate north, then moves them to her left indicating three o’clock - East. A single student stands between the two teachers. She has a marker and her workbook is folded over, resting on a clipboard, which she holds in one hand. She is finished and is waiting to illustrate her answer on the board.

However, in doing the rounds Ms Montgomery has noticed a common error in a number of workbooks, and she asks the student to wait as she reiterates how they are to orientate their work on the page before starting. She picks up a sheet with the compass points on it and moves into the semi-circle so that they can follow as she speaks. Kate, the student who has been waiting at the board starts writing on the board, but Ms Montgomery is still battling to get the students to follow her instructions and I can hear Ms Talbot in animated discussion with her students upstairs. Finally, satisfied that the students have the correct orientation of their workbooks, and that their responses are now correct, a few more join Kate to write their worked examples on the whiteboard.

As more finish, Ms Montgomery engages those still seated in conversation about when compasses are useful. Some respond by adding their ideas to the written list on the board, and others wait to be called on to verbally give an answer. Ms Philips is keeping a keen eye on those still working, and Ms Montgomery calls the name of a student seated at the back of the semi-circle. 12 The student looks up but has not heard the details of the question. Ms Montgomery throws her hands in the air. It’s expansive but not frustrated, and she reiterates, ‘One idea for what we use a compass for?’ Erin responds with, ‘When you’re hiking?’ Ms

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12 IDENTIFYING THRESHOLDS OF DISENGAGEMENT

PART 2, OBSERVATIONS AND REFLECTIONS
Montgomery gives an appreciative ‘Yeah’ and repeats, ‘When you’re hiking!’ She then recounts a personal story of hiking with a map and no compass and ends with, ‘So yeah, when you’re hiking you-should-have-a-compass!’, clapping out a rhythm with her hands for emphasis.

Scanning the students, she calls on another. He suggests that one could use a compass at school but Ms Montgomery is not entirely convinced, so he mumbles, ‘To find my way...it’s a big place?’ Turning, she asks another student, ‘What do you think?’ He has a practical suggestion, ‘Well perhaps when you’re learning about it (the compass)?’ Ms Montgomery follows up by asking who amongst them will be doing the Amazing Race for sport this term, and suddenly all eyes are on her and a number of hands go up. She asks if they will be using compasses. Moving across the semi-circle she looks to the back of the group and calls on another student, ‘When might you use a compass?’ The students offer variations on themes already raised. Those writing up on the board sit down and Ms Philips continues to list their ideas on the whiteboard.

Ms Montgomery has a word with Ms Philips and then turns to the students saying, ‘I’m just going to wait until everyone settles again because you are not listening to each other.’ She pauses. The students continue to talk amongst themselves so she turns to speak to Ms Philips, who mentions the image of the airplane often found on the screen on the back of airplane seats, the type that tracks direction and distance travelled. She uses her hands to draw a screen in the air, and Ms Montgomery responds enthusiastically, mirroring her tracing of the screen in the air, gentling bobbing up and down as she too tracks the imaginary path of the plane. Most of the students are now watching, and Ms Montgomery is suddenly self-conscious. Still using her hands she says, ‘Did you like the way I did that?’ She bends at the knee and does a little bob. The students laugh and she points out that they understood what she meant, and as she repeats the move many of them move - ever so slightly - with her. She concludes with, ‘Everyone up there (motioning and looking upstairs) thinks that we are doing dancing in maths!’ A
number look up to see if the others really are looking at them and some start dancing in their seats.

Bringing them back to the discussion, she points to Caleb and asks if he has any other suggestions. Before he has time to respond, she asks where all the noise is coming from. Her eyes track from right to left around the semi-circle and she comes to rest on a couple that had been talking. She has the visual attention of almost all at this point, and loudly says, ‘Active listening?’ Looking from the left to the centre of the group and back to Caleb, she apologises for interrupting him, and repeats, ‘What is active listening?’ A couple of hands go up and she calls on a student whose response is hard to hear. Bending forward at the waist, she puts her hand to her ear and asks the student to repeat herself. Having heard the answer, she responds with, ‘Yeah, when you are switched on!’ She clicks her fingers and gestures with her hands palms up and open, ‘What else does active listening mean?’ She uses her right hand, palm open and side-on to direct everyone’s visual attention in Caleb’s direction, ‘So at the moment everyone should be looking at Caleb because he’s the one that is about to speak.’

‘What else does active listening mean?’ Another student offers, ‘You shouldn’t be talking when someone else is talking.’ Ms Montgomery brings her left hand to her right palm and raising them together to just under her chin, emphasises, ‘You definitely shouldn’t be talking, not just because we’re actively listening but also because it’s very rude to Caleb.’ With both hands open and palms side-on, she points towards Caleb as she visually tracks the faces of the students around the arc and comes to rest where her hands have stopped, pointing in Caleb’s direction. The motion is deliberate but not forced, and I’m left with the impression that she is willing them to follow her gaze. Caleb, now a little self-conscious says, ‘Well I was thinking that when you are mountain biking it would be a good idea?’ Ms Montgomery responds positively and repeats his suggestion before looking to those seated on the floor in the curve of the semi-circle. She calls on another who offers a long explanation. As she
Vignette 1
On the role of gaze and gesture in open learning environments.

listens, she has a single hand raised to her mouth and is looking directly at the speaker. On raised toes she leans forward, listens, nods and tries to summarise what has just been offered.

She is losing the attention of the group so scans the board where the students have written some of their earlier ideas.\textsuperscript{14} Stopping at wind direction, she annunciates as she reads and points to the words on the board. Looking up, she brings her hands together in a quiet clap and says, ‘Wind direction - to tell which direction the wind is coming from.’ As she says this, she moves her hands together like a weather vane, ‘Why is that important?’ She is bent over at the waist and looks at those in the front row of the semi-circle. Turning, she says, ‘Year six students, you are going to discover this in term four! Why is wind direction important? What are you doing in term four for sport?’ She puts her right hand to her head and taps her head (thinking). Someone shouts out, ‘Surfing!’ Hands palm up and questioning she says, ‘Well, why is wind direction important?’ The students upstairs are finishing and it is getting noisy, so she puts both hands behind her ears and makes big eyes as she tries to hear what a student seated at the back is saying. It’s a long explanation, after which she gives the speaker the thumbs up, nods her head, and says, ‘Good! Depending on whether it’s an onshore wind or an offshore wind (raising first the right hand then the left for emphasis), you know which beach is going to have the best surf!’

She looks to the board and says, ‘Well, we might move onto the next one.’ She confers with Ms Philips, who points to the sheet, and they make their way through the students’ worked examples on the board before recess.
Vignette Two

BECAUSE THIS IS WHAT WE DO IN THE ZONE

On the conscious use of space and the value of intentional disruption

Vignette 2 describes the annual rotation of home bases in the Zone. In doing so, it provides key insights into how these teachers thought about the role of the physical environment in teaching and learning. The activity described in this vignette takes place in various locations, over a number of days, and involves the entire learning community housed in the Zone. It is the subject of discussion in Chapter 6.

22 June 2012 Today marks the halfway point; it is the last day of term 2. At 8.50 am the music that signals the start of the day, begins to play. The students of years five and six make their way to the doors of their respective home class teachers, where they gather to share a relaxed but intentional 'good morning' before making their way into the Zone.

Inside, they settle in their home classes for a time of independent reading. All this takes place in under five minutes. Drop Everything And Read (DEAR) is part of the daily ritual in the Zone. Placed at the beginning of the day, it provides a buffer between the morning rush, and the active work that is to come. It accommodates those who are late, and provides a pre-
scripted and undemanding transition for all. Students are required to bring self-selected reading material to school and books, eBooks and magazines, such as The School Magazine or Scientrific, are welcome. However, a distinction is made between reading material access via laptops and eReaders because this is intentionally a laptop free moment in the day. Those without something of their own are required to choose from a small selection of reference books, picture books and magazines.

Each home class has a slightly different ritual, many of which vary internally over time. Some teachers sit with their students on the floor and read something of their own. Others regularly read aloud to their students, discussing what they have read, and every now and then the time is used by staff to catch up on marking or to prepare for the learning session to come.

On this occasion, Ms Bailey sends her class back outside because they had come into the Zone, ‘with the volume up’, which she points out was disrespectful to those already reading. As was so often the case, the students had picked up on a change in routine without so much as a word having been spoken. This class had been greeted and asked to come in and settle down to read. It was Ms Collier who was in the process of telling her students that they would be moving home base today, and that they were to do a general tidy-up before settling down to read. Ms Bailey’s students wait outside to be invited in and, on her invitation, they make their way back to their current home base - at a barely contained jog. Most manage to get on with their reading.

Many in Ms Collier’s group are still tidying their shared storage cubes. A number have discovered overdue library books and ask if they may return them. Some have started to read, but this is short lived as it is not long before they are asked to carry their storage cubes downstairs. Ms Collier’s class appear to be swapping home bases with Mr Hughes’s class and his students are milling around. Sitting on the stairs, I watch the movement up and down the stairs, and as a student in year five passes
ask if it is only these two classes moving today? Her expansive gestures and sparkly blue eyes tell me that she is excited. She responds with, 'This is what happens in the zone. Halfway through, we all move.' I ask if she is happy to be moving and she responds with, 'Yes, because (now) I’m close to the middle. The middle (upstairs on the carpet) is my favourite place to work – I don’t like sitting at a desk.' She doesn’t stop to chat, which is unusual for her and she rushes off. By now the students are all abuzz and the teachers are mostly looking stressed.

Downstairs, I chat with a few of the year five students in what has been their home base for their first six months in the Zone. They are checking for things they may have left behind and doing a bit of tidying up. One student has come back down to find a clipboard; he illustrates how he balances his laptop on it, and adds ‘Otherwise it feels like people are watching your computer.’ Another who is tidying up tells me, ‘Some groups mess up your space and don’t put it back.’ She is referring to her time in the centre downstairs, which is a favourite place for many to work. She is sad to be leaving but is looking forward to moving into a corner [UL (a)] that is not quite so popular. Another joins in, ‘I like having it the same. Now I’m used to this space it feels like home.’ Biting her lip and looking around, she says, ‘Now I feel a bit nervous’, to which her friend replies, ‘It’s good for a change but I like it here.’

I’m still piecing things together as one of the teachers passes me on the stairs, smiles and says, ‘I would move home base every couple of weeks if I could.’ I ask a quick question and, as she describes their reasons for ‘mixing things up halfway through the year’, I get the feeling that my interest in how people use learning spaces suddenly makes sense to her. She pauses to offer a more detailed explanation. Her first reflex is to describe the benefits of using the smaller downstairs spaces with lower ceilings and retractable glass walls to house the year fives as they transition into the Zone. She described them as, ‘Coming in and learning about the space and then moving up and branching out.’ This primary justification quickly gave way to a lengthy description about the secondary

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benefit of intervening before teachers became accustomed to, ‘Treating the two smaller spaces as classrooms and reverting back to four-walled-teaching.’

When talking to the year sixes about the move, they chat about things that one might consider small, or of little significance, like wobbly tables that they won’t miss, or proximity to the high stainless steel benches, which they will miss. The eight-seater tables upstairs have room for laptops, assorted bags, and larger working groups, but they are wobbly and the students are not sad to be leaving them behind. They are, however, worried about the size of the tables downstairs and, after fretting for some time, one of the students pragmatically concludes the discussion with, ‘So maybe these small triangle tables will not be SO bad - they will stay still!’

During these brief exchanges with the students, I am conscious that they too are beginning to make sense of my work and am struck by how accepting they have been of my presence. I have never really felt the need to justify my interest in learning spaces to them, the students.

The move is swiftly executed and the students gather upstairs. They are doing dance in PE today. All of a sudden I find myself sitting alone downstairs in Ms Collier’s new space (LR). Looking around, I can see that some of the furniture has already been moved. The IKEA shelving that houses the students storage cubes is no longer under the window next to the door, but on the opposite windowless wall. In its place are a number of small triangular tables. The space, with its lower ceiling, is not dark but placing the tables under the windows makes it feel less like a cave and makes good use of all available natural light.

I note that Ms Collier has taken up residence in the corner between the two windows. She has arranged a small table, a single chair, and her caddy into a very deliberate ‘teacher’s space.’ Looking around, I wondered how I could document that the same space feels ‘so different’ with new occupants. As I speculate whether what I feel is real or imagined, a fellow
researcher appears at the door and I ask if he notices anything different. His response surprises me, for he describes the space as feeling ‘qualitatively different.’ He is here to conduct a second round of interviews with a small group of students and, when pressed, he attributes the difference to the fact that many of the students are out for sport. He leaves me to my thoughts and I find myself wondering about the traces we leave in the environment, those things which hint at who ‘lives here’ and how this space is used. Looking at the wall where the shelving now sits, I can see the marks left by grubby fingers, at desk height, and I wonder how long it will be before the wall under the window is similarly marked. Glancing back at Ms Collier’s teacher’s table, for that is what it is, I try to read the message it conveys.

**Figure 61 – A ‘teacher table’**

My thoughts are interrupted by the sight of two girls who, in quiet unison, spin out of their dance class and make their way down the stairs. I wonder where they are off to – so happy - and have mother thoughts about their socks, as they make their way towards the toilet block. Not five minutes later they return, chatting as they scamper purposefully back up the stairs, their socked-feet moving quickly into step with the group. I’m struck by the quality of this simple act of leaving and re-entering a class, quite literally in motion. It leaves me with questions about the underlying orchestration of these large group lessons, which give rise to moments like this in which students act with purpose, in a respectful manner that
balances the need for a certain degree of conformity without extinguishing their developing independence or natural exuberance.

17 July 2012, Day one of Term three. Arriving back after the winter holiday, curious to see if anything else had changed since the day of the big move, I am surprised to find Ms Collier upstairs on the carpet (UC) with her students, not in her old space (UR) but not in her new space either (LR). As the shape of the day becomes clearer, Ms Collier’s presence upstairs makes sense; she would continue to teach literacy upstairs in her old space, which was to follow shortly after DEAR\(^{18}\) time. Meanwhile downstairs the group who were scheduled to do sport first, were doing Italian in relative seclusion (LR).

![Figure 62 – Mr Hughes moves into the centre](image)

Mr Hughes sits diagonally opposite Ms Collier on the carpet with his group and says, ‘It’s exciting to have a new space. Yes, it was nice downstairs but we will learn to like being up here.’ From where I sit, it seems that the year sixes are just getting on with their work, and the year fives are taking a little time adjusting to the changes. Mr Hughes’ home class follows him about like a brood of chicks. They mirror his every move, are tightly bunched together and never very far from him. Earlier, I had watched as he herded them into their new space, and this new and invisible connection appeared to lose its power as they found seats at the

\(^{18}\) Drop Everything And Read was the first activity of the day. It involved fifteen minutes of quiet reading for everyone in the Zone - teachers included.
rectangular tables in a ‘classroom’ formation: everyone in a chair, seated at a big table. The problem was that there had been no apparent front to this 'classroom' and Mr Hughes, uncomfortable with the configuration, had moved to sit on one of the green couches on the carpet. As he did this, he could be seen by some but was 'outside' of what might be considered the 'class space' and he had to invite them to join him on the carpet. He wanted to tell them a bit about his recent trip to Rwanda during the break, something that didn't lend itself to standing and talking to the students sitting at desks. 19

My attention returns to Ms Collier, who is talking to her home class about the two-marshmallow experiment, and a quick scan of the central space downstairs reveals that a relief teacher is filling in for Ms Bailey. Ms Bailey has arranged the circular seating that lives in this section into an asymmetrical assortment of disconnected curves. The students mill around and the relief teacher tries to 'do the roll', which is something Ms Bailey seldom did in this fashion. She either marks them off as they make their way in, or waits for them to settle, after which she accounts for their presence with a quiet visual scan of the room, cross-referenced against a list on her computer. Having called the roll, the relief teacher hands out this term's student diaries, along with pre-printed sticky labels. All she wants them to do is stick the label on their new diary. When they are slow to complete the task, she says, 'Why is it so hard for you to do the right thing? What is your action plan?'

By 9.25 am things begin to settle down, and Mr Hughes talks to his group about completing the passion projects they started last term. This term there will be some changes to their Matrix (project) work to accommodate what needs to be done before the exhibition. He says, 'If you've chosen something you don't think you can do, that's OK - it's a learning process. Remember all those discussions? Well, you've done something - you can document that. What you have to offer is good.' His students are quick to see a gap, and try and exploit it; one student responds with, 'So we don't have to do the whole task?' He responds, 'No, if

19 BEING AWARE OF ZONES OF INFLUENCE
you can - you do. That's not what I'm trying to say. My concern is what ARE you doing, what HAVE you done? Show what you have and we will talk through it and see what we can do.'

Across the room, Ms Collier is letting her group know that this term's Matrix work will be done in groups and that each task should be completed in a maximum of three learning sessions. The caveat is that they are to work as a group, and nobody is to start until they are all agreed upon what is needed and how the task should be executed. Because there was a lot of unfinished work last term, this term the teachers have assigned working groups taking into account different skill sets, and have reduced the number of compulsory tasks from six to four.

As Mr Hughes finishes going over the changes with his home class, who are becoming increasingly animated, he remarks to one in particular that, 'This is not such a great start', followed quickly with a possible alternative, 'Do you think you want to move?' Addressing the group as a whole, he says, 'We are going to play a game - all in a circle.' He walks to where his computer is connected to the large screen and, as he does this, his students and one teaching aid form a circle on the carpet. He walks to join them on the carpet, where they are a single excited unit waiting to follow his lead. Dropping to his knees, he starts to explain what they will be doing.

Having second thoughts, he launches straight into the game, calling out a word and clapping first his right, and then his left hand, to the floor. His gaze following his hands, he calls out the first, and then the second letter of the word. He is silent as his gaze comes to rest on the student to his left. A small nod and she quickly falls in 'step' and the group visually tracks the clapped letters around the circle to its end. The child who finishes the word calls out a new word and they follow the rhythm until a mistake is made. The person who makes the error sits up, still within the circle, but the words now pass them by until all are 'out' and the next

20 IDENTIFYING THRESHOLDS OF DISENGAGEMENT
21 CREATE CENTRES OF ACTIVITY

PART 2, OBSERVATIONS AND REFLECTIONS
round begins. The students are transfixed. They do this for less than five minutes, clapping out either spellings or times tables. It’s over almost before it begins and they transition very quickly into learning session 1, which takes them outside.

![Image](image_url)

*Figure 63 – Mr Hughes makes a circle*

It is less than an hour into the day, and Ms Montgomery comes in from outside for the first time with her group. She is the one teacher who has made substantial changes to the layout of the space she inherited. Mr Osborne had used the space as it was originally set up, with six rectangular tables each accommodating six students, one small and one large set of shelves for storage, and his teacher’s caddie. The configuration would change but not the composition of the furniture. The space was always tidy but regular in its appearance – consisting of rows and chairs – having some variation in layout but not much, and it was always open to the central carpeted space.

Today two of the green couches, three triangular red ottomans, and two large beanbags from the central space have been used to create a semi-circular arrangement in front of the large screen. Fanned out behind this inner semi-circle are four tables for six forming a second semi-circle. The teacher's caddie is closer to the large screen but oriented in the same way and, behind the tables, one of the new movable storage units acts as a corner of sorts. To its left and right, forming a ninety-degree angle, are two cloth covered room dividers with art pinned to them, and together they
Vignette 2
On the conscious use of space and the value of intentional disruption.

form a discontinuous visual boundary. This arrangement was clearly an attempt to replicate the feeling of what they had enjoyed downstairs, with the brown circular seating and triangular tables. However, the assertion of separateness in the construction of the corner was something new.

![Figure 64 – UL (a) and UL (b) prior to the rotation](image1)

![Figure 65 – UL (a) trying to recreate the semi-circle](image2)

As Ms Montgomery brusquely walks towards her caddie, the students find a seat and she hands them their new student diaries. 'The dates are on the wall; please write them up as they may be rubbed out during maths.' She reads what she has written alongside the large screen, and asks them to make sure they get the details down. A couple of students fiddle with the brakes on the wheels of the table they are sitting at, in an attempt to stop it wobbling.
Ms Collier has moved to the centre in front of the large screen, and she plays a YouTube clip of the two-marshmallow experiment conducted with younger children. Nothing is said, but the fiddling with the wheels stops. Ms Montgomery follows their gaze and others, curious to see, stand and watch as the video plays. The clip finishes, and this temporary suspension resolves as they go back to their tables and pick up where they left off, unasked. They just carry on writing the administrative details of the term into their student diaries.

It is Ms Collier, across the room, who is animated about the students in the video. She says, ‘See those students had skills! They persevered for 20 minutes!’ I am left wondering that the other lesson resumed with not so much as a word, all but unnoticed. Ms Collier asks her students to take some time to think about Term 1 and 2, including both literacy and numeracy. ‘Did you reach your targets? Be honest with yourself. Think about what got in the way. What skills do you need to reach your goals? Be honest, think and write a statement about your goals. Challenge yourself but BE REASONABLE. So nobody is talking. You are thinking! What stops you from doing your best?’

The remainder of the day plays out as usual. There are odd references to the change but, apart from Mr Hughes’s students who don’t seem to come to rest until he gathers them together on the carpet, everyone seems settled.

19 JULY 2012. Two days later, I arrive to find the Principal moving furniture with a couple of middle school helpers, he is trying to get this done with as little fuss as possible. They move all but three of the stainless steel benches out of what had been Ms Collier’s space (UR), but is now Ms Talbot’s space, and bring in an assortment of smaller working tables that seat four, have fixed legs, and work really well with the couches. Nobody pays them any attention. Ms Talbot sits with her students on the carpet, reading, as it is DEAR time. After checking the number of

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23 CREATE CENTRES OF ACTIVITY
available low chairs, the Principal asks the older students to swap all but nine of the high drafting chairs for lower desk chairs. The day takes its usual course and it is only the following morning that Ms Talbot discusses these changes with her home class during DEAR time.

20 July 2012. Gathered in their newly furnished space, 5T talk about how they would like to arrange it. Some are working on the whitewall, and some on small A5 whiteboards. Those who are not drawing debate possible options over the heads of those who are drawing, voicing their preference for more couches and beanbags. This is the first time they have been in this space when it was anything other than the wet-space. They comment that they will find the concrete cold and hard and note that they preferred sitting on a carpeted floor.

Figure 66 – 5T consider the ‘new’ furniture in UR

Many of their illustrations have the four smaller tables joined up as one long dining-room table. It is how the Principal had left them, and they clearly liked it. Its orientation did change in some of their drawings, but the configuration was replicated in most. Some of the individual illustrations on A5 whiteboards echoed the semi-circular seating they were accustomed to downstairs, but most students worked with the furnishings that were currently in this space. After a time, those at the wall

24 FREEDOM TO REPURPOSE
were asked to illustrate three options: Plans A through C, taking into account both what had been discussed, and what had been illustrated. Ms Talbot was clearly happy to have discussed this with them, but there wasn’t going to be any major moving of furniture today. She places the A5 boards on the windowsill, above the illustrations of the three options, and says they will leave them there so that everyone can have a good look and think about how they’d like to arrange their space in the future.25

![Plan C, thoughts about how to use UR](image)

26 July 2012. It is 8.55 am and the students are in their home classes for DEAR. Ms Talbot is reading something of her own on the carpet alongside her students and I can see that she is trying to model silent reading.26 She is also managing behaviour, keeping certain students on task, but in general the rangy ones seem calmer with more open space.27 With fewer walls to bump up against, they are more inclined to form a circle around her, and today there are only three hiding behind the green couch. They are within arm’s reach of the group, close enough to listen and be heard, so they are still connected – albeit, behind the couch.

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25 RESETTING THE LEARNING ENVIRONMENT  
26 CREATE CENTRES OF ACTIVITY  
27 BEING AWARE OF ZONES OF INFLUENCE

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Sitting upstairs in Ms Talbot’s newly arranged space (UR), I consider the qualities of the central, unfurnished, carpeted space (UC) and the changes I can see in Ms Talbot’s students. As I think, Ms Collier walks into what had been her space and lets out a long sigh. I quietly ask her what she makes of the changes and she says, ‘It feels so much better.’

Looking around at the new arrangement, she says, ‘So much better. You know I hated it, only because I am so little - I had to stand on something to feel big.’ She was still teaching literacy in this space. There were moments over the next few days when there was insufficient formal seating for her large group and this created moments of frustration, but in general she was far happier gathering with her students in this space – with its new furnishings.

It was during one of these moments of frustration that I offered to help move things around to solve the problem. Up to this point I had often felt the urge to help out, by moving things around, but had resisted the impulse. I was there to see what the inhabitants of this space made of their environment, but today I could see a way of organising things that would provide a functional solution for this group, and suspected it would appeal, more generally, to all. Removing the bulk of the high stainless steel benches had opened up the space considerably, but the remaining three benches sat awkwardly around the edge, obscuring either the whitewall or blocking the line of sight across the central carpeted space. The hard edge that they formed, in an already hard space, tended to keep students on the carpet, which often meant that Upper Right remained empty and unused.

Looking for a way to house these tables, I considered how they were currently used, noting how groups seldom formed all the way around them; they did not appear to be wide enough to accommodate a working person on each side. This, in conjunction with the fact that I’d noticed how the students loved to work up against the northern glass wall, which inevitably meant they were sitting on the floor behind things, gave me an idea. I moved two of the stainless steel benches up against the windows, where they did not obscure the view out. They were still within Ms Talbot’s line of sight and could be moved closer if necessary. This
arrangement was an instant hit with the students, who would rush to claim them in the mornings. Sitting up high, back to the centre, and looking out, it was the students who liked to be connected but a little separate from the group, the ones who were in the habit of making their own in-between spaces, who chose to sit here.

![Figure 68 – A new, well-loved space using unloved furniture](image)

An additional benefit for both staff and students was that those who were seeking a quiet space in which to work were now no longer distracted by those choosing not to work, who had previously tended to gather up against the window on the floor. With the stainless steel benches gone from Upper Right, a couple of upholstered couches had been pulled up alongside the ‘new’ tables, adding softness and colour to what had been a hard, monochromatic space. So began my more active participation in observation and, as the students and staff navigated this interim adjustment, I arranged furniture in different configurations to see what use would be made of it.

**7 September 2012.** A little over a month into the term, I arrived before the students and found Mr Hughes moving furniture. He was trying to replicate an arrangement I had made in the back right-hand corner of the carpeted space, after moving the stainless steel benches. He asked for my help, saying, ‘I really liked the corner with the cross
(ottoman) - it worked really well for my class and when I’m not using it and works for larger groups too.'

Figure 69 – 5H colonise the edge of the carpet

I had also noted how Ms Talbot often used this configuration with both her home class and her numeracy class, and that Mr Hughes and his home class, still ill at ease in their new space, had become accustomed to using the couches along the edge of the central carpet. Their new home base was furnished with six eight-seater tables and chairs, and had cold concrete flooring. This lack of soft furnishings was exacerbated by the presence of an art installation in the corner. Created at the start of the year, the installation had served as a point of interest but had lost its relevance to the group over time. Sitting in the only fixed corner in Upper Left (b), it made using this space difficult.

We chatted as we reassembled ‘the corner.’ It was easy enough to requisition most of the furnishings necessary to reassemble the L-shaped seating on the edge of the carpet. But the original configuration had included the red cross-shaped ottoman in the return angle of the L-shape. In its absence, people were left sitting in two perpendicular lines looking at activity ‘outside’ of the space created by the L-shape. Mr Hughes was undeterred and went looking for the missing piece. I knew where it was, and that it had not been well used, but I was reluctant to disturb Ms Montgomery’s space. She had tried to use it with a semi-circular seating

28 FREEDOM TO REPURPOSE

PART 2, OBSERVATIONS AND REFLECTIONS
arrangement, which was not the gentle curve she was hoping to recreate, but an angular arc created with two, two-seater couches. Mr Hughes’s persistence saw us swap the cross-shaped-ottoman for two additional triangular ottomans - and he was happy. I did feel a little awkward and my self-justification for moving it on the day read, ‘It works really well on the carpet: students kneel at it, sit on it, sit up against it, lie on it, fall off it, pile up on it. Students use it all the time - on the carpet’ (5/09/2012). What is more, furniture upstairs was considered available for use by all, and not the preserve of a particular space – or person.

Ms Montgomery was a bit sad. She had actively tried to replicate first her semi-circular configuration downstairs, and then the couch and table configuration she had seen in Ms Talbot’s new space. The problem was that the tables she had used were higher, and this made them uncomfortable to work at. So, those wanting to work at the tables had pushed the couches aside and pulled up additional single chairs. This meant that the soft furnishings, including the ottoman, were not being used where they were, and were not available for use by others in the centre. I offered to help her shuffle things around to see if we could come up with something softer that offered variation, but worked in a similar fashion. Starting with the four triangular ottomans, we replicated the now missing red cross in front of the large screen (Fig. 70) and arranged the six-seater tables into a discontinuous ‘U’ shape, rather than the semi-circle that never held its shape (Fig 71).

Figure 70- Replacement for the red cross ottoman

Part 2, Observations and reflections
Vignette 2
On the conscious use of space and the value of intentional disruption.

In the ‘corner’ backing on to the L-shaped configuration, we created a quiet corner with two green couches and a couple of beanbags next to the window (Fig. 72). Two felt display boards were used to create an edge, but were later removed by Ms Young, who explained that as the learning area manager one of her jobs was to manage things for the group as a whole, and that this particular use of screens was detrimental to the functioning of the whole, as it created separation - making it easier for teachers to ‘revert to four-walled-teaching.

Figure 71 - A discontinuous ‘U’ replaces the semi-circle in UR

Figure 72 – A quite corner to read in

What follows is my reflection on what I saw and heard, pertaining to the annual rotation of home bases in the Zone.
WHAT WAS SAID: A TEACHER’S PERSPECTIVE

In the minds of the teachers, there was no doubt that this rotation in space would affect student activity and teaching practice. Ms Bailey’s justification of the move, on the day, was formed around two key ideas:

1. **Space aids in the integration of new comers.** The first element of her justification was clearly about the students. This move was the culmination of a six-month induction into life and learning for the younger students in the Zone. Implicit in this ordering of home bases over time was that the lower sections provided an easier transition into this open, networked learning environment: with clearer lines of sight, less volume and a reduced area in which to wander both mentally and physically. A gradual introduction to these attributes was deemed beneficial in helping students become independent members of this community. The initial focus was on helping them master the necessary skills associated with independent online work and in-person and online collaborative group work. There was a sense that this digital skill set was somehow easier to acquire in the slightly more physically confined space downstairs. Moreover, these skills were considered the necessary precursors to navigating the larger, more flexible, and digitally enabled learning environment provided upstairs.

2. **Space silently scripts teaching practice.** The second, more detailed part of her justification, was concerned with how teachers tended to teach in the lower section. The lower section, now one continuous but divisible space, had been a string of small four-walled classrooms. It was not that these now transformed spaces did not facilitate a different style of teaching, just that they seemed to echo a former life. Moreover, they tended to evoke ingrained patterns of behaviour in staff. So, whereas the lower section was deemed positive for students in transition from traditional to open environments, it was seen as negative for teachers learning to teach in open rather than traditional spaces. This underpinned the second part of Ms Bailey’s justification, namely intervening before teachers became accustomed to “treating the two smaller spaces as ‘classrooms’ and reverting back to four-walled-teaching.”
WHAT WAS OBSERVED: A RESEARCHER’S PERSPECTIVE

There was no clearly articulated list, ‘the sins of four-walled-teaching’. Rather, the term was used to refer to teaching practices commonly used in older, more formal teacher-centred learning environments, consisting of uniformly arranged students, made to sit still, and physically oriented towards a teacher who remained anchored in his or her defined teacher space. Where the teacher led, and the students followed with their eyes on the teacher or the page. And out-of-step-movement was indicative of off task activity, resulting in censure from the teacher. In contrast, open learning environments require a different style of teaching. In the Zone, the teachers taught in teams and relied on the activity of learning to draw students in to the learning flow of the day. This activity was characterised by variation in physical orientation, focus of attention, learning objectives, tools, age, stage and preference. Moreover, conducting teaching in the open offered countless opportunities for good practice to be modelled and less helpful practices to be identified and avoided. All of this was facilitated by a number of attributes inherent in the built environment that called for alterations in practice, amplifying certain effects and ameliorating others:

1. Visibility. The obvious lack of walls behind which to hide meant that teachers in this space were visible to each other, the students, passers-by and endless visitors - even when teaching on their own. This was not unidirectional, although those new to it might feel it to be so. For, as much as the individual was visible, so too were those who observed. Immersed in this environment, teachers were continually exposed to the unedited practice of their peers, which helped in building a sense of shared community and underscored the notion that there was no single perfect solution for every eventuality. Nowhere was this more evident than in those moments where a difficult situation was managed with good grace - or a lack thereof. Strategies that worked wonders for some were awkward for others, and this variation in effect gave staff pause for thought and reduced the sense of shame often associated with failure,

29 CREATE CENTRES OF ACTIVITY
encouraging the acquisition of a raft of skills to be tried and tested in different circumstances. Teachers, much like students, worked in pairs, teams or as a single group in order to navigate the rhythms of the day. This was only possible in a space big enough to house these configurations with minimal fuss, at a moment’s notice. The space both enabled and required this type of team teaching; attempting to teach in a space that wasn’t quite big enough to require this style of teaching appeared to facilitate a drift towards a more isolated, less flexible didactic stance.

Less visible by virtue of its nature, but clearly felt, was the digital permeability of this space. The teachers regularly shared their professional experiences of learning and teaching in the Zone with the wider world through personal blogs and twitter feeds. They also often chose to bring the outside in, recruiting the help of external tutors via YouTube or various ‘how to’ sites. The students, too, were always encouraged and often required to publish their work to a wider audience via websites, blogs and YouTube. What is more, this porous boundary was stretched even further, by inviting parents and significant others into both private online school spaces and open online learning spaces.30

All this openness and visibility, whilst clearly energising for the staff, did at times take its toll on them. Certain moments in Vignette 2 illustrate a drift towards reasserting spatial separation: Ms Montgomery’s construction of my-class-space, complete with corners, and Ms Collier’s careful construction of a teacher’s-table within her home class space. Both configurations were made after the move. The first was an ordering of physical space in order to reassert local cohesion, and the second was an attempt to re-establish a familiar individual identity within both local and regional space. Both acts, one larger than the other, were clearly visible to all, and both sought to reorder physical space to reflect the identity of the new occupant(s) in a way that was meaningful and evocative of something past. The larger act of separation was seen as problematic, so the corners were peeled away by the member of staff tasked with overseeing the good
functioning of the whole. The smaller territorial assertion of identity was never really put to use but disappeared, reabsorbed into the fabric of the space by the students, never to be re-established by the teacher.

2. Seating and group formation. In much the same way that clear lines of sight set the precondition for increased visibility, the affordance of available seating sets the preconditions for ordering bodies in space, either increasing the ease with which groups formed and dissolved, or acting to impede their formation. Consequently, the seating in the lower section assisted collaborative formations around a point of shared attention, either digital or physical. It was hard to arrange this circular seating uniformly, as there were insufficient similar tables to create homogenous workstations for all. The effect of this was that those expecting uniform seating were unable to recreate what they were accustomed to. Moreover, having to use what was available helped to teach that learning in the Zone was about shared endeavour, not predicated on allocations of territory. The variety of available furnishings invariably meant trying something different every now and then, even for the reluctant. But for many this transition, and the ability to choose not only where to sit, but on what - floor, chair, ottoman, cushion or stairs - was welcome. It mixed things up, making integration quicker. “Talk to the person sitting next to you”, seems a simple instruction, but in this space the local dominance of one group over another was very quickly diluted by the boy leaning against the ottoman you were sitting on, who now became your partner, or the girl sitting behind you on the stairs. Both people fit the descriptor of “next to you”, however, in the absence of more regular rows in which sameness was easier to manage, difference was more routinely encountered.

Once groups became accustomed to using these spaces and the style of teaching that they engendered, spontaneous group formation and dissolution was marked. There was less waiting to be told to “work in groups” and far more seeking out people and resources to help in the completion of a particular task. This movement was not a visible disturbance against a uniform and still backdrop, a squeezing between
regimented lines of desks, but a vector across open space to solve a problem, acquire resources, find an audience and return to one’s starting point. This type of dynamic engagement was facilitated, first by the variation in seating arrangements, and second by the availability of empty space into and through which one could move.

3. Freedom to choose. In a space with porous boundaries and sufficient but varied physical resources it was unlikely, if not impossible, for everyone to be doing the same thing, in the same way, at the same time. This meant that, for all, freedom to choose was a part of every learning encounter. In this space, with its attendant freedoms, teachers counted on being able to trust students to use their time wisely. Moreover, this environment, and others like it, had been designed with the deliberate intention of creating space in which independence would flourish.

In the Zone, this independence was predicated on the acquisition of certain skills and a measure of trust. In Ms Bailey’s words, the students were “coming in and learning about the space and then moving up and branching out.” She said this standing in the central teaching space downstairs (LC) while facing the stairs. As she talked, she turned to look out through the glass at the year three and four classrooms and in one sweeping gesture she visually tracked “their” path in, through and up (UC). As her eye tracked up the stairs, she recruited large expanding gestures to emphasise her point. The students were welcomed in and trained in trust before being granted greater freedom, which lead to independence in learning.

4. The role of lines of sight, posture, gaze and gesture. The absence of walls used to contain or control led to clear lines of sight, a complex auditory soundscape, and a high degree of independent blended learning activity. Staff learnt to assess levels of engagement by scanning the environment, noting posture, gaze and gestures to map their route through the learning space. Without physically regimented bodies,
movement was not an indicator of off-task behaviour. More often than not, it was movement that accompanied engagement. As a result, staff had to work harder at reading the signs of productive learning activity. Too still for too long, in conjunction with regular scans of the environment, might indicate a student was watching an online video that was unrelated to work; alternately, it could indicate a student was watching a prescribed video but being distracted by noisy others. Students repeatedly seen wondering around and chatting to other students, fifteen minutes into independent work, could indicate an inability to get started, someone having lost resources, or a student conducting a survey. 32

Even I, after nine months, got quite good at reading the tell-tale signs. But I was always impressed by how the staff approached those they identified as ‘possibly off task’. They would visually keep track of them, and make their way closer to them over time, checking in with others along the way. On reaching them, they would orient themselves on the same physical and visual plane, dropping to sit on the floor, or pulling a chair up to a table. Having done this, they would ask questions to establish what the student was working on. Only then would they make judgements about their use of time. If necessary, warnings were given and freedoms restricted for repeated infractions, but this happened over time and with very little venom, which made it easy to enforce. Natural consequences are fair, and less easy to rail against, especially in an environment where everyone understands the rules: respect the learning, respect the people, and respect the place. 33

5. The role of volume, tone, intonation and pitch. In less complex environments, with a one-to-many orientation, sound is much easier to use as a measure of off task behaviour. However, used in this way in participatory learning environments, it is a rather blunt instrument - especially where work is often collaborative by design, and most work can be completed in groups. As such, sound has to be read with a great deal of attention to the discernible differences in tone, intonation, inflection and

32 READING THE LEARNING LANDSCAPE
33 ASK BEFORE JUDGING
content. Moreover, teachers have to learn to use the qualities of their voices with a greater reliance on the full range of its audible qualities.34

Quite apart from these aspects, the auditory soundscape of the Zone followed rhythms during the day, which became familiar over time. Transitions were generally marked by an increase in sound that mostly took less than five minutes to abate. Whole group sessions were conversational, often starting with a discussion amongst the staff and expanding to include the students as a matter of course. These exchanges were easily managed through the conventions of turn taking, or call and response. It was large-scale independent work that was more difficult to manage. On a global scale sound did, however, appear to regulate itself. There seemed to be some mechanism by which, beyond a certain volume, sound would not continue to escalate. But there was internal variation across the spaces within the Zone, and amongst teachers and students who demonstrated different levels of tolerance for noise.

In managing the soundscape, in a one-to-many configuration, staff would often lower their voices and make themselves physically smaller.35 This was a strategy that seemed counter intuitive to me but was extremely effective because, in time spent together, students knew they were being prepared for independent work. As a result, they mostly wanted to hear what was being said and, if they couldn’t, they moderated their behaviour, individually and collectively, to ensure that they could.

In a many-to-many configuration, staff would use pitch, tone and intonation to attract attention or to drive a point home. To get attention or mark a transition, staff would call “LIST-en-UP” following a pattern of high-low-high. This change in volume and pitch and the staccato rhythm, often accompanied by a gentle clapping of hands, meant they could gather attention without shouting. The singsong intonation of the words strung together was sufficiently different to the general sounds of work in

34 MONITORING THE AUDITORY ENVELOPE
35 BEING AWARE OF ZONES OF INFLUENCE
progress to be a marker for activity to stop, before further instructions were given.

When it came to listening to the voices of the students, the teachers were not listening for off task chatter so much as listening to identify vocalised misconceptions in learning, and wider patterns of confusion. They were looking for opportunities to help, to correct underlying errors in logic, and promote independence. Their questioning was always that, questioning, "Why did you choose to do it that way - could you think of another way to do it?" In this way, alterations in course were more constructive than being called out for having made a mistake, followed by a pointed verbal correction. Because these interactions were constructive, when more than a few were making the same mistake, a call would go out for a 'just-in-time' workshop. These were held to make sure that everyone was on the same page, rather than an exercise in collective shaming. And this style of attention was one more thing that fed into the positive cycle of trust that focused energy on active learning and not perfect performance in this environment.

36 JUST-IN-TIME-WORKSHOPS
Vignette Three
The role of immersion experiences and framing stories.

VIGNETTE THREE
THE BROWN-EYED, BLUE-EYED EXPERIMENT

THE ROLE OF IMMERSION EXPERIENCES AND FRAMING STORIES IN THE LIFE OF THE ZONE.

Vignette 3 describes the immersion day experience that framed the unit of work for term 3. In doing so, it provides insight into how the teachers in the Zone tapped into emotion to engage their students in learning and how, in this particular instance, they enrolled the built environment. The activity described in this vignette takes place in the upper central section and involved the entire learning community. This experience challenged everyone, and I encourage you to read through to the end where you will find my reflections on why I, even as a parent, think my children learnt something valuable on that day. It has been included to describe more fully the social aspects of learning activity in the Zone.

18 JULY 2012, LEARNING SESSION ONE

It is week two of term three, and all the students are seated on the central carpet upstairs for literacy. It’s not the first day of term, nor even the first day of the week. The students are dressed in school uniform and there is nothing to suggest that today will be different in any way. However, as I was not ordinarily on site on Wednesdays, I had been given advance warning that today would be ‘immersion day.’ This term the students will be exploring the question ‘Who am I?’, and this morning I learn that the framing experience for this unit of study will be a version of the blue-eyed, brown-eyed experiment. I’m not
Vignette 3
The role of immersion experiences and framing stories.

sure what to expect - a quick Google search reveals that a third grade teacher ran the original exercise in the US in the 1960’s. Jane Elliott, grappling with how to teach her students about racism in the wake of Martin Luther King Jr.’s assassination, decided to let them walk a mile in someone else’s shoes. For two days, she segregated her class according to eye colour, awarding privilege and academic status to the blue-eyed on day one, and to the brown-eyed on day two. The students in the Zone will experience just one day of segregation and, as today’s learning session gets underway, the teachers gradually move into character.

Ms Bailey has downloaded an image onto the large screen and is standing in front of it. It is a grid of three-by-three and in each of the cells is an eye of a different colour. She talks in general terms about eyes, making use of the image to discuss the range in eye colour. She asks those with brown eyes to move to the front, and those with ‘other-coloured-eyes’ are asked to move back to make space in front of the big screen for them. As she talks, Mr Hughes wanders around with a roll of sticky green dots, which he hands to those who do not have brown eyes. They are asked to stick them on their white collars. Ms Bailey’s tone is conversational as she makes the following statement, ‘Nations that score the highest in national testing are nations like Korea.’ This is followed quickly with the question, ‘What colour eyes have they got?’ There is no obvious response, so she continues, ‘The majority are?’ She pauses, looks around and says, ‘Brown!’ In that one move, she links academic achievement with eye colour. Mr Hughes is still handing out green dots and he is clearly uncomfortable - so too is Ms Collier. The two of them busy themselves with the sticky dots, talking to each other in passing but not making eye contact. I am doing my best not to make eye contact with anyone; I am finding it hard to watch.

Ms Bailey continues, ‘A lot of you ask why Mr Rogers is no longer principal of primary; well, what colour eyes does he have - blue! Yes, well what colour eyes does Miss Freeman have - brown!’ The students laugh nervously and looking around, they smile awkwardly at one another, looking for clues to indicate the appropriate response. Mr Hughes digs
deep and, stepping into character, he says, ‘I wouldn't laugh about it.’ Ms Bailey continues, drawing them in with organisational details: ‘First, in order to give the brown-eyed people the best opportunities and assist the coloured-eyed people as best we can, we are going to try and operate for the rest of the year with slightly separate groupings. Second, we want to try and collate data that’s going to support the research done in other schools.’

Introductions to units of study often start like this - with everyone gathered together and the staff initiating a conversation amongst themselves, and the dialogue gradually swelling to include the students. Today is a little different and, whilst the tone is still conversational, it feels a little rehearsed. Ms Bailey is cueing the other teachers in, not because they don’t know what to say, but because they appear reluctant to assume their roles: ‘Mr Osborne, I think you had something to say, um, about Julia Gillard and her eye colour that is pertinent?’ The discussion that ensues is slightly easier to have. He is clearly not in favour of Gillard as prime minister and manages to steer his part of the conversation into safer teacher territory with a discussion about dominant and recessive genes. He asks, ‘What does recessive mean?’ and is about to ask a student in the back with her hand up when Ms Bailey interjects, ‘No, don’t ask the ones over there’, pointing to the back. The conversation lurches from genetics and politics to sport and Ms Bailey interrupts with, ‘How many people think JG is doing a good job?’ The students groan and she poses another question, ‘What colour eyes does she have?’ The students, gaining in confidence, respond with ‘Brown!’ They think they have figured out the rules, but Ms Bailey responds quickly with, ‘Nope, hazel - other coloured!’ and the student’s snigger. Mr Osborne can’t help but ask what colour eyes Tony Abbot has; he doesn’t know, so suggests they need to do some research. The students offer, ‘Brown?’

Warmed up and realising that the conversation is heading nowhere, Mr Osborne steps into character, ‘Right guys, so I’m wearing mine (green dot) because I realise, well, I’ve been wondering why I’ve
never been head of primary or head of the school and now, because of the research, I understand why.' Attributing what he describes as his apparent lack of professional advancement to his genetic makeup, he puts his right hand to the green dot on his collar, touches it and wanders to the back of the group.

Ms Talbot is sitting on a green couch to the left of the large screen. Speaking to the group as a whole, she invites them into her confidence with an admission that she was the first in her family go to University - and that she found it very difficult. Speaking of her husband and his family, who have advanced degrees, she thinks aloud describing their brown eyes. Returning to a description of her own family, her voice quickens: ‘none of them have got brown eyes; they've all got green or blue eyes. Now it kind of makes a bit more sense.’ Her voice trails off and Ms Bailey turns. Scanning the group, she comes to rest on Mr Hughes. ‘Ah Mr Hughes, what would you like to add?’ He responds, 'Well, there’s nothing else that needs to be added really - it's obvious, really.’

Ms Bailey attempts to draw things together for both the students and the teachers. She acknowledges that it will be difficult, but asks for their cooperation and details the new rules for segregated play at recess. Gesturing to, but not looking at, the students towards the back she says, ‘You will ONLY play with people in the other-coloured-group.’ Mr Hughes adds ‘Full stop!’ Ms Bailey echoes ‘Full stop!’ and justifies this course of action with: ‘The reason why we’ve asked other colours to be at the back is really to give these people (pointing to the front) the best chance. Because of their DNA, they will be able to absorb the most information so we want them to be there (motioning to the front) so that they can do that in the most opportune way.’ By now the students are looking confused; there is less nervous laughter and more indignant whispering. Ms Bailey brings their time together to an end: ‘Thanks. Brown-eyed people, would you please grab your things.’ As they move off to do their work, one of the students hangs back and tries hard to make eye contact with me. He is clearly uncomfortable and is looking for reassurance. I try
my best not to engage and he says, ‘I hope they don't do this all term.’ He is brown eyed.

Having told them that research shows that brown eyed people are smarter than those with other coloured eyes and that brown eyes are dominant, all references to doing well, getting attention, position and privilege are being linked to one’s predetermined genetic makeup. This ranged from teachers who can’t find things: ‘I’ve lost my pen; now I understand why I lose things - I have blue eyes’ to the pacing of work: ‘How many brown eyed people are ready? Right, everyone turn to the other page.’ Apart from this, ‘normal’ lessons are taking place and the students are being expected to write a recount of a memory. It is an hour into the day and the students are working quietly. Communicating amongst themselves in whispers, they worry about sitting next to or playing with their friends on the other side of the divide.

Mr Osborne is doing the rounds and comments, ‘These guys understand (pointing to the brown eyed students); why don’t you understand?’ He poses a question to the group and ignores those with the wrong coloured-eyes who want to respond. As learning session one comes to an end, Mr Osborne says, ‘Could everyone, especially the people at the back, make a folder called Term 3 writing because we will be reworking this.’ They go out for morning tea and I am exhausted, although intrigued to see how it plays out. Some of the students have figured out that this is their immersion day and their questions are fobbed off as they go out to recess. Yesterday, the year six-extension class were given an introduction to their project for the term, they will be creating a web based anti-discrimination campaign and when they come back from recess they are more insistent - they are asked to play along.

**Learning Session 2: Numeracy** The second learning session of the day is numeracy and as the students gather on the carpet upstairs they are given a times-table-tester, a grid of 10 by 10 on a single A4 sheet. They are all familiar with the process and it is very quiet. Ms
Bailey wanders around noting strategy: ‘It’s interesting to see how some people do this in rows or columns, and some do it in groups - known or easy - there is no right or wrong way.’ Ms Talbot asks, ‘Who found that easier?’ The question is shaped in a subtly different way: who found that easier – easier or harder than yesterday? What is implied is that the new groupings will have had some impact on performance; she has linked membership of a group with proficiency, which is very unusual in this space. Numeracy groupings are subject to frequent change and the allocations are framed in terms of the acquisition of skills, rather than the absence of ability.

As they finish, Ms Talbot asks for feedback from lunch, ‘No whinging, just constructive feedback please.’ Some talk quietly amongst themselves and some put their hands up. One, not waiting to be asked, offers loudly, ‘I got to hang out with different people and that was good’; he has brown eyes. Another sitting next to him says, ‘It didn’t make a difference for me.’ There are no more volunteers. Some jostle others - hoping they will speak on their behalf, and some stare at the carpeted floor. A single student towards the back of the group deliberately wipes his nose whilst maintaining his focus on the large screen at the front. Ms Bailey says, ‘It sounds like some teasing happened today? You shouldn’t be bulling, you should be trying to be kind to the blue-eyed people.’ No further comments are made and she returns to the task for today ‘to establish the difference between mathematical operations and a strategy.’ As she makes her way onto familiar ground, she manages to assume her character, ‘Ok. Our aim today is, underline it with a ruler - that’s a good try for an other coloured eyed person.’

Scanning the space, I see another. He has created a little distance between himself and the back of the group. He has one knee under him and the other he holds tight to his chest. His chin is resting on his raised knee and he is rocking, very gently, back and forth whilst the tears drip from the end of his nose. He is incapable of listening or participating. One of the other teachers quietly taps him on the shoulder and takes him
outside. Later on, I find that there is a small and growing group of students for whom this is all too much, gathered in the garden, chatting and letting off steam. Many of the others - especially the older ones - have figured out that this is a game of sorts, but they are uncertain and play along. They participate in the lesson and with each ‘out-of-character’ interaction they either band together in indignation and disbelief or withdraw into themselves. Recess two is a relief for all and Ms Talbot, still in character, reminds them to be kind to one another.

During recess, I learn that one student has phoned his parents and asked them to phone the school down the road, to ask if they have space for him. He is angry. Those with parents on site have taken the opportunity to find them and ask for support, and others have appealed to their year three teacher for help, for they are certain that she would ‘never treat them like this.’ Many of those with mobile phones have either texted or spoken to their parents, and the teachers collectively decide to curtail the active part of the experience, and lengthen the time for reflection.

**Learning Session’s three and four.** As recess two ends, the students are greeted by their home class teachers who begin the debriefing process. They are given time to talk and an opportunity to write down their thoughts before gathering together on the carpet upstairs. A video is paused on the large screen, and the image of Jane Elliott standing at the front of her third grade classroom in Iowa on April 5th 1968 waits to speak. Ms Young, who is battling laryngitis, uses the microphone to get the students attention. She speaks gently to them, and as the bulk of the students gather she lightens the tone with: ‘Right, this is the point at which you might want to go to your bags and get your squishy tomato so that you can throw it at your teacher!’ A general ‘Yeah’ goes up from the floor and many turn to look at their friends. Ms Young responds with, ‘But you are not going to, because none of us believe that brown-eyed people are better in any way than people with a

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37 IDENTIFYING THRESHOLDS OF DISENGAGEMENT
38 MONITORING THE AUDITORY ENVELOPE

**Part 2, Observations and Reflections** 297
different eye colour.’ This is met with more vigorous affirmation from the students, many of whom look pointedly at those sitting alongside them.

Ms Talbot puts her finger to her lips, ‘Shh’ and Ms Young, looking directly from one student to the next, says: ‘So you might be thinking, what on earth did they just put us through? Well, we want to show you something now, and then we are going to continue for the rest of today to unpack all of the feelings and the emotions and the responses that the last two learning sessions caused in you. Because I know that a lot of you are feeling highly emotional.’ The students are feeling more confident and their indignant chatter is getting louder. Ms Young brings her index finger to her nose and says, ‘Touch your nose if you are.’ She invites them to demonstrate their feelings without talking and quite a few do.39

Ms Bailey, who is standing to the left of the large screen, says: ‘If you are angry, good - I want you to be angry. No one deserves to be treated differently because of their eye colour, skin colour, religion, the way they dress, the family they come from...no one! So if you are angry, awesome. You have learnt the lesson best of all. If you are sad, awesome - because you have learnt the lesson as well ... sometimes the only way to learn what it feels like to be in someone else’s shoes is to be in someone else’s shoes.’

Ms Young responds, ‘There’s a saying: before you can step into someone else’s shoes (that means to feel how someone else feels) you have to take off your own and, really, that’s kind of what happened this morning. You were forced to take off your own shoes - not literally – metaphorically.’ She gestures from within to without in a single expanding movement, ‘You were forced into a role, based on the completely random fact of your eye colour...we are going to show you a video and then Mr Hughes is going to share a little bit.’ She walks over to the console next to the large screen and sets the video in motion.

39 READING THE LEARNING LANDSCAPE
Jane Elliott’s unfamiliar voice asks, ‘This is a special week, does anybody know what it is?’ A few of the children in the video shout out, ‘National Brotherhood week’ and they talk about what this means - how different people are treated, the names they are called, and what all this might feel like. Jane Elliott then offers, ‘It might be interesting to judge people today by the colour of their eyes. Would you like to try this? Sounds like fun doesn’t it?’

The students around me are still and silent as they watch. One puts her hand to her mouth; the candour with which the children in the video speak is confronting. It is not until ten minutes into the documentary, when one of the American third graders says, ‘It feels like this has taken our best friends away from us’ that they respond. Ms Bailey doesn’t stop the video, but asks for a show of hands of those who can relate to this. Mr Osborne apologises. As the children in the video discuss name-calling and shaming, there is more ribbing and pointing. Again Ms Bailey lets the video play on but quietly asks for a show of hands from those who were called names.

At the point where the now adult children are interviewed, she stops the video and explains to the students present that two years ago they had used the video in class and that those students had wished that instead of just watching it, that they could have actually experienced it themselves. She acknowledges that it was hard and returns to the phrase that has been used repeatedly as they reflect on the experience: ‘Hard does not mean bad.’ Ms Young, who is standing at the back, asks if there are students here today who wish they had not gone through the experience. A few hands go up, and then a few more. About a quarter of the group have their hands up and she says, ‘That’s okay - to wish we hadn’t done it.’

Ms Bailey, on the opposite side of the group, nods in agreement and responds with, ‘You know what? That’s actually really good, because discrimination should never happen. But it still happens - it happens every day.’ She mentions a few simple examples that these students can
Vignette 3
The role of immersion experiences and framing stories.

relate to - things like name calling based on intelligence and status based on the ownership of certain brands of computer. She invites them to think about where and when discrimination happens, and Mr Hughes talks about the genocide in Rwanda. Ms Young, who is now to the right of the space, invites them to think about instances of social injustice where atrocities have been committed based on something that is ‘largely inconsequential.’ The students offer what they know about Hitler, Pol Pot and Robert Mugabe. They talk about Nazi Germany and Ms Young describes the yellow star worn by the Jews. She pauses, looks around and gives those who are still wearing their green dots the opportunity to take them off. They discuss power and the abuse of power, and fear, and what it can lead to.

As the students ‘unwind’ more, and more want to talk, Ms Young and Ms Bailey suggest they make groups where they are sitting and chat for five minutes, before settling down to write about the day. Mr Osborne mentions that they will be drawing on this experience in many of their writing tasks for the term but that today they can write whatever they want; they can describe what it felt like and what they liked or didn’t like. It is not long before the room is almost silent. Most have their heads down and are writing. Some stare into the distance, and after a time they begin to regroup on the carpet - they are finished.

Twenty minutes before the end of the school day, Mr Hughes begins to talk to those gathered on the carpet. He asks them what would have happened if he had just read the definition of discrimination to them out of a dictionary, or just shown them the video. A student offers a staccato, monotone response, ‘In-one-ear and out-the-other!’ Mr Hughes asks, ‘Did you like it?’ The student, still looking at the floor, responds, ‘No, I didn’t have a good time but it wasn’t awful.’ This is a brown-eyed student.
A personal reflection

Running this exercise was contentious. As an observer, I found it both hard to watch - and compelling - in equal measure. Justifications offered on the day included the notion of exposing students accustomed to lives of comfort and privilege to something that would, for a very short time, feel real. Also, the Rwandan genocide of the 1990’s had made its way into the collective experience of the school through the telling and retelling of the personal experiences of staff and students involved in current educational initiatives there. Within this context, and in a learning community in which staff were actively encouraged to explore new ways of connecting their students with the real world, both past and present, this course of action was not at odds with the cultural or teaching norms of this space.

Searching for responses to the use of this exercise in other schools unearths forty-five years of polarised opinion. Jane Elliott was thrust into the limelight, feted by the White House, major corporations and talk show hosts. She made her way into the academic record as one of the first to conduct applied social psychology in the wild, and was vilified in equal measure by local media, parents and colleagues. In a sensitive article published in the Smithsonian, the author interviews past students, their parents and some of Jane’s colleagues. In all these interviews, it is not the voices of the students that castigate Mrs Elliott. They speak of how it changed their view of the world – for the better.

Aside from the merits of running this exercise, I was there - I watched and saw some interesting things. I saw how quickly social order can be shaped by those with power, how assignations of privilege immediately translated into the preferential ownership of things and space, and how non-verbal cues are so very powerful at including or excluding those in collaborative endeavours. It was a moment in which the weight of authority, the ownership of things and the power of both the verbal and the non-verbal were highlighted as a very, very effective means of shaping activity. I do not think that it was accidental that these teachers made use of these tools to separate and divide, for they used
them in the service of active, engaged and participatory learning - on a daily basis.

In this space authority is shared. They teach in teams with roles allocated according to interest and ability, which change according to the requirements of the learning for the day. New teachers are paired with those accustomed to teaching in this space, and both find they learn things about themselves, their students and their passions as they work together. The students are keen observers of this, and the implicit message is that this is a space in which we all learn, sometimes on our own, but mostly together. Ownership of things and space is shared, as is their care, and whilst teachers are free to establish home bases, collective use of space is determined by activity type. Where there is freedom to choose, choice belongs to the individual, until such time as their choice infringes on the rights of others to learn. In practice, this means that the teacher has no room to call their own, no desk at the front, and no fixed point in space to which he or she is tethered.

Free to move, teachers engage students in short formative conversations about their work. In this way, they very quickly establish who needs a nudge in the right direction, or if there is a common thread to the problems impeding progress. If so, a call quite literally goes out for a just-in-time workshop to be held in the corner on the red couch or on the floor next to bookshelf, where they discuss the common misconceptions underlying the problems observed. All of this is facilitated by the availability of space for use in the service of learning, regardless of ownership. If it is empty and appropriate, it is available for use, by all.

Making eye contact with students was deemed so important that, when it was perceived to be under threat from the changes inherent in open environments, the staff undertook to intentionally make eye contact with each of the students in their care, at the start of every learning session. As such, they limited access to the shared learning space at the start of each session, requiring students to gather at the
door closest to the home base of the teacher under whose care they would be. There they would wait to be greeted individually as they made their way into the space. It was not uncommon to see teachers share a joke, a moment or a handshake with the students and, whilst it was a social ritual of sorts, it was not a rule that weighed heavy on anyone’s shoulders. It was something that, if allowed to slip, was missed by both students and staff, at which point the ritual would be resumed to the enjoyment of all.

This complemented the very direct and conversational style of instruction, where verbal invitations to ‘have a go’ were accompanied by a direct and steady visual connection - a moment held - in which having a go, even if you were uncertain, was valued. On occasion, this was even rewarded; for, in the language of the Zone, it was considered ‘evidence of participation’, which was in many respects equated with learning. It was what made the withholding of this attention so painful to do, to watch and to bear. If the impact of withholding one’s engaged participation in an active learning environment can be felt after only a few minutes, what then of those who fail to recruit this tool at all, ever?

One might well ask why I am so determined to mine this experience for what it can teach us. The answer is twofold. First, it is not uncommon practice to learn from encounters which present themselves as the exception. Often housed within the tension between the healthy functioning of a system and its collapse, we see the value of all that lies between. Without the contrast of the ill formed against the well formed, it is hard to determine how the latter works.

The second part of my answer is more personal. Growing up in the over blown bloom of an ugly regime and acutely aware of having been born into privilege, I navigated my education, and the world that housed it, as the tide turned. At nine, I recall waiting for the school bus that would take me home. If it was not too hot, I’d sit on the back of a bench that enjoyed no protection from the sub-tropical heat or the afternoon thunder showers. It was a little removed from the entrance to
my private all-girls school and, sitting there on the back of that bench with my feet on the seat, I would trace my nine year-old white finger through the grooves in the wood that spelt out the words *non-whites only*. At eleven, I recall discussing options for a birthday party with my mother - an outing to the cinema or a video at home. One would preclude my friend of colour and the other would not. At eighteen, dabbling in lightweight left wing student protests, I’d worry about the even younger girl who lived across the passage from me who hadn’t returned from a protest march because she had been rounded up into the back of a police van. Only the day before, she had worried about her parents response to a far smaller, more personal act of defiance. She had, for the first time in her life, freed herself from the iridescent black tresses that hung past her waist, and now sported a decidedly rakish new haircut. We should have been studying for our end of year history exam, the preparations for which had included, for me, a discussion with a classmate about the iron curtain. We shared a history class and a university residence but our lives, to this point, had shared very little else. Her question to me was ‘Was it a real curtain - it must have been very long?’ As we talked our way through that afternoon, I became acutely aware of how much I’d learnt from books, films and visitors from far off places.

That bench lives on in my memory; I remember the feel of the wood as it aged, and how I couldn’t help but spend my time picking at the layers of different coloured paint, exposed and peeling in the sun. Not more than 20 nine-year-old paces away stood a rather ornate brick structure. It housed, out of the sun and the rain, two benches. I don’t remember if those benches were marked in any way - did they say ‘*Whites only*’? Maybe they didn’t need to; even I knew they were different, reserved for me. My nine-year-old protest was to refuse to sit on them and, standing in the shade of a tree or sitting on that other bench, I’d wonder about the message these benches delivered: different benches and different buses, different cinemas, shops, beaches, public toilets and - for the most part – different school buildings in places I
rarely saw, delivering a curriculum designed to perpetuate difference to children I seldom met.

Exposed to extremes, it is sometimes easier to see the potential for ‘things’ to shape and order our world. Whilst it may not be necessary to experience these things first hand in order to appreciate quite how powerfully they shape our lives, we can choose to take note - to be conscious of how our choices shape our spaces, and how our spaces perpetuate those choices. We can choose to look people in the eye, to be inclusive, and to actually see those in our care. We can take the time to consciously inhabit our spaces and divide our time in ways that make it possible to walk, talk and sit with learners as they explore the world around them.
VIGNETTE FOUR

A LESSON IN TWENTY FOUR HOUR TIME

ON THE APPROPRIATION OF THE ENVIRONMENT IN THE SERVICE OF LEARNING

Vignette 4 describes how Ms Talbot recruits first bodies in open space, and then an analogue wall clock to help a small group master 24-hour time. In doing so it provides insight into how the teachers in the Zone used elements of the built environment to support learning. The activity described in this vignette takes place on the carpet in the upper central section. It is referenced in the discussion of Chapter 4.

AUGUST 2012. It is Monday and Stage 3 feel like a group, not a crowd, as they start the week with a time of shared devotions. As their time together ends, those who do numeracy downstairs move quietly to join their teachers, who lead the way. Those left upstairs group themselves loosely around their individual numeracy teachers; it seems that today there will be no whole group lesson. Ms Bailey hands a recently completed assessment back to her students, who are sitting at the tables behind me (UR), and goes over the plan for today’s learning session as they file their assessments away.
Ms Talbot is sitting with a couple of her students on a couch in the centre (UC). The rest of this group is spread out around them on the floor, chatting quietly as they put their assessments into their folders. In Upper Left (a), Mr Osborne sits down on a chair. This is something he did not do very often, and it sets off a chain reaction as first one, and then another, of the students pulls up a chair - not opposite, but alongside him, forming a circle. Nobody pays any attention to its creation. But the quality of the interaction that follows could only be described as intimate, and it is a space that these students are reluctant to leave.

Sitting on a couch at the edge of the carpet, I watch as Ms Talbot’s group morphs from just her students to a smaller subset of the whole, consisting of those who have been assigned to work with her based on the results of their latest assessment. She will be running a workshop on 24-hour time. Ms Bailey is running a workshop on timelines, and Mr Osborne will be working alongside those who are completing set work and extension tasks.

As the students finish filing their assessments away, Ms Bailey pulls up one of the new storage cupboards on wheels, the back of which doubles as a whiteboard. On this shiny new surface, she writes the aim of today’s revision: *To consolidate knowledge of timelines*. Using a long ruler, she begins to draw a number line and as she works, the students assigned to this group gather. She asks them to turn their workbooks on their side ‘landscape’ before they start replicating her work, with one difference - they are to make their line as long in centimetres as they are old in years. This number line is a timeline. She takes care in drawing hers, and I can see it with relative ease from where I sit. As she works, she chats with her students about the importance of uniformity in distance between each marker. They talk about why this is important and the problems they will encounter if they are not accurate, which leads to a discussion about the importance of naming the intervals correctly, in years and not centimetres. As they talk, Ms Bailey, using a

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40 CREATE CENTRES OF ACTIVITY
different colour, begins to mark life events on her time line. I’m all but entranced by this convivial little group chatting and working. I stand up unobserved, and make my way around taking the odd picture. I note the pride the students are taking in their bookwork. Sitting together amidst coloured pens, pencils, rulers and erasers, they comment on their emerging ‘life-lines’ and those of their peers.

**Thinking** about the dynamics at work within this group, my attention is suddenly drawn to Ms Talbot. She has a number of the students in her group up on their feet, and is trying to order them in space and time. Each pair is given a time of day, where one has to think about what they would be doing in the morning and the other has to consider what they would be doing at the same time in the evening. She asks them why they think there are only twelve numbers on an analogue clock, then finds herself having to backtrack to go over the difference between analogue and digital clocks. The pairs get side tracked, and their linear arrangement leads to confusion about where morning ends and night begins. I can almost imagine the pairs peeling off to form a circle - except there are not twenty-four students - and anyway they are more interested in talking about variations in bedtimes than they are about the distinction between 8am and 8pm.

Ms Talbot thanks her volunteers, sits back down on the couch and waits for the students to settle. Sitting on the edge of the green couch, both feet flat on the floor with her hands under the angles created by her knees, she rocks forward and ‘U-hums’ as she exhales. I watch as she looks from the students seated in front of her, towards her caddie in the far corner behind me. It seems to me that she wants to get up and fetch something from it, but she hesitates. Taking my time, I turn to see what she was looking at, and I find that Ms Collier is talking to a student who is visibly upset. Turning back, I see Ms Talbot biting her bottom lip and I feel sorry for her. She has turned herself

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41 **READING THE LEARNING LANDSCAPE**
42 **BEING AWARE OF ZONES OF INFLUENCE**

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**PART 2, OBSERVATIONS AND REFLECTIONS**
inside out trying to teach 24-hour time to these students, yet together they appear to have made little progress.

Remarkably undaunted, she stands and makes her way purposefully across the carpet to the wall behind me, where she helps herself to the clock hanging on it. Armed with the clock and three whiteboard markers, she sits back down amongst the group, and slowly makes her way around the perimeter of the clock naming both the 12 and 24-hour times. As she does this, she writes the ‘missing’ 24-hour equivalent next to each of the hour markers. Visibly caught up in the moment, the group is sharply focused as they annotate the newly inscribed clock face with actions relating to either the 12 or 24-hour time.

Having completed a full 24-hour cycle she ‘cleans’ the clock face and writes four questions in black across the middle: lunch 24hr, wake 24hr, eat dinner 24hr and go to bed 24hr. She wants them to answer these questions in their maths workbooks, and they get to work. Once they are finished, she asks individual students to tell her when they do each of these things in 24-hour time and, as they do, she writes their answers on the clock face. This time they are less distracted by discrepancies in individual routines and clearly engaged with the mechanics of calculating the 24-hour equivalent of each response.

The lesson comes to an end and the clock is placed face up on a red square ottoman, which is left where it is in the middle of the carpeted space (UC). It’s time for recess and, as students from other groups make their way out, they stop to have a look, consider the current time in 24-hour time, and move on. The clock stayed there, on that ottoman, for a number of days before it was cleaned and returned to its home on the wall, without any fanfare or fuss.

43 FREEDOM TO REPURPOSE
44 CREATE CENTRES OF ACTIVITY
45 resetting the learning environment
The fact that at the completion of this lesson the clock was not quickly cleaned and hung back on the wall, spoke volumes about the culture of this space. It was not interpreted as disregard for the physical resources of this learning space, or a careless oversight. It was a silent acknowledgement that this was a learning space, and that Ms Talbot’s group were not the only ones who could benefit from an alternate representation of time. I was also conscious that, despite the fact that it was never read as defiance, it was - in some way – ‘very cool’. It made others curious about the ways in which different students came to know, and there was no stigma attached to the clock, or this way of learning. For many students across all levels of competence stopped to appreciate its form, the presentation of the concept, and the ingenuity of the group who had approached the problem in this very tangible way.
VIGNETTE FIVE

IN THE FUTURE I HAVE A MOUSTACHE AND I’M GRADUATED!

ABOUT IDENTITY AND THE APPROPRIATE USE OF SOCIAL MEDIA

Vignette 5 describes an activity in which the students were lead through a reflective exercise on identity, before being asked to create a future oriented mock-up of a social media profile. It provides insight into how these teachers balanced the opportunities associated with working in a highly connected learning environment with the responsibilities of being entrusted with the oversight of young learners. The activity described in this vignette was initiated upstairs on the central carpet but continued throughout the day, across the Zone. Whilst Vignette 5 is not the subject of detailed analysis, it is referenced in both Chapter 3 and 7, and has been included to describe the more social aspects of learning activity in the Zone.

24 August 2012. It is 9.05 am and the students are seated in their home classes discussing what they liked about last night’s student progress meetings. These meetings take the place of what would once have been called the annual parent-teacher interview. The change in name is not cosmetic. They really are about progress and are led by the students, who are required to prepare a short presentation that references either a digital or physical exemplar of their work. The students are animated and, in spite of all the moans and groans, they seem to have found the experience positive. Their teachers question them, ‘What would you have
liked to have done more of?’ and ‘How did you find doing your speech?’ Many of the students talk about how nervous they were and Mr Hughes assures them that they are most certainly their own worst critics. Scanning the group and attempting to focus their chatter, he asks what they can learn from their experience last night. One student offers, ‘You need to know what you are going to say!’ Mr Hughes rolls his eyes good-naturedly and agrees, ‘That really helps!’ They chat for a little longer before moving into their literacy classes.

Today has been called Media Frenzy Day, which I suspect is a way of accommodating low levels of energy after a week of late nights, and the fact that a number of students will be leaving during the day to compete in regional sporting events. Those staying will work their way through a selection of media related literacy tasks but everyone has to complete a grammar assessment before the end of the day. Those leaving early are asked to get their PDDs out and find a quiet space in which to do the assessment downstairs.

Upstairs, Ms Bailey initiates today’s activity by asking, ‘What is Facebook and what’s the point of it anyway?’ There is a lot of movement as students establish where they should be. About fifty have gathered on the carpet and some, having finished their assessment, re-join the group to take part in as much as possible before leaving. The students are slow to respond so she poses a second question, ‘What is Twitter and what is the point?’ The students talk amongst themselves. They don’t really have an answer but are eager to talk about what they do know about social media.

In general, the school works hard to balance the use of appropriate technology with generous access to cloud based resources. This makes me particularly interested to see how they frame the task, because I know that the use of Facebook in those under thirteen is actively discouraged, although primary school students do have access to teacher moderated groups in Edmodo.
Today’s lesson includes an informal discussion about how people present different images in different places and the consequences of being careless online. Growing weary of trying to talk over the group, Ms Bailey raises her right hand, fingers spread wide and loudly says, ‘Right, fin-ish-ing in 5-4-3-2-1, thank you.’ Her raised fingers mirror the verbal countdown - and the students are silent by the time she reaches 1. She does not stop to berate them. They know what she wants and she expects them to fall in line – and they do. Moving straight on she says, ‘So Freya, what is Facebook for?’ Freya, without hesitating, offers, ‘It’s to tell people what you are doing; to communicate.’ Ms Bailey nods and throws out the Twitter question, ‘What is Twitter and what is the point?’ The students relax a bit more. No longer noisy, they start offering ideas without waiting to be called upon: ‘To say funny things’, ‘Social Media’, ‘Contacting people online.’ Ms Bailey is beginning to enjoy herself; she smiles and says, ‘What’s the point - why would you have both?’ They are quick to respond and they are right on the mark, ‘Twitter is for following, Facebook is for friends!’

Mr Hughes joins Ms Bailey in conversation and mentions a project some of the high school teachers are doing with their students. He is talking to her about an aspect of the project that has obviously caught his attention and he doesn’t dumb it down, even though he can see the class following closely. He describes how the high school students have gone through the process of analysing their online profiles and comparing the messages they think they are sending with what they have actually found in their own and others’ profiles. He finishes with, ‘They have realised how easy it is for people to get the wrong idea about who I am!’

Ms Bailey steps in and, turning to the large screen, she says, ‘It’s a bit scary but this is what I found when I Googled myself: Twitter, My Space, Facebook, a Blog and Google plus. All the different hats I wear in my life and I’m OK with that.’ Clicking on one of the Google links she says, ‘Here is my Facebook account.’ The students are watching and quiet. In fact, it is very quiet and most have now joined the group; some sit on couches but most are
on the floor. Ms Bailey returns to the Google search page and clicks through to her Twitter account saying, 'These are the people who inform my life; if I don't like what they say I stop following them.' She shows them her Twitter profile and then scrolls through her Twitter feed. As she does this she says, 'If you looked at this, you'd think I'm an Edu-geek, and I'm OK with that!' The mood is contemplative, which I find surprising.

The tone of her voice changes as she navigates away from the Google search to two MS Word templates on PETE: mock-ups of a Facebook profile, and a Twitter profile. Having done this, she reads an excerpt from today's paper about opinions on the use of Facebook. The article cites food diary entries as the least popular type of status update and 'nasty pictures' and 'being negative ALL the time' as the primary reasons for un-friending people. In support of this line of argument, she shows them a YouTube spoof of the current iPhone 5 advert. In it, the creator waxes lyrical about the food he has eaten, complete with photographs, annotations and a voiceover that ends with 'picture your life - better', which is the current iPhone by-line. The students are laughing, and talk amongst themselves, as Ms Bailey brings their time together to an end with a reminder that they are to 'Remember that the aim of the exercise is to project a positive online presence into the future, then email me.'

There are students dotted all over the Zone. Some of the tables that were moved to accommodate last night's student progress meetings remain stacked in Ms Talbot's space. Nobody seems bothered by this, and one of the students sitting on a couch near me pulls up a chair to use as a table. The students are engaged but tired. Their work is accompanied by quiet chatter and it is not long before requests for help can be heard from more than a few. Ms Bailey, who has been moving through the working students offers to go over the technical details again on the big screen. As she moves towards the big screen, she says in a clear voice, 'OK, if you are in this space you are learning; PDDs to half closed. If you know what to do then please move to the back so those who need to see, can.' She copies and pastes the

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49 F REEDOM TO REPURPOSE  
50 D OING-T HE- ROUNDS  
51 J US T- IN- T IME W ORKSHOP
template into MS Word and shows them how to select text boxes (with no outlines) in which they can write their details. She talks them through the process, helping when necessary. Some quickly master the mechanics and move away to work at tables.

An in-service teacher sits near me. Ms Bailey is on the floor with the students. Ms Collier stands at the caddie next to the large screen, taking questions from students, and Ms Young comes in to talk to her. Ms Talbot, who had been supervising those taking the assessment, is now sitting on the carpet near the big screen working on her laptop. Those sitting around her, who have been chatting amongst themselves, now include her in their conversation. She is dressed in the school sports uniform and merges into the group.

Looking from this group to the group using the cross-shaped ottoman, I can’t help but smile. Three boys are using it and one lies across it with his head hanging off, working on his laptop that is on the floor. Another kneels at it with his laptop sitting on one of the remaining two arms. The third, sitting on the floor, is tightly tucked into the angle opposite the second student with his legs crossed and his computer on his lap.

I see that Ms Bailey has progressed to the details associated with inserting pictures into the MSWord template with a different group of students. Ms Talbot, Ms Collier and the in-service teacher offer help fixing the printer and redirecting behaviour. As recess approaches, Ms Bailey gives some final instructions, lets them know it is time to save and finish off, then leaves to supervise those participating in sport. It takes about seven minutes for the students to finish and move out to recess. There is no mass exodus and some have to be encouraged to stop working; they will be returning to this task later in the day.

After recess, those who have not yet completed the grammar assessment do so - first the year fives and then the year sixes. Ms Talbot is leading this learning session. She is firm but good-natured as she details

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52 READING THE LEARNING LANDSCAPE
their options, 'When you are finished the assessment, go on with Media Frenzy. If you are stuck you could read a newspaper (online). This is not a cool guise for mucking about - which will get you a TS (teacher's supervision) for lunch. We might be old but we have great eyes; work looks like text and maybe one photo!' She is kneeling on the floor near one of the whiteboard cupboards and has written all their options on it. She reiterates that if they need extra help with the task they are doing, they need to move on to one of the other activities listed on the board, one they can do quietly because the teachers will be supervising the assessment and not helping out with set work for a bit. She asks for any last questions, and one student asks if they can do pre-learners when they are finished the test. Ms Young is making her way through to the staff room and, in passing, says, 'Nice try. No, that's homework. This is class time dedicated to Media Frenzy tasks: newspapers, magazines, Facebook or Twitter - or you could read a book!' She organises some students who have chosen to sit too close together and are distracting each other, and a few others who continue to talk, despite her warnings to the others. It takes all of about 20 minutes before the bulk of year five are finished, which is timely because the Principal arrives with a group of visitors.

The students pay no attention to the guests; visitors are part of the landscape in the Zone and the students are always happy to answer questions - but their default is to keep working. It is much the same with the teaching staff, but on this occasion Ms Young walks over to speak with the group. Ms Talbot and one of the regular substitute teachers monitor those completing their assessment and those working on an assortment of tasks. The visitors talk amongst themselves, make their way around the Zone watching different groups working and leave after about 10 minutes. By this time, the last assessments are finished and handed in.

In an attempt to create a conversational centre to their activity, Ms Talbot says, 'I just got a really interesting question: What's the point of a status update?' They chat and voice their opinions before Ms Talbot asks the year sixes to go downstairs to prepare for their assessment.

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53 BEING AWARE OF ZONES OF INFLUENCE
transition is smooth and quiet, all but for one small boy who can be heard saying, ‘In the future I have a moustache and I’m graduated!’ He is making a Facebook profile and gets on with it as the year sixes move off to take their test. I am struck by the quiet - I can hear a vacuum cleaner in the distance. Despite all the late nights and disruptions - visitors, activities and assessments - my field notes include an aside, ‘Somehow the space seems almost eerily calm. Maybe the students are overly tired from yesterday?’

Ms Young lets the year sixes know that they have 15 minutes left in which to complete their test. As she does this, another group of visitors gather outside the glass doors. They enter quietly and again nobody takes much notice of them. It’s not quite 11.30 am when the level of noise increases as the year sixes finish their assessment. I can hear one of the visitors asking about how the school controls Internet access and their host explains the firewall settings, which doesn’t seem to satisfy him. She moves the group downstairs and, after a short while, they make their way out of the Zone.
**VIGNETTE SIX**

**MANAGING THE HERE-AND-NOW VIA THE ANYWHERE-ANYTIME**

![Image](image_url)

**ON THE ROLE OF PERSONAL PRESENCE IN BLENDED LEARNING ENVIRONMENTS**

Vignette 6 describes online activity that serves to connect co-located and loosely dispersed groups of independent learners working in open plan environments. This vignette provides insight into how teachers manage differentiated learning using in-person and online strategies. The activity described in this vignette took place in the centre downstairs and involved a single home class and their teacher. Whilst Vignette 6 is not the subject of detailed analysis, it is referenced in Chapter 3 and includes examples of patterns described in Chapter 7. It has been included to describe the more social aspects of learning activity in the Zone.

**17 SEPTEMBER 2012.** It is late in the day and Ms Bailey and her home class are working together downstairs. She approaches a small group, two boys and a girl, who appear to be having some difficulty in working together. The boys are engaged and working at one of the small triangular tables, whereas Iris has chosen to sit on the edge of the circular seating, a little removed from where the boys had arranged themselves earlier. Ms Bailey’s presence draws another two into the activity, one of whom is Iris’s friend. The friend is supposed to be working with another
group so, after a while, reluctantly leaves Iris to join them. When Ms Bailey moves away, a student teacher casually sits down on the circular seating next to Iris. They have a chat and then she moves off, leaving Iris and the boys to get on with their work.

The low hum of students working in small groups rises and falls as they confer with each other, referencing their laptops and periodically typing. Some are working on the floor but each of the tables has at least one occupant; the remaining students are scattered on either the circular seating or the carpeted stairs. With less than an hour left of the school day, I watch Ms Bailey, who is standing at the caddy next to the big screen, reading something on her laptop; she types and navigates between screens. As I wonder what she is reading, she lifts her head, scans the working students and compliments them, ‘nice working everyone - keep it up’ and returns to her work.54

Because they are all so focused, I notice that I’m almost holding my breath - contemplating what will disrupt this calm. I wait - but nothing changes. The student teacher is now sitting with her computer between Iris on the circular seating and the boys who are still working at the table.55 Her presence acts to tentatively link Iris to the group. She engages Iris in dialogue, using what is on her screen.56 This works; Iris opens her laptop and together they type on their separate computers. I am curious to see what the boys are working on and move, just enough to catch a glimpse of their screens. They are both typing in MS Word - the task is called ‘Communication Breakdown’ and I wonder if the irony is lost on them.

Ms Bailey’s attention shifts from her laptop to the papers on her caddy. The student teacher stands and makes her way to the printer, collects what she has just printed and returns, handing it to Iris. Ms Bailey cautions a student to moderate his voice as Mr Osborne walks over to speak with her. She listens but keeps working, after which he makes his way outside to check-in with a group of students sitting in a circle on the

54 READING THE LEARNING LANDSCAPE
55 BEING AWARE OF ZONES OF INFLUENCE
56 CREATE CENTRES OF ACTIVITY
concrete, without their computers. Leaving them, he walks in through the door behind me, and stops to say hello. We talk about how well the students are working and I ask him if he notices a qualitative difference. Furrowing and raising his eyebrows, he says, ‘Not hugely, but a little?’ And then proceeds to tell me that after lunch some of his students came in and got straight to work, cued by their behaviour he went straight into doing-the-rounds and the remaining students followed their lead as they came in, ‘No mess, no fuss?’ Still thinking, he makes his way back around the circular seating to his home base (LL).

It’s only twenty-three minutes into the learning session when Ms Bailey walks across the room to check in with the student teacher. I’m sitting on the carpeted stairs and shift a little to get a different view of this afternoon’s activity. Iris appears at the bottom of the stairs, plugs in her charger, connects it to her laptop and continues to work. I see that she is now sitting next to her friend and wonder if she is in need of power, or of company? Either way, she is now working and the remaining members of her group negotiate the final details of their joint task. It is not long before the student teacher is sitting a short distance off, on the bottom step, working on her computer. A second student teacher joins her and they chat for a bit as they watch the students work.

Ms Bailey has moved from her caddy to the shelving unit and as she posts marked workbooks into the appropriate boxes, a student approaches her with a question. She responds first to the student and then to the group, ‘Just letting you know, it’s half past two.’ Finished, she makes her way around the circular seating to where a group are working on the floor. She doesn’t stop but walks the long way around, returning to her caddy where she goes online again, pausing every few minutes to look up. In one of these moments, a student asks what the compulsory tasks for this term are, and which of them he has submitted. She suggests that he needs an Evernote account and, taking a deep breath, she asks if anyone else is uncertain about the electives they chose earlier in the term. If so, they are to see her now. A small group gathers and, one by one, she crosschecks compulsory and elective tasks against work they have already submitted.

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57 DOING-THE-ROUNDS
The level of noise from upstairs is rising. Ms Bailey speaks over it, letting her group know that there are still ten students who need to submit the task due for today. She checks her Edmodo home class page and asks a particular student to come and have a look at what she has received. They compare the task with what has been submitted and the student describes the work she remembers doing. As the conversation comes to an end, I understand that Ms Bailey is trying to show her that, although her work is complete, it has not been submitted correctly. Her questioning of this student prompts another four to check in with her, so again she asks who is uncertain of what their electives are. A student seated at the back says that she can’t remember but doesn’t join the group at the caddy. Instead, she logs into Edmodo to check and, as I look around the room, I can see a few more doing the same. The group around Ms Bailey disperses and her attention returns to her laptop. Apart from the muted sounds of someone singing, it is very quiet and the students continue to work. 58

Ms Bailey moves, carrying her laptop with her. She checks in with the students on the floor behind the circular seating and is approached by another who asks a question, then returns to the circle. Upstairs, the year fives are getting noisy. Ms Bailey keeps her group focused, handling a few administrative things.59 Someone comes in with lost property, and a student asks to go to the toilet.

Upstairs, Mr Hughes is sitting on a chair near the big screen (UC). His students should be busy with project work but they are edgy; a number have finished and some seem to have given up for the day - it’s 2.36 pm. Looking around, he asks his students to move in closer to him, to tighten their formation.60 Looking from Mr Hughes to some of the other groups spread out across the Zone I make a mental note; yes, those in closer proximity to their teachers are mostly on task. I imagine a zone of proximal engagement, but am not convinced that this explains everything I see.

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58 MANAGING THE HERE-AND-NOW VIA THE ANYWHERE-ANYTIME
59 READING THE LEARNING LANDSCAPE
60 BEING AWARE OF ZONES OF INFLUENCE

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Downstairs, two year six classes are with relief teachers (LR and LL). Those who have moved out of the teacher’s sphere of influence appear to be either physically or digitally roaming with varying degrees of purpose. Some move straight from completed tasks into productive engagement of another sort - video editing, music mixing, or scouting around sites like WikiHow or YouTube - and others drift. But is not always easy to distinguish between those who have finished a task, those who are acquiring new skills or working on a sideline project, and those who are drifting.

Returning to her caddy, Ms Bailey places her laptop on it and continues to browse the work submitted on Edmodo. At her feet is a student who is also in Edmodo, and it strikes me how ordinary it is in this space to be in two places at the same time, with actions in one spilling over into the other. There are only fifteen minutes left in the day and her home class is still focused and working. A student from Ms Collier’s class walks through, but there is no disruption; neither the walker nor the workers take any notice of each another, despite the fact that the walker is not moving with any outward signs of purpose.

Having followed ‘the walker’s’ path through the space, my gaze returns to the group I am sitting with and I notice that Ms Bailey is now seated at one of the small tables; perhaps she was tired of standing. She continues to work online, lifting her head every so often to scan the space. With fifteen minutes left in the day, Ms Bailey gives her class five minutes to finish and upload their tasks to Edmodo. She stands as she says this, and then sits again. To her left, I can see the student teacher sitting on the floor, still talking with the visitor. Five minutes pass, then Ms Bailey gives a time marker and sets another. They have five minutes to shut down their computers and return to the circular seating. She carries on working as the students begin to move towards the circle. Since most have gathered she does not wait the full five minutes. Looking at those who are finished, but not moving, she says, 'OK thirty seconds to be in that circle!' They move faster and she reminds them to get out their student diaries. The circle is complete; it is 2.56 pm.

61 MANAGING THE HERE-AND-NOW VIA THE ANYWHERE-ANYTIME
Standing at the caddy, she is within the circle but standing; the students are all seated. Looking from her screen to the group, she lets two students know that she is yet to receive their work. One replies, saying that she had emailed rather than uploaded it. Scanning the circle for Iris, she asks if her work has been uploaded. It has not, so Ms Bailey reiterates to everyone that, finished or not, the work has to be handed in saying, ‘I’ve been clear. It’s not fair on others who hand in when you get this afternoon to finish up at home. This time, but next time - no.’ There is no drama; it is all very matter of fact, and Ms Bailey moves on to other administrative matters. Working her way down a list, she asks them to write their questions about budgets into their student diaries. They are to ask their parents a few questions about monthly household expenses in order to complete a numeracy task. She finishes off by letting them know that the pre-learners have ‘gone up’ and that they are expected to have done them by Monday. By now, it is already 3.10 pm and there isn’t time for them to make their way around the circle, as they so often do, for a brief reflection on something they have learned or something they have been thinking about today. They share a tired but happy goodbye and the circle dissolves.

I hang back, feeling like one of the students. I have so many questions I want to ask. I take my time, packing up my bits and pieces so that I don’t look like I’m hanging around or interrupting the learning session. When the students are finished, I ask if I could make a time to speak with her. We get chatting and I end up asking her all my questions.

A conversation with Ms Bailey. I explain that I was trying to trace her path to see how she moves between the physical and digital spaces of the learning environment. I note how she uses Matrix time to check up on the online life of the class by responding to questions they have posted online, commenting in person about what is missing, what is needed, and mistakes she has observed in more than a few online submissions. I note that she makes many small direct observations, and then engages with particular students who are within line of sight but are working on something else - and that these conversations start and stop with ease because there is a shared point of asynchronous online attention. They all seem very comfortable with this and what is particularly
interesting to me is that I am aware of others listening in to these conversations. I tell her how I see them change tack, move online and finish off work as a result of these short conversations, which they are not technically part of. I note how sometimes they overhear and are prompted to action; sometimes they don’t listen in at all, and that sometimes they actually join in 'uninvited', asking qualifying questions, checking up on details and clarifying that their work has been received in the correct format. All this activity ensues off the back of one seemingly unrelated verbal response to an asynchronous online question from another member of the class.62

Ms Bailey is interested in my questions, which leads me to talk more than I really wanted to; I had hoped to get her to tell me more. What she does say is that she would like to spend less time online. She explains that she feels as if she is interrupting them when she talks to them in person whilst they are busy with independent online work, 'They just want to get on with it and, when I ask them what they are doing, it seems counter-productive?' I remark that, to the contrary, I think it is fascinating, and talk about different forms of presence. She perks up saying, 'Yes, it’s like I’m checking in with them in a different space and I have a reason, not just because I should.'

Thinking aloud, I begin to explain my thoughts about a zone of influence, which I phrase in terms of connections from her to the students - a stretchy elastic tether of sorts. I comment that I’ve seen this invisible connection in action upstairs in interactions between Mr Hughes and his class, and Ms Talbot and her class. However, in both cases, when they are downstairs they rely on the physical space to hold their class’s interactions (LL and LR). They relax into single one-to-one interactions rather than this understated, but very present, observational mode in which they, through their visual attention, voice and physical presence maintain a point of connection with all their students.63
My mention of other classes leads her back to organisation. She worries that some of the other groups have worked their way through far more tasks than her group this term. She is surprised that her group, the eldest and most competent, have worked constructively yet have completed fewer tasks. I point out that her class have worked collaboratively in groups of her choosing, and that the effect of this has been to slow them down; maybe what they have been learning is something nobody is measuring? Her response is animated, ‘Oh yes, I should have done that sooner! It has worked so well. I see it when we play X.’ I don’t know the game she mentions, but it involves choosing participants and she says that it was always the ‘popular students’ who were picked first. She notes that, since they have been working in groups of her choosing, this doesn’t seem to be happening quite so obviously.\footnote{BEING AWARE OF ZONES OF INFLUENCE} She is happy with this outcome but wonders how she is going to get them to ‘go deeper.’

I ask her what she thinks she relies on most when teaching. I talk about how others rely on the space and comment that I don’t think that she does - not in the same way. I’m curious and want to know what she thinks. She pauses, laughs and says, ‘It’s funny, you know - I think it is relationship!’ I’m not surprised; it makes perfect sense. She also points out that she has been with this group for nearly two years, which means they know each other well. Elaborating, she says that they now understand that when she calls them out, she is not ‘cross’ with them, but is helping them to make good choices about their work.

**Reflections on connections and presence**

I found tracing the *invisible elastic connection* and the boundaries of the *zone of working influence* particularly interesting in this large open and flexible space. To the casual observer this barely contained movement often seemed threatening and permanently on the brink of collapse. However, as I watched over time, it was Ms Bailey in particular...
who managed to knit the physical and the digital together by her actions in their shared presence.65

I am not certain if these phenomena are two sides of the same coin, or just loosely related. The one describes the relationship between the teacher and each individual student - the *invisible elastic connection* that develops as students become accustomed to working in this space - that connects them to their teacher and thus to the whole. The other is more diffuse; I imagine it as a force field - a *zone of working influence* - with learning activity at its centre. It was the space within which students could not help but follow the learning whole. Some chose to repeatedly move beyond it, some inadvertently fell outside it and either moved in or fell away, and some were always well within it - or chose to live on its periphery. The latter were not the disengaged, but they actively monitored its outer edge because I think they found it more comfortable there. They were the observers, and I often found myself sharing this peripheral zone with them.

The *invisible elastic connection* was maintained by the teacher but consented to by the student as she tracked the actions of each individual, as part of the larger whole. It required an acute awareness on the part of the teacher about what needed to be done and who was in her care at any given moment. It also relied heavily on her knowing the students and their working styles quite intimately.66 For when this observational disposition became either an overt attempt to control by the teacher, or a demand for immediate or prolonged attention from the student, this delicate balance was ruptured. In other words, if either party sought to establish a unidirectional connection through an assertion of their rights, their actions often resulted in the withdrawal of the corresponding other's tacit participation in this unseen connection. This disruption could come from either side. Teachers, unfamiliar or uncomfortable with the manner in which effective cohesion was established and maintained in this space, all too quickly used their voice and their position of authority to assert their dominance. And students,
unable or unwilling to work without individual attention, tended to assert their need for attention in a way that made this link unidirectional, which served to disrupt this gentle linking of one-to-one to the whole.

The *zone of working influence* started with the teacher but very quickly expanded to include those working alongside her. It always started with either a point of shared attention or activity then expanded, like a force field, to include those within a certain radius. Watching, I would wait for the point at which the activity itself took on a self-sustaining energy that was often only appreciated after it had dissipated. Sometimes this dissipation was natural and expected. Other times the teacher would have to change something he or she was doing to re-establish its energy.

Both these connections - one actively maintained by the teacher67, and the other generated by learning activity68, were very subtle in their action and most evident upstairs. This is not to say they were not evident downstairs, but rather that I was far more likely to see them in action in the larger space. I suspect that they evolved as effective strategies to draw in, rather than fence in, the students in the larger space. Downstairs, the walls of the two smaller spaces (LL and LR) acted to hem students in, regardless of what their teachers were doing. This seemed to work against the perceived need to form centres of activity to draw individuals into the working whole, maintain this invisible but active connection.

This vignette is not unique in providing insight into the *invisible elastic connection* and the *zone of working influence*. What is different, is the way in which Ms Bailey extends her reach into the digital spaces of this learning environment, simultaneously affecting activity within the physical and the digital spaces. Her feelings of conflict about when she may legitimately interrupt her students are informative. When leading a discussion about themes in project work or giving guidance about how
to complete a task, she is active within the learning space, responding to their clear and present needs, and therefore she feels entitled to interrupt, advise and redirect - in the here and now. However, when her students are working on different tasks and their learning activity is unseen - conducted online - she expresses a reticence about engaging with them, for fear of interrupting them. In other words, when she can see what they are doing and can choose a point of shared or common interest, she finds it easy to engage; otherwise, she feels that she is interrupting ‘because she should’ and not because she is comfortable with this.

Motivated by the responsibility she carries for overseeing activity in both spaces, she has learnt to use asynchronous online activity in Edmodo as the point of shared attention - the thing that gives her legitimate grounds for disturbing their online work in their shared physical present. In so doing, she neatly connects what they are doing now with what they have done and are yet to do - in the online space. As she does this, there are moments where these interactions spill over into discussions about organisation and the management of tasks, which sometimes end with her asking for them to physically reorient themselves in the physical space, so as to cross check what has been done with what is visible in Edmodo. There is a sense that she is aware of the complexity of what she is expecting them to do and, even as she upholds the consequences of their non-compliance, she is actively teaching them how to do it next time.

My first instinct was to say that there was something in her attitude - in the way that she did this - that preserved this delicate balance. But on second thoughts, I think this measured but specific questioning, starting with a point of shared digital attention, is actually how she manages the one-to-many-to-whole into the digital and back through the physical, thereby effectively knitting together a single digital/physical environment.69

69 MANAGING THE HERE-AND-NOW VIA THE ANYWHERE-ANYTIME
VIGNETTE SEVEN

MAKING THINKING VISIBLE

ABOUT NOTICING WHAT IS LOST WHEN TOOLS CHANGE.

Vignette 7 describes a moment in which a student working in an online environment reconfigures her physical environment to help complete a task. It provides insight into how these students addressed learning challenges by using a mix of the tools at their disposal. The activity described in this vignette took place on the edge of the central carpeted section and involved one particular student, out of a group of ninety, working with three teachers. It is referenced in Chapters 3 and 4.

21ST SEPTEMBER 2012. It is 9.15 am and after DEAR,70 the students move into their groups for numeracy, some upstairs and some downstairs. Those who didn’t originally pass the general assessment (pre-test) are rewriting it after a week of instruction. Ms Talbot is making an effort to ensure that everyone knows what they should be doing: ‘This is an assessment; the last question is not a philosophy question. You must apply maths to this question. No guessing or hypothesising - please.’ The students, having started the

70 Drop Everything And Read was the first activity of the day. It involved fifteen minutes of quiet reading for everyone in the Zone - teachers included.
learning session on the carpet (UC), take a copy of the assessment and disperse, self-selecting where to sit in order to take the assessment. As they do this, Ms Bailey follows up with procedural reminders that they will lose marks for talking and for not writing their names in full on their work. As she does this, she turns to those doing extension work and reminds them that they are to work in silence. There is a fair bit of low-grade distraction: pencil case noise, tapping and sniffing.

One student sitting in front of me doesn’t even seem to start. She holds the clipboard she is working on so close to her face that I wonder if she can read the paper on it at all. She is sitting on the red cross ottoman and, as Ms Bailey moves past her, she addresses the group as a whole, letting them know how impressed she is with how hard they have worked this week on ‘De- Con-Struct-ing questions.’ I hear the encoded message and am not sure if the holder of the clipboard has. Returning to more administrative matters, she reminds them that they are expected to work for at least fifteen minutes on the assessment, which consists of six questions on one side of an A4 sheet of paper.

A number of students stare into the distance, chewing their pencils. Both Ms Talbot and Ms Bailey are keeping watch; one is walking71 and the other is sitting on the floor in front of the big screen.72 A student gets up to check the clock. Another wanders around looking for scrap paper and Ms Bailey lets them know that they may do their working on the back of the paper. In fact, she says, ‘That is good, so that the teachers can see what you were thinking.’ In her wanderings, she can obviously see a lot of mistakes being made and she can’t help but remind them to take note of mark allocations, ‘It is worth two points for a reason.’ And again, she points out that, ‘Question six is maths, not an opinion - it’s not about feelings; prove it in maths.’ Despite her attempts to get the reluctant started, there are

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71 DOING-THE-ROUNDS
72 READING THE LEARNING LANDSCAPE
still some staring off into the distance, and I wonder if those who have the far off look in their eyes have written anything at all.

It is 9.30 am and looking around, I find someone tucked right behind me between the green couch and the storage unit. There is a screen up and it gives her a nice enclosed box on three sides.\(^{73}\) She is working and I try hard not to disturb her. My attention is drawn away to a few who are trying to get Ms Talbot’s attention. They indicate that they are finished and want to get up and hand their papers in. This is interesting in itself; under non-test conditions they would have moved without a second thought. Ms Talbot avoids making eye contact with them and deliberately looks towards those who are still working saying, ‘There are at least five minutes left before anyone may hand in their work and this time can be used to check your work.’

Some take this to mean that the assessment is over and one gets up to get a tissue and two boys start fencing with their rulers. They are instructed to subtract a mark each from their assessments and separate. When the five minutes is up, Ms Bailey starts collecting papers. She is in no hurry but there is a flurry of activity. Almost in an attempt to slow them down, she advises those who have not written their names on their papers to subtract a mark, after having rectified the situation. Some continue to work and those that are finished get out their PDDs to access this week’s set work in Mathletics. As more students finish, the level of chatter increases; however, I can see at least six who are still working on the assessment. Those who are talking are asked to move. One student makes no noise but just sits and, when questioned, he explains that he has no computer today. Ms Bailey asks him how he is going to solve the problem. When she is met with silence and a blank look, she instructs him to make his way up to the SCIL building to borrow one for the day.

The student sitting next to me has her laptop open, working in Mathletics. I watch as she reads the question, pauses and flicks the

\(^{73}\) FREEDOM TO REPURPOSE
protrusion on her ballpoint pen that extends or retracts the writing nib; click-click, click-click. Her screen is clear of all information apart from the question, which is written in black on a white background. Under the question is an empty box in which she is expected to type the answer. After some deliberation she enters a number, hits return and is ‘rewarded’ with a big, red X. She doesn’t immediately rush to answer a second time but pauses before offering a second answer, which is returned in a similar fashion. Standing up, she puts her laptop on the couch and makes her way to the tub in front of the large screen. She selects an A5 whiteboard and a whiteboard marker and returns to the green couch. Balancing the whiteboard on top of a clipboard, which was already on the couch, she completes her working before typing in a third answer – and she is rewarded with a big, fat, green tick. Happy, she continues to work in this manner until she has completed the set work for this week.\(^74\)

I am struck by her relative fluency in answering word problems in this manner, considering the degree of difficulty experienced by most in completing the purely paper based assessment, minutes before; it is a similar task done on the same day - with a slightly different assemblage of tools, an altered context and different rules of engagement. When left to her own devices, she selected a set of tools that successfully scaffolded her working. She had been at liberty to scribble on the back of her assessment, but this would have meant turning it over and transferring the information from front to back - an opportunity for error and an admission of need, or of a lack of skill. The clearly legible and unselfconscious working on the whiteboard in broad green pen seems at odds with what appeared, under test conditions, to be furtive pencil scratching on the back of the assessment, which quite quickly became muddled and unhelpful.

Ms Talbot is still seated on the floor and Ms Bailey is at a table; both are marking completed assessments. One of the familiar substitute teachers is standing in for Mr Osborne and she checks in
with a pair who is working on a single laptop. Edward volunteers that
he is explaining the word problem to Isobel. As he says this, Ms Bailey
calls for Isobel – to tell her she has made the target she set herself for
the assessment. The pair high-five one another; they are clearly
pleased to have conquered word problems. Drawn into this little circle
of celebration, another student approaches Ms Larsen and asks if she is
Ms Montgomery today. She laughs and says, ‘No, today I’m Mr Osborne
- I just morph into whoever is needed for the day!’ There is an attempt
to keep the level of noise down for the few who are still working,
although everyone I can see has moved onto the set work in Mathletics.
Ms Talbot lets out a muted ‘yay!’ She has just marked a paper with no
errors, but her face drops when she sees that it belongs to one of the
students who had been sword fighting and had been instructed to
subtract one for being a distraction to others.

There are only two minutes left until recess and the sounds of
many voices begins to swell, filling the Zone. It is the last day of term,
they have just finished a unit of work that has challenged many of
them, and they are all ready for a break. In the midst of this rising hum
a single student makes her way across the carpet, and sits down next to
the student I had observed using the whiteboard a little earlier. Having
settled next to her friend she asks for her help, and it is happily offered
– making use of the small A5 whiteboard.

**Why I chose to include this vignette.**

The point I wanted to highlight with this vignette was the things - or
rather, the traces of things that have been 'lost', so to speak, in
translation between the physical and the digital. There are many
interesting interactions taking place within this episode but the
moment that highlights the challenges of translation is the maths
problem presented on the screen - the empty box and the big, fat, red
cross. It seemed so at odds with what came next that it made me look
harder at what was happening both on and off the screen.
Vignette 7
About noticing what is lost when tools change.

Computing technology makes it possible to translate paper-based worksheets into online tasks. Mobile, cloud-based computing means that teachers can set proficiency based class, group or individual tasks, which can be accessed at a time and place that is convenient to the individual, within an environment that offers immediate feedback, additional support and rewards for performance. All of this is valuable, but one cannot help but notice that it offers a disembodied experience of ‘doing maths’, and the way this student remedies these shortcomings, highlights this. Phrased in a different way, one might ask, ‘What have we lost by taking paper-based maths drills online?’ In asking this question, we do not have to ignore what we have gained - this is not an either or choice. It is a moment to pause and consider how we might make certain that we have not lost something that is valuable, whilst still choosing to use new technologies.

Paper-based maths drills require students to solve problems using largely un-configured paper, which allows space to show their workings. Students have to assess the problem, select a method, carry out the process and detail the solution. This remains the same for the online version - only the tools change. Doing this type of work online does not preclude the use of pen and paper to solve the problem. But what is often easier - is to guess - and this is what many do, cycling through the options waiting to see the big green tick. Watching them, I’d sometimes get the uncomfortable feeling that I was watching someone playing the slot machines - pulling the handle until the visual feedback was correct - but not this student. She didn’t like the feedback; two red crosses were enough to prompt her to change her assemblage of tools.

It was, however, her physical movements that alerted me to her problem and its subsequent resolution and, had I not been sitting right next to her, I would not have been able to connect them with her online activity. She paused, flicking her pen a number of times whilst staring off into the distance - scanning available resources and the activity of
her peers. Then, placing her computer on the couch, she stood and made her way through her working classmates. Stopping in front of the large screen she selected a small A5 whiteboard and a marker, and returned to the green couch. Once seated, she organised her laptop on the couch next to her and held the whiteboard on her lap, looking from the screen (displaying the maths problem) to the A5 whiteboard she transposed the question, used the marker to do the calculation, and rubbed out mistakes with her hand when necessary. After pausing, to consider her work, she reached across to her laptop and typed in what she considered to be the correct answer. Hitting return and seeing the green cross, she smiled, cleaned the A5 whiteboard and started again - a little faster each time.

If we were watching as her teacher, what could we have learnt from observing this chain of events that would have been missed if it had all happened online? First, we may never have guessed that she was having trouble. Second, we would not have witnessed her exercising independence and persistence on encountering difficulty. These are things we say we value but do not often acknowledge or give credit either to the student who exercises them or to the teacher who facilitates learning in such a way as to allow for their emergence. Furthermore, if we had not paused to appreciate this moment we may not have noticed that we were not the only ones watching. For a careful reading of the vignette reveals that a friend, sitting quite some way away, had followed her movements to and from the tub of A5 whiteboards and noted the satisfaction with which she had completed her work – and, on encountering difficulties of her own, had approached, asking for help.

My point in describing this moment is not to assert the benefits of one technology over another. It is to highlight that, if this student had not been in a position to move about and self-select an alternate medium in which to work, then all those messages, conveyed through movement, would have been missed. We no longer physically stand, carrying a finished material artefact towards a person of authority to
hand-things-in, marking completion and transition. Nor can we see the many tools used by those around us as they type, their eyes alone following the activity on their screens - at once pen and paper, calculator, reference book, messenger, reminder of what is to come and record of work complete. In this moment, it was the rules of social and physical engagement\textsuperscript{75} that traversed the dimensions of this environment, linking them in purposeful learning activity that maximised benefits and minimised loses for all. Arguably, it is the absence of these fluid social arrangements that facilitate tool use and peer-to-peer interaction that renders similar ecologies less vibrant.

\textsuperscript{75} FREEDOM TO REPURPOSE
VIGNETTE EIGHT

MS TALBOT’S NUMERACY WORKSHOP

ON THE VALUE OF IMPROVISATION IN THE USE OF TOOLS FOR LEARNING

Vignette 8 describes a workshop for a group of twenty students battling with a mathematical concept. It provides insight into how this teacher modifies her teaching strategy on the fly, using everything at her disposal, to engage the students in a way that increases their understanding. The activity described in this vignette takes place on the carpet in the upper central section. It is the subject of detailed analysis in Chapter 5.

15TH OCTOBER 2012. As music filters through the playground to mark the end of recess one, Ms Bailey and Ms Talbot make their way towards the large screen in the Zone. After placing her laptop on the caddy alongside it, Ms Talbot plugs into the large screen and turns to respond to the questions of some of her students who have gathered around her. Ordinarily they would wait to be greeted by her at the door, but eager for details of the immersion experience, scheduled to take place in the second half of the day, they have not followed convention. Dressed in casual clothes, they are noticeably
excited and can’t quite believe that they will be doing numeracy this learning session. Ms Talbot doesn’t send them out but deflects their protests of ‘But why do we need maths?’ with good humour, singing, ‘Life, oh life.’ Not deterred, the main offender curls her lip in mock disdain and launches into a discussion about the merits of Ms Talbot’s rather beautiful, green coffee mug. Ms Talbot doesn’t engage but moves towards the centre of the carpeted floor. The group, which is getting bigger, follows. She answers a question posed by one, addressing the group as a whole, ‘Yes, everyone is meant to be here.’ The noise increases until four minutes later Ms Talbot says, loudly enough for the group gathering around her to hear, ‘Right, too much noise - go back out and come back in.’

The group goes out and they wait until she motions them back in. Before the whole group has reassembled on the carpet she says, ‘I’m thinking of a number between 0 and 0.6 - what is it?’ One student offers, ‘Zero point twelve?’ and she says, ‘No, but I’m glad you said it like that because we need to talk about how we say decimals.’ They finish one round of guessing and, as her group finally settles, she goes over the details of what will be happening in this learning session. Those who received less than a ‘three’ (achieving at grade level) on the topic test are with Mr Hughes for the remainder of the week. Those who received a three will do a workshop with her today, and those who received a four or a five are to work independently on the set tasks for the week, followed by extension tasks - both of which could be found in ‘This week’ under ‘Numeracy’ on PETE.

Ms Talbot calls those left on the carpet to move closer. Ms Bailey checks a list on her laptop to confirm that all the students who need extra revision are amongst the group with Ms Talbot. This group is a mix of year five and six students and Ms Talbot lets them know that they will be going over common errors as a group before moving on to independent work.

76 MONITORING THE AUDITORY ENVELOPE
77 CREATE CENTRES OF ACTIVITY
78 MANAGING THE HERE-AND-NOW VIA THE ANYWHERE-ANYTIME
Ms Bailey is seated to the left of the large screen. She is close enough to make comments and join in the conversation with Ms Talbot, but a little removed. She is seated at one of the high stainless steel benches, loading pre-learners into the online environment for the following week. She is listening and watching both independent workers and those at the back of Ms Talbot’s group when she is approached by a student who isn’t ordinarily in her numeracy group. The student doesn’t know her test score and is uncertain about where she should be. Ms Bailey checks an online list, nods in the direction of the workshop and the student runs to join the group on the carpet. There is still a fair bit of chatter but, instead of telling them to keep quiet, Ms Bailey reminds them that there is only one learning session in which to get their work done for today, ‘So there in no time for chatting!’ Looking around from her vantage point she says, ‘I can already see that Miranda is doing a blog of her work.’

Ms Talbot starts by drawing a number line on the whiteboard to the right of the large screen. It starts at zero and ends at one; the decimal points between are marked and labelled. She sits down on the floor with the students and asks, ‘What would half be?’ Some call out answers, but they are incorrect so they keep guessing. She stops them and using the number line on the large whiteboard she repeats her explanation of the format she is looking for - percentage expressed as a decimal. They try a few more and then she plays a YouTube clip of a worked example on the large screen. The instructor in the video talks his way through the problem and the sound is loud enough for those who are close to hear, but not so loud that it intrudes on others. However, some of the independent workers stop what they are doing and visually follow the worked example. It was not the sound but the movement of the video in their peripheral vision that attracted their attention. In contrast, a couple that should be watching are talking and, without lifting her head, Ms Bailey says, ‘You guys need to get this.’
An earlier offender who couldn’t stay on task is now sitting next to her at the raised table. He is working.

Ms Talbot rewinds the YouTube clip, pauses it and sits back down on the floor. She takes a small A5 whiteboard from the tub in front of the large screen and writes an example on it. They talk through the problem as a group and then she clears the small board and writes another example for them to try. As the lesson progresses, other students help themselves to A5 whiteboards, using them to complete their examples before calling out the answer. As more and more do this, she can see their workings - many are still making mistakes. In response, she asks them to hold up their boards, rather than shout out the answer. This way she can see who is still struggling. She doesn’t say this to them but makes the revealing of the worked example part of the asking and answering of the task.\(^\text{83}\)

As the learning session draws to a close, Ms Talbot acknowledges that many amongst the group still ‘Don’t get it’ and that it is a hard but important concept. Before they leave, she calls for a thumb-O-gram, ‘How did you feel at the beginning of this revision?’ Stretching, yawning and chatting, thirty-odd hands with thumbs down are raised into the air and, ‘How do you feel now?’ Some of the thumbs go up. They laugh, she laughs and they make their way out to recess.
VIGNETTE NINE

EDWARD AND ISOBEL DEVELOP A METHOD

THE VALUE OF AVAILABLE SPACE, APPROPRIATE TOOLS, AND THE FREEDOM TO USE THEM

Vignette 9 describes the learning activity of a pair of independent learners. It provides insight into how they solved a number of problems using multiple resources, both physical and digital, to develop a method for completing an online task. The activity described in this vignette takes place in the corner of Upper Right and involves a single pair of students, with limited input from a teacher, the researcher and a couple of other students. It is the subject of detailed analysis in Chapter 5.

31ST OCTOBER 2012 Part of the way through a learning session dedicated to numeracy, my attention is drawn to the far upper corner of the Zone where I can see Edward sitting on the floor, whilst Isobel jumps around him. I make my way over to the edge of the central carpeted space and pause, not wanting to disturb them. As I get closer, I can see that Edward is doing his best to hold two 30 cm rulers, one on top of the other, in order to measure the height of Isobel’s jumps. His attempts to do this mid-air fail repeatedly and it is not long before Mr
Osborne has also taken note of their activity, although he does not move towards them.\(^8^4\)

They continue jumping until finally, from a heap on the floor, they both look to where I am sitting. I smile, remain seated at a distance and hope that they will persevere. They laugh and collapse animatedly on the floor, for my benefit. Torn between doing nothing and having them abandon their work or interfering, I ever so slightly nod at the wall behind them. Interpreting my action in an instant, they quickly locate an appropriate marker and set to work recording height jumped against the semi permanent writing surface of the whitewall.\(^8^5\) The task they have selected involves calculating the height of their jumps, on the moon – without actually going to the moon.

Scanning the space, I see that Mr Osborne is slowly making his way towards them, stopping to check in with others along the way.\(^8^6\) He approaches and withholding judgment, questions them about the rationale behind their method. Satisfied, he goes on to ask about the relationship between the weight of the jumper and the height of their jump. This leads to predictions about the height of his jump on the moon, considering his weight on the earth. Predictions made, he seamlessly moves from interested observer to participant. Jumping, adding his data to the wall and – after a brief discussion – withdrawing from the group.\(^8^7\)

The wall had initially been used to mark and measure the height of each jump but having done this, Edward, with pen in hand, begins to record these measurements at standing height in a list to the left of where they had been working. As a small group gathers, they refine their method: jump; mark, measure and call it out; calculate and call out the conversion; echo and add the converted height to the list; calculate the moon-weight of the jumper and tabulate it against the

\(^{8^4}\) READING THE LEARNING LANDSCAPE
\(^{8^5}\) FREEDOM TO REPURPOSE
\(^{8^6}\) DOING-THE-ROUNDS
\(^{8^7}\) ASK BEFORE JUDGING
moon-height of their jump. The table had been a natural outworking of their predictions about the effect of weight on the height of their jumps on the moon and as it began to fill up with data, it provided an effective aid in explaining their method to others who joined in.\(^{88}\) During this process, Edward’s laptop, safely placed on a nearby workbench, was consulted many times to clarify the structure of the task and locate resources to illustrate and then calculate the conversions.\(^{89}\)

As the learning session drew to a close, it dawned on them that the only record of their work was on the wall. Undeterred, they recruited me to photograph both their list and their table. Marvelling at their resourcefulness, I capture their work but my reverie is short lived for, without the correct cable to transfer the images in a useable format, I think I am powerless to help. Mumbling an apology and trying to assess the capabilities of their laptops before suggesting alternatives, I am stopped by Edward – who simply asks where to find the SD card in my camera. Rolling my camera around in my hands, I locate the correct door in the housing and try to open it. Edward helps to remove the card and dashes off to find a friend with a computer that will accommodate it. Laptop sourced and access negotiated, he downloads the correct files, emails them to himself, returns the card to me and uploads their work in a PowerPoint presentation to Ms Bailey, well satisfied.\(^{90}\)

I am left wondering what Ms Bailey will make of their submission, for she was tasked with the responsibility of seeing that they make adequate progress according to the curriculum, but how could she possibly account for all that had transpired during these 17 minutes, not having watched as it played out? Knowing her, I am certain that she will have taken note of their movement, and seen first my move towards them and then Mr Osborne’s. But at no point was I aware of her presence. This speaks to her confidence in the online structure, her teaching peers and her students’ growing ability to navigate their learning landscape with skill.

\(^{88}\) CREATE CENTRES OF ACTIVITY
\(^{89}\) MANAGING THE HERE-AND-NOW VIA THE ANYWHERE-ANYTIME
\(^{90}\) FREEDOM TO REPURPOSE
VIGNETTE TEN

ON THE GETTING AND SHARING OF WISDOM

ESTABLISHING AND MAINTAINING A CULTURE OF LEARNING

Vignette 10 describes how the students of year four were introduced to life in the Zone through a day of activities hosted by the students currently in year five. This vignette provides insight into how the learning culture of the Zone was intentionally passed on from one cohort to another. The activity described in this vignette took place in Upper Right and the central carpeted section and involved a single group of year four and five students. Whilst Vignette 10 is not the subject of detailed analysis, it is referenced in Chapter 3 and includes examples of patterns described in Chapter 7. It has been included to describe the social aspects of learning activity in the Zone.

15th November 2012. Today the year fives start the day on their own. The year six students are on their way to Canberra to visit the Australian Capital Territory before starting high school, which is an Australian rite of passage of sorts. The students are old enough to enjoy the attention and young enough not to be too cynical.

The year fives ought to be reading as it is DEAR time, but there is a lot of chatter and I am conscious of how quickly changes in familiar
Establishing and maintaining a culture of learning.

Routines elicit changes in behaviour that are sometimes good, and sometimes not. Today the year fives appear to be testing boundaries in a way I haven’t seen them do when the older students are around. They stand a little taller, bigger and bolder, and lean with attitude against walls, tables and chairs. Maybe they are testing their authoritative selves out on each other before the year fours arrive? Today they will host next year’s year fives in the Zone for the day. Some of the younger students have already made their way in. They are quiet and well behaved. Sitting in front of the large screen, they wait for instruction.

Both Mr Hughes and Ms Montgomery are managing to hold their students’ attention as they review the details of what will be happening today. Another member of staff is sorting out something on Ms Talbot’s laptop, and she talks to the year fours. Her group of year fives ought to be reading, but they are more interested in what she is up to and are battling to keep quiet.

By 9.15 am, the year fives have packed their books away and everyone is seated on the carpet. Ms Young suggests they sing a Christmas carol, something the year fours have just learnt for the Yule Fest. They need no encouragement and gladly sing their well-rehearsed song. It’s not long before the entire group joins in and, standing there on the carpet, they move together as they sing. Song over, Ms Young thanks the year fours for their help in leading the singing, then introduces the schedule for the day, which looks like a Matrix grid and is displayed on the large screen (UC). She describes it as, ‘PBL - which means problem based learning.’ Then animatedly asks, ‘So, what’s the problem?’ She looks around but doesn’t pause before volunteering, ‘Students arriving in the Zone don’t recognise this as school, so how can we help them and their parents figure it out?’ In one move, she establishes this year’s year fives as bona fide members of the Zone. This done, they are now to help prepare for those who will be new to the school next year and, in the process, they too will get a feel for the changes ahead.
Ms Hudson, one of the year four teachers, joins in, ‘Everything you do today will have a purpose and will be used by the new students and their parents who will be visiting us next week.’ I’m struck by how naturally Ms Hudson assumes a conversational style. Falling in-step with the year five teachers, she speaks as the third adult, completing the triangulation of visual and auditory attention over the heads of the students. Together they create a conversational space into which the students are invited. Later, I discover that Ms Hudson was one of the original teachers who piloted teaching in this space. This year she is teaching year four.

Introductions over, the students move into groups allocated in advance. I have been sitting at a desk in Upper Right. Quite unselfconsciously Ava, one of the year five girls, leads a group to the ‘dining room table’ alongside me. The group of six is made up of two girls and a boy from year five, and two boys and a girl from year four. The older girls negotiate how many computers are necessary and whose will be used. Ava, adamant that only one is necessary, leaves Isobel sitting at the table with the younger students downloading the matrix grid, whilst she disappears into the art supply cupboard to get some paper. The students sit around the table waiting and there is very little talking. On her return, Ava reads aloud from the grid that is now displayed on Isobel’s computer. Finishing, she says, ‘I think we should do a list of helpful hints because we only have fifteen minutes left.’ Mr Hughes has just informed the students that they, ‘Should be discussing but starting. Introductions should be over. If you need clarification go to any adult you can find.’

Ava initiates their work with, ‘Right, number one.’

1) Don’t always sit with your friends.

In response, the young girl from year four offers,

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91 CREATE CENTRES OF ACTIVITY
Vignette 10

Establishing and maintaining a culture of learning.

2) Try to be independent, which prompts Finley Tanner, a year five, to offer,

3) Don’t always ask the teachers for help.

Standing to fetch something, Madison, a year five, says,

4) Try not to be distracted.

To this Ava adds, ‘Wherever you go!’ Speaking very directly to one of the year four boys, she says, ‘What did you think of?’ He doesn’t respond so she turns to Finley saying, ‘You were new - what did you have to learn quickly?’ He is fiddling with his pencils and one of his friends approaches to ask for some stationary. Ava sends the friend away and I can see her assertiveness is not helping. In the silence that follows, she offers,

5) Do not walk up the middle stairs between lessons - you have to go around to your class door.

She then regales them with stories of project credits lost for infractions such as this. It feels a little like the telling of ghost stories around a campfire, except it is tales of punishment, around a table in broad daylight. I half expect her to say, ‘Boo! I’m only joking.’ I am struck by how much the older students delight in laying down the law, in black and white, when what was asked for was a list of helpful hints. I wonder at human nature, at the need to initiate others - with just a touch of fear. It’s especially noticeable in this space where punitive courses of action are embarked upon sparingly, if at all. General sanction is firm but not overstated, and is more often than not dispensed over time.

Ava turns to Lewis, one of the year four boys whom she knows from choir, and says, ‘Why don’t you close your pencil case and join in?’ The other year four boy offers:
Vignette 10
Establishing and maintaining a culture of learning.

6) Don’t be shy - have a go!

Ava is quick to respond with, ‘That’s an everywhere thing.’ What she means is that his offering is not specific to the Zone. Sighing and trying to distract Ava, Lewis says:

7) Don’t do bad things on your computer.

He has finally been successful and Ava says, ‘That works.’ Molly, the youngest girl in the group, then offers, ‘What about...Stay safe on the Internet?’ Still in control, Ava is dismissive and says, ‘That’s the same as what he said.’ Lewis, beginning to enjoy himself and entering into the spirit of things says:

8) Be scared of Mrs McGee!

Ava, marking the boundaries of what is appropriate and what is not says, ‘No! That is REALLY rude.’ And Finley offers something innocuous about:

9) Accessing the stationery cupboard, which results in Lewis, who is not yet a full member of this community, hitting on one of the very few shared rules of this space, ‘Don’t write with pen on the couches!’ ‘Actually yes’, says Ava and she types:

10) Don’t use felt-tipped pens or eat on the couches.

As she finishes, she looks at Lewis and asks, ‘Another one?’ Finley responds with, ‘Treat the furniture with respect and eat in the eating zone.’ Ava points out that eating zones are outside and that the bit about eating doesn’t fit on the inside list, which is a little unfair because she has just mentioned eating, albeit inside the Zone. Thinking about moving in and out, she offers:

11) Keep track of yourself and your work.
This is followed quickly with an announcement that they only have a word count of 90 odd words, to which Molly adds:

12) Put as much detail in your work as possible.

Ava can’t help herself - she is so enjoying being in charge today - and says, ‘No, if you do that they say this is too much, and they don’t mark it!’

Mr Hughes wanders past, checking in. Thinking aloud he asks, ‘Where do you leave your laptops when you are not working with them?’

The group spends time discussing endless details about bags and where they should or should not be. It’s time for recess one and they save their work and make their way out for morning tea.

After recess, the year fives come in and get straight back to work, picking up where they had left off. They had not finished, and assumed they would continue with what they had started. In contrast, the year fours have gathered on the carpet and Mr Hughes calls the older students to join them. He spends a little time chatting with them about the work they are doing and what remains to be done, and the students are asked if they have any questions before resuming their work. They don’t and the large group slowly disperses throughout the space.

The group I’ve been watching returns to the ‘dining room table’ and Ava loses no time in getting Lewis to swap places with Finley, ‘Because he wasn’t very involved.’ Molly, the youngest, addressing the group as a whole says, ‘What are we going to do?’ Ava has her laptop out and Madison sits down with a thump. Five minutes pass in which Ava types. The others are quiet for a time and then the older students start talking about distinct rooms off the Zone, and Finley offers:

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92 DOING-THE-ROUNDS
13) You can’t go into any of these rooms without permission.

Quite unexpectedly Ava says, ‘Should we go and sit on the floor, so we can sit in a circle and then everyone can join in?’ Nobody says a thing; they get up and reform in a circle on the carpet. Unasked, Madison goes to get a red laptop support for Ava to work on and Finley, now sitting in front of the large screen, starts to read the instructions for the task from it. It is a very subtle shift but Ava no longer controls access to information about the task. In addition, the group forms with the computer on the floor in the centre and not on the laptop support. Lewis, crouching next to Ava, reads from the screen as she types and it is clear that she has lost control of what she is able to document of their discussion. They are talking and I can’t make out everything they say, but they are far more animated and there is less daydreaming. It is true that my distance from them means I have to strain to hear what they say and so my attention shifts from predominantly auditory detail to predominantly visual cues. But there is suddenly a centre of shared activity, and the qualitative difference in their interactions is marked. Kneeling and leaning forward into the centre, the pace of their speech quickens. They make much more frequent eye contact, and talk - not over one another but in turns, in response to one another. There is endless shifting of bodies in space but they are now engaged as a working whole.

As I watch, I hear one of the year four teachers begin to speak. She is thinking aloud and asks them all to think about where they will be doing the next task, ‘What would be a good area to make your movie? Maybe not in front of the printer, or on the stairs. Have a think and finish off the green task.’ I am suddenly conscious of the fact that I have been caught up in the activity of this single group. Looking across the carpeted floor, I see Mr Hughes sitting amongst a group, who are

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93 IDENTIFYING THRESHOLDS OF DISENGAGEMENT
94 BEING AWARE OF ZONES OF INFLUENCE
95 CREATE CENTRES OF ACTIVITY
96 READING THE LEARNING LANDSCAPE
Establishing and maintaining a culture of learning.

interviewing him. I can hear them as he talks about how much sport he played when he was their age. Visually scanning the space, I’m left with a sense that it feels different; the year fives are ready to be year sixes and they are enjoying this moment of responsibility. What is more, in less than a few hours the group I have been observing has gone from decidedly authoritarian to collaborative, with very little input from any of the teachers. Thinking back to the day before, it is clear that the year sixes are ready to move on. They are physically bigger and needing to question the social norms of what is now an overly familiar space - they are in the words of one of the teachers, ‘Kind of over it and ready to be the bottom of the ladder again!’

Mr Hughes takes the final learning session of the day and, with half an hour left, they gather on the carpet to reflect on what they have learnt. I hear how one group has produced a video in which the students ‘play school.’ They have had great fun contrasting school as they know it in the Zone, with school experienced elsewhere, or the old-style school of their very fertile imaginations. School ‘out-there’ is framed as arbitrary, authoritarian and boring and is presented quite literally in sepia tones, whilst school in the Zone is presented as movement with moments of insight - in full colour. Another group has made a video of, ‘A day in the life of a student’, featuring a girl in year five. It was punctuated with words of advice like, ‘No sharing food - some people are allergic’, and ‘Wear your hat or else you can’t play.’ All of this is presented as running commentary from a busy insider to her online fan base.

Other themes that emerged across multiple formats included not being left out, no bullying, and how one ought to make use of different spaces. There appeared to be an assumption that knowing what to do and where to do it was self-evident and that either matching activity to a particular part of their environment or reconfiguring what was available was the norm. But the fact that they bothered to detail this for those who would be new to the Zone suggested that they knew that this was not the norm and was a skill that needed to be learned.

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97 FREEDOM TO REPURPOSE
I did wonder if the instinct to conduct the year four orientation in this fashion really took in the multiple levels at which it defined and clarified for all, what was happening in the Zone. It was a moment in which everyone was both teacher and learner, reflecting on rules, norms and strategies that contributed to making this a successful learning community. Teachers noted progress with admiration, and the students saw both where they had come from, and where they were going. I think the success of this day was unanticipated by the year five teachers. Both the very real evidence of new skills learnt and their students’ ability to articulate what made the Zone an effective learning community were a welcome affirmation of their efforts. 98

Certainly there were moments when the tension between teaching the way one believed to be the most effective and the measurement of one’s effectiveness were at odds, when activities didn’t work as expected and gains were not made as quickly or as observably as desired. However, on this morning when the year fives led the year fours in preparing for some imagined others, there were moments when it was clear for all to see that the year fives had, over the course of the year, become independent members of a community in which learning was valued.

98 RESETTING THE LEARNING LANDSCAPE