WHAT’S WORKING?
Informing education theory, design and practice through learning environment evaluation

2016 LEaRN International Graduate Research Symposium
H. Mitcheltree, B. Cleveland & W. Imms.
WHAT’S WORKING?
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INFORMING EDUCATION THEORY, DESIGN AND PRACTICE THROUGH LEARNING ENVIRONMENTAL EVALUATION.

Informing education theory, design and practice through learning environment evaluation.

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**THE UNIVERSITY OF MELBOURNE**

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Welcome! The symposium convenors are pleased to present this official proceedings of *What’s Working? The Third Annual International Research Higher Degree Symposium in Learning Environments*. These proceedings report on events that occurred on the 3rd of June 2016 at the University of Melbourne, when post-graduate researchers from Australia, the Philippines, Taiwan and New Zealand gathered to share their developing knowledge of innovative learning environments. The event, focussed on the evaluation of learning spaces, encompassed a broad interpretation of the purpose and process of effective evaluation. The twelve papers represented pioneering thinking on this critical topic.

**THE BACKGROUND**

Now into its third year, the International LEaRN Research Higher Degree Symposium was established to showcase the best of contemporary graduate learning environments research. Hosted annually by the *Evaluating 21st Century Learning Environments* Australian Research Council Linkage Project (E21LE), in conjunction with the University of Melbourne’s Learning Environments Applied Research Network (LEaRN), this forum is breaking new ground in conceptualising how Masters and Doctoral research can support the development of cutting edge thinking on an important topic at the intersection of educational and architectural design.

Much of the fresh thinking contributing to emergent knowledge in the field comes from research higher degree (RHD) students who bring to their studies exemplary experience of school practices and school design. These students go beyond established evaluation approaches to address the issues most pertinent to our future schools.

In June 2014 the first symposium, *Snapshots*, explored emerging issues, methods and knowledge in learning environment evaluation (Imms, Cleveland and Fisher, 2016). In 2015, *Terrains* focused on mapping those evaluation concepts and strategies across the design and educational landscape (now available as a peer-reviewed conference proceeding). In 2016, *What’s working?* developed this thinking further, through a series of papers exploring the theme of ‘What’s working? Informing education theory, design and practice through learning environment evaluation’.

Current or recently completed RHD students were invited to submit papers for this event. The final 12 peer-reviewed papers present instances where innovative school designs were/were not proving to be effective – as assessed through a variety of lenses. The authors were asked to critique the evaluation strategies that provided translational evidence of relative success.
Translational evidence refers to the capacity of research to influence and inform practice. Past doctoral learning environment theses have proven significant in informing future practice. What’s Working? continued that tradition. Contributors to the symposium addressed the simple question: What is working in learning environment design and occupation, and how does this success inform future best practices?

**THE 2016 SYMPOSIUM**

In keeping with the first two LEaRN RHD symposia, *What’s working?* was designed to be a working event, with the audience participating in the exploration of new ideas via discussions facilitated by guest interlocutors. The 12 papers were placed into three themes:

1. **New generation learning environments and evaluating teaching practice;**
2. **Using evaluation to understand spatial affordance and affect within learning environments; and**
3. **Gaining evidence on pedagogy and space.**

Each group of four papers was chaired by its interlocutors in a manner that enabled the presentation of each paper and exploration of new ideas.

In introducing the sessions, LEaRN’s Dr Ben Cleveland stressed that LEaRN’s research agenda was building a significant body of knowledge aimed at not only understanding what constitutes good design, but also understanding and supporting teachers’ roles in innovative learning environments. He identified the symposia as “…a day at the edges of where new knowledge is going – about building ideas, questions, and new knowledge around ‘how can we understand new learning environments?’”.

As a research group LEaRN is moving from asking “…how can we avoid industrial era education?”, and is instead asking “What comes next?”. The by-line for the symposium, ‘informing education theory, design and practice through learning environment evaluation’, as, Cleveland said, come out of that idea: “How are we developing new knowledge that will inform educational theory? How can we develop new knowledge that will inform both design practice and educational practice?”

**THE SESSIONS**

Professor Tom Kvan, interlocuteur of the first session, focused on **New generation learning environments and evaluating teaching practice**. He noted that researchers participating in the preceding LEaRN symposia have, over three years, gone from “…what, to where, to how. This is an exciting moment for research in this field, leading us towards the end of one ARC project [E21LE] and setting the groundwork and tools for the next ARC project”.

Professor Kvan further noted that the symposia “are helping to develop insight into what metrics can be used, and should be used, to evaluate and to determine the effectiveness of learning environments - giving direction to how evaluation might be done”. He suggested that the symposia have provided platforms for students to share their work and participate in a community of practice, linked by a shared interest to learning environments research. These symposia, he said, have highlighted a number of challenges in the field, especially with respect to the evaluation of innovative learning environments, and have raised important questions about how we might use this data to inform design and teaching practice.

Professor Kvan introduced his session by situating this thinking into an actual physical space, the new Melbourne School of Design building, which hosted *What’s working?* This innovative building was, he said, an exemplar in space, place and learning. Students, academic staff and professional staff were now using the building in many different ways: as a ‘sticky’ space where people come and stay to do various things, using each space differently. The spaces are engaged with activity – enabling it, and facilitating it.
Dr Andrys Onsman, interlocutor of the second session that focused on *Using evaluation to understand spatial affordance and affect within learning environments*, posed to presenters the question; “Where are the affordances you refer to in your research?” In challenging the second session’s presenters to explore this important focus of LEaRN’s current research, he drew attention to the distinction between physical and social spaces and how certain affordances might be opened up or closed off within a space because of social interactions and practices. It was an observable phenomenon, he said, that the physical space and people within that space create the social space. This relationship, one concerning spatiality, is a complex one.

“So do we utilise the affordances that a space presents as effectively as we can? What are the features of the environment that enable or hinder certain practices – the physical, the imagined, the social and the real?” This is important, Dr Onsman posited, “because all impact on the pedagogical affordances of a learning environment”.

The ‘affect’ of a space – that is the complex interrelationship between these elements of space and the resulting rituals and rich experiences that we bring to it as individuals – becomes the conduit between affordances, people, pedagogy and space. “So how do we value and capitalise on that body of experiences to create a sense of belonging and an engagement with learning? How can physical spaces incorporate technology into them? How do you measure impact? Which elements are critical? How do you measure affordances?” These important questions framed the collection of papers within the symposium’s second session.

Dr Peter Jamieson, interlocutor of the third session that focused on *Gaining evidence on pedagogy and space*, drew on experiences from his own practice to reference how working closely with school staff can be challenging when trying to get them to “buy in” and contribute to the design and testing of new spaces. His comments stressed that this was a two way street, that it was not just looking at teacher practice, but at what we as designers can understand and learn about learning. For example, “prototyping as a means to test the design and occupation of a new learning environment”, he said, “is a provocation for change”.

Designers are often confronted by conservatism – not just from teachers and parents, but also the students in terms of what they expect a learning environment to look like, and the different activities and modes of learning and behaviour that are expected within a space. A way to circumvent this, Dr Jamieson commented, is to address methods for gaining evidence. How do we know if ‘what works from a design perspective is actually working from a pedagogic perspective?’ How do we (designers, educators, researchers) then utilise this knowledge? This is the emerging question of importance. It places special emphasis on this group of graduate researchers, he said, which is developing and testing tools for evaluating learning environments and developing new knowledge and understanding of 21st century learning environments.

**THE EMERGENT DISCUSSIONS**

The following excerpt is from a discussion between Professor Tom Kvan and PhD candidates and presenters Mark Osborne, Alana Harper, and Gina Grant. It encapsulates the rich dialogue that was generated on the day, showcasing the opportunities arising from the symposia for generating new knowledge, questions and avenues of inquiry:

Tom (to Mark): I was particularly interested in your perspective on change management. You referred to the corporate literature and the issues there. What are the issues in change management as they apply particularly to learning environments and space as opposed to anything else? What is different about change management in this topic?
Mark: I’m trying to understand the change process – what leadership processes bring about the successful implementation of a new generation learning environment? And what do successful leaders do to maximise the likelihood that practices will shift once the spaces change? I use evocative or ‘narrative’ ethnographies: analytic auto-ethnography… I think the area of my research is really about what is the same. What can we bring across from there?… When we are asked to challenge our knowledge and beliefs it is challenging for us. Innovative learning environments are challenging for us. As you move into a new space you have to navigate that space and challenge your understanding of your identity and role within that space. How we support people through that has to support them in that renegotiation.

Tom: That is an interesting take on change management because it is often viewed as the context in which you are in rather than your personal identity.

Tom (to Alana): You talk about the issues of being a beginning teacher, as opposed to those that are seasoned and honed. Have you got a feel for what this distinction is? What is different about a beginning teacher?

Alana: The way I look at it is that an established teacher is someone who has an established set of pedagogies – a set idea of how they are going to teach. Anyone can go back to being a beginning teacher. Changing the space reverts them back to being a beginning teacher, and having to re-learn how to teach in that space. If you have a default set of pedagogies that you go to, and you move a teacher from one space to another and they go back to that regularity, they revert to their teaching methods – that is what I mean by an established teacher. A beginning teacher is still learning that process. Still learning who they are as a teacher.

Tom: So that suggests, and I am going to be provocative here, that a good teacher never ceases to be a beginning teacher.

Alana: Every student you get, you need to teach in a different way – you need to look at them in a different way. Ideally you should always be learning, trying to be that beginning teacher. The beginning teacher wants to inspire, and a teacher should never stop doing that.

Tom: A lot of what Gina showed in her presentation fits in with the idea of beginning teacher – you may wish to think about a different way to frame that, rather than beginning and established.

Tom (to Gina): I wanted to ask you about the subject matter of the teacher. You made quite a point about being an art teacher. In describing what you observed, you described it as more like jazz or controlled chaos, but to what extent is the subject matter going to define your research? Being a practicing art teacher, how is that going to define your research?

Gina: The reason I chose the art teaching is because the literature out there – when they talk about teacher involvement in the space – tends to talk more about the generic teacher, and there is a whole lot of disciplines out there and people bringing in their own sets of skills. In the best world, I would like to see whether each discipline brings something to their teaching that is particular to that discipline. However, I am choosing art because that is where I am from: I am going with what I am familiar with.

THE PAPERS

It was through the productive challenges presented by the interlocutors that much of the day’s learning was generated. The papers that are presented in the following pages were written following the event. We hope that they profited from the lively academic forum provided by What's Working? Each has been refined following the presentation, using the symposium’s discussions and audience ideas to re-think theoretical or practical positions. The papers represent a ‘snapshot’ of thinking at that time, and most
certainly – as is the nature of post graduate research – these will be developed further by the time this proceedings is published. These papers represent a valuable and unique view of graduate researchers’ thinking, providing new insights into known and emerging issues in learning environments research.

REFERENCES

INTRODUCTION

Two recent influences on the development of school learning environments in New Zealand have been the Christchurch earthquakes and the New Zealand Ministry of Education’s ten-year property strategy. Following the 2011 Christchurch earthquakes, the New Zealand government embarked on an ambitious plan to regenerate 115 schools with an overall investment exceeding NZ$1.1 billion. One of the opportunities provided by the Greater Christchurch Renewal programme was that of rebuilding the schools, not as they were before the quakes, but as ‘Innovative Learning Environments’ (ILEs) – also variously described as open, flexible, collaborative or new generation learning environments.

Simultaneous to the reconstruction and remodelling of the Christchurch education network, the New Zealand Ministry of Education has been prioritising the construction of innovative learning environments to ensure school property is ‘fit for purpose’. The building of ILEs will continue to be a high priority over the coming years, with the Ministry’s policy being that if schools lack “the range and quality of teaching spaces needed to support educational outcomes, they will need to upgrade these spaces before they undertake other projects” (2011, p. 13). One of the key challenges presented by both the Christchurch rebuild and the Ministry’s 10-year property strategy is transitioning the teaching workforce from working primarily in industrial-era classroom spaces into new, open, flexible, collaborative ILEs.

This paper describes the approach – methodology and methods – being taken by the author to researching the process of school leaders leading the implementation of innovative learning environments in these schools, with a particular focus on change leadership.

KEYWORDS: INNOVATIVE LEARNING ENVIRONMENTS, INNOVATIVE EDUCATION PRACTICES, EXPERT ELICITATION, SITUATION PROFILE, CLUSTER ANALYSIS, EVALUATION.
POSITIONING THE RESEARCHER

It is against this backdrop that I go about my work. My day job involves working for an educational not-for-profit organisation as a consultant/facilitator in schools, helping them to implement innovative learning environments. I first began exploring the nature of change within learning environments as a newly-appointed Deputy Principal of a new senior high school in Auckland, New Zealand. We worked with architects on the design, engaged the community, appointed the staff, developed approaches to curriculum, pedagogy, assessment and culture – and preparing people for the transition from traditional schooling to something different.

Essentially, the question facing those implementing innovative learning environments is, ‘If our built environments are changing, how do we best support people through the process of changing their practices to make the most of these new opportunities?’

The practices that may elicit change include (but are not limited to) ongoing training and professional learning, as-well-as updates to organisational culture, methods of evaluation, relationships, curriculum configurations and pedagogical practices.

LITERATURE REVIEW

Blackmore, Bateman, Loughlin, O’Mara and Aranda (2011) indicated that the research literature surrounding innovative learning environments revolves around the design phase, with little attention paid to “the organisational cultures and leadership that facilitate or impede innovative pedagogies in new spaces” (2011, p. 5). Supporting this assertion, journal and database searches using phrases like ‘change’, ‘change leadership’ and ‘change management’ combined with ‘learning environments’, ‘new generation learning environments’ and ‘innovative learning environments’ turn up no relevant studies. Consequently, while some of the change leadership literature explored in this paper comes from within education, there is a wealth of relevant literature from other fields that is highly informative.

With respect to change leadership and its influence on the success of innovative learning environments, there are a number of assumptions that need to be tested. Researchers like Robinson, Hohepa and Lloyd (2009) have provided comprehensive evidence about the best way to lead existing schools successfully. Robinson et al. (2009) cite characteristics such as clear vision and goals, coherent systemic structures and the strategic allocation of resources as key to successful leadership strategies. However, most of these studies focus on leadership processes designed to maximise the effectiveness of the status quo and engagement in incremental, low-level improvement. It appears that when schools engage in dramatic changes such as implementing ILEs, something different is required. Heifetz, Grashow and Linsky (2009) posit that such dramatic changes can disrupt cooperation, a sense of well-being, and social cohesion. Furthermore, it may confront group identities, change working relationships, challenge expertise and throw people into stages of ‘conscious incompetence’. Indeed, research suggests that little is known about how best to support profound adaptive change.

As a result of my review of the change leadership literature some assumptions emerged that needed to be tested, particularly because much of this literature came from sources outside of education. Looking across the literature, I have begun to develop a three-phase theoretical framework for change leadership based on the assumptions being tested. Figure 1, below, illustrates this framework for proposed ‘persistent principles of change’.
The ‘persistent principles of change’, illustrated above, are important throughout the entire change process. For instance, in the preparing for change phase, change readiness assumes critical importance, but as the change progresses, it recedes further into the background. Similarly, sense-giving, sense-making and knowledge building appear to be particularly important in the implementation phase, however these assumptions need further validation, leading to my PhD research question:

What leadership practices are most likely to lead to the successful implementation of an innovative learning environment (ILE) and associated practices?

**METHOD**

**RESEARCH DESIGN**

A central methodological challenge associated with this research is my position within the project’s context and communities under observation. My employment requires me to work with school leaders to help them successfully implement ‘innovative learning environments’. Thus, I’m enacting dual roles within my project, as both researcher and research participant. In these roles, I’m trying to both shift practice, while at the same time attempting to analyse the ways in which we might best implement changes in practice.

These dual roles present significant challenges to objectivity in the research process, partly because the relationship between consultant (me) and school leader is based on an understanding that the consultant is there to make changes throughout the process: to act as an instigator and catalyst. In essence, my job is to jump into the school context and muddy the waters. It’s what I’m paid to do. My work is to help school leaders “organise flux” (Weick, Sutcliffe & Obstfeld, 2005, p. 411) across many levels. This involved trying to:

- Help school leaders make sense of their own jobs. Resolving questions such as, ‘In what ways is this type of work congruent with conventional models of school leadership and in what ways is it a departure from them?’
- Help school leaders make sense of the situation they find themselves in, which is often complex, emergent, dynamic and unbounded. Identifying and putting in place the enablers and support mechanisms that all parties need.
• Draw lessons out of one context and apply them sensitively in another i.e. taking ‘success’ or ‘failure’ and identifying antecedents (noticing, bracketing, communicating).

There is considerable alignment between my day job and my research interests. Both are attempting to support others by producing “meaningful, accessible, and evocative research grounded in personal experience” (Ellis, Adams & Bochner, 2011, p.1).

Several potential methodological challenges arise out of this context:

• ‘Objective’ approaches to research clearly do not fit this context. The idea of me as a ‘knowledgeable outsider’ entering the research context, dispassionately observing cultural members, then leaving to write about the culture feels like a betrayal, if not exploitation.
• The nature of my personal relationships with the research participants is critical to the project. I know them well and they know me. In this context we are emotionally and professionally entwined – joint authors of the narrative.
• The commercial arrangement between my organisation and the school leaders alongside whom I work is also important. To attempt to be impartial in the research process, to stand back and to be a fly on the wall, would jeopardise not only my professional position, but also those of the school leaders with whom I work.

These challenges have contributed to my growing sense of unease about playing the role of what Struthers (2012) refers to as a “silent author” (p. 68). I am an observer of, and a participant within, the research context. I am both gazed upon and the gazer. My preference is not to ignore self, but to use self to break my silence and to analyse and help others understand these cultural experiences from a personal perspective.

AUTOETHNOGRAPHY

Ellis et al. (2011) characterise autoethnographers as researchers who “retrospectively and selectively write about epiphanies that stem from, or are made possible by, being part of a culture and/or by possessing a particular cultural identity,” (p. 276). This approach of positioning the researcher not as the centre of the research endeavour, but as a member of the community under study, responds directly to some of the challenges presented by the current research.

Autoethnographers often seek “to produce aesthetic and evocative thick descriptions of personal and interpersonal experience” (Ellis et al., 2011, p. 276). Some of these approaches are gathered together under the label of ‘evocative ethnographies’ (Anderson, 2006) and while this approach might resolve the challenge inherent in my dual roles as researcher and researched, it won’t necessarily prepare other school leaders to guide their communities through a similar process. Ellis et al. (2011) suggested that in addition to merely telling about experiences, autoethnographers are often required to offer a level of analysis around these experiences using their “methodological tools and research literature” (p. 276). This, they argue, is a way for the researcher to use personal experience to illustrate facets of cultural experience, and in so doing “make characteristics of a culture familiar for insiders and outsiders” (p. 276).
ANALYTIC AUTOETHNOGRAPHY

Analytic autoethnography prioritises sense-making and the gaining of insights while responding to the challenge related to the positioning of self. The purpose of this approach is to “understand the topic under study by placing it within a social analytic context” (Anderson, 2006, p. 378). Anderson (2006) argues that analytic autoethnography takes place when the researcher is:

1. A full member in the research group or setting;
2. Visible as such a member in published texts; and
3. Committed to developing theoretical understandings of broader social phenomena (p. 375).

The key feature that differentiates analytic autoethnography from other forms of autoethnography is the commitment to improving theoretical understandings. Applied to my work in schools, this approach allows me to improve the community’s theoretical understandings while operating within that community. It also extends the reach of this theoretical understanding by producing ‘more accessible texts’ than conventional approaches to research, which in turn makes “social and personal change possible for more people” (Ellis et al., 2011, p. 277).

METHODS

SELECTION

Selection of co-participants is guided by the principle that the autoethnographer is “the ultimate participant in a dual participant-observer role” (Merton, 1988, cited in Anderson, 2006, p. 379). First and foremost, co-participants must be part of the cultural group under investigation: “a social world with clear locales and sub-culture” (Anderson, 2006, p.379). To further establish “the boundaries of the phenomenon” (Preissle Goetz & LeCompte, 1984, p. 66), the cultural group in this project was defined as New Zealand public school leaders who engaged in the process of implementing ILEs. Further criteria have also been applied to this group in order to ensure the selection is appropriate to the methodology. These criteria include:

1. Leaders of existing schools (not new builds);
2. Leaders of schools implementing ILEs; and
3. Leaders of schools with whom I have had an existing relationship of twelve months or more.

These criteria are designed to meet the requirements of autoethnography and to ensure that selection can “with some measurable margin for error, be asserted to represent the whole group from which it was extracted” (Preissle Goetz & LeCompte, 1984, p. 66).

In addition to interactive interviews with co-participants, a ‘key informant’ was employed to triangulate the sense-making with co-participants as it takes place. A key informant is a confidant and trusted advisor to the researcher – chosen because “they possess special qualifications such as a particular status, wide communications, or even accurate information for the study” (Young & Young, 2008, cited in Faifua, 2014).
**DATA COLLECTION**

Several of the potential pitfalls of autoethnography can be hedged against with a careful and strategic data collection plan. I propose to use approaches that fall into two categories: internal and external.

The internal approach will include my own reflections, a timeline of events from my appointment calendar, personal memories supported by my research journal, field notes and other cultural artefacts such as presentations and activities developed with co-participants. These data will inform my analysis of the culture under study and myself as a reflexive researcher.

External sources of data will include artefacts that arise out of professional development, activities inside co-participants’ schools and transcripts of interactive interviews with co-participants. In addition, I will also engage the expertise of the ‘key informant’ in order to assist with sense-making, triangulation and checking of assumptions.

**NARRATIVE ANALYSIS**

Chang (2008) advises against approaching the analysis and writing process with preconceived notions of predicted outcomes, cautioning that in autoethnography “data analysis and interpretation hinge on data collection ... [and is] often not prescribed by a rigid research design” (p. 67). A flexible plan to analyse and interpret data is required because of the fluidity of the process. Taking into consideration Chang’s (2008) recommendations, a narrative analysis will be employed within this research. This approach enables the researcher to analyse the experience of educators, particularly those undergoing emotional of difficult experiences, such as when implementing disruptive change (Cortazzi, 1993). Taking into consideration Riessman’s (2005) notion that narratives “do not mirror, they refract the past” (p. 6), I have found Grumet’s (1990) notion of a ‘triad of voices’ to be a useful framework from which to work. Grumet proposes that situation, narrative and interpretation offer different opportunities for understanding: situation being the context of the narrative – physical, social, cultural, political; narrative relating to specific experiences focussed through the interviewee’s voice; and interpretation relating to a more reflexive and distant voice i.e. reflection on the meaning of the narrative and its relevance to current circumstances (Grument, 1990, cited in Cortazzi, 1993).

**CONCLUSION**

This paper described the approach being taken by the author to researching the process of school leaders leading the implementation of innovative learning environments in New Zealand schools, with a particular focus on change leadership.

Ultimately, this investigation highlights an important aspect of the broader field of learning environment research – particularly that related to the development of innovative learning environments. The outcomes of the project are anticipated to aide school leaders in supporting their communities through the process of implementing disruptive change in innovative learning environments, and in schools more generally.
REFERENCES


ABSTRACT

Economic and educational reforms encourage adults to return to study to optimise their contribution to Australia’s place in an increasingly competitive global market. Yet the features of adult learning spaces that are discussed in much of the literature relate to physical structure and architectural design, or to distance and mobility. There is little research on space as it relates to social, intrapersonal and interpersonal connections and the impact these have on vocational learning and new kinds of knowing that emerge. This paper draws on Mezirow’s Transformative Learning Theory (2000) and Nonaka and Konno’s notion of ‘Ba’ (1998) to explicate the contexts that founded a qualitative doctoral research project that uses narrative methodologies to understand the lived experience, learning and identity work of six vocational practitioners undertaking a diploma teaching program in vocational education and training. This paper reports on preliminary research findings from an inquiry that invites participants to consider the conditions of learning spaces that have been catalysts to personal change, fostering transformed perspectives about themselves as learners and about learning more broadly. I argue that cultivating spaces where teachers can reflect individually and collectively on the learning of their lives provides a platform on which a shared understanding of learning and teaching can be critiqued, reimagined and practiced.

KEYWORDS: LEARNING SPACES, ADULT LEARNING, IDENTITY, KNOWLEDGE CREATION, STORYTELLING, CHANGE, TRANSFORMED PERSPECTIVES, CRITICAL PEDAGOGY.

Jennifer K Miles is a Teaching Associate and Doctoral candidate in the Faculty of Education at Monash University. Her work as an educator and researcher in the spaces of teacher professional development focuses on identity work as the primary foundation for cultivating learner capability. Jennifer works with teaching practitioners across a broad range of professional development programs including universities, TAFE, Adult Community Education, private and not-for profit sectors and contributed to an International Boys School Coalition (IBSC) research project exploring masterful teaching practices in the education of boys. Her current PhD research examines the lived experience of vocational practitioners as they engage with spaces where they can unpack their own transformative stories of learning. Jennifer is an active member of the international Transformative Learning community.
THE HISTORICAL LANDSCAPES OF VET

The landscapes of Australian Vocational Education and Training (VET) have emerged from centuries of British and European political, economic and sociocultural influence, enduring civil unrest, world wars and global crises (Armytage, 1956, 1957a, 1957b; Brown, Rushbrook, Ferrier, & Selby Smith, 1995; Lloyd, 1953; Musgrove, 1966; Rushbrook & Brown, 2001; Ward, 1973). As the debate around the place, purpose and methods of providing relevant technical and vocational education and training has continued to ebb and flow against the backdrop of an increasingly competitive global market, consecutive Councils of Australian Governments (COAG) have implemented economic and educational reforms to promote Australia’s standing on the world’s economic stage, offering incentives to individuals and industry to engage in further education and technical skills training (Bowman & McKenna, 2016; Brown, 2015; COAG, 2016; Forward, 2013; VTA., 2013).

I am a teacher educator of vocational practitioners who are ‘on the ground’ in the vocational education and training sector. Having already contributed richly to our nation’s economic prosperity through engagement in their own industries, they come to me as students, however they are skilled professionals and business owners who have made a decision to share their extensive skills and knowledge with the younger, emerging workforce who enrol into courses to learn their chosen trade or profession.

I am also a student myself - a PhD candidate researching the experiences of these vocational practitioners as they navigate the often disorienting landscapes of VET through the lens of their own emerging identity as educators. This paper explicates the contexts that founded the qualitative project and reports on the progression and early findings of this inquiry. The narrative study invites participants to consider the conditions of learning spaces that have been catalysts to personal change, fostering transformed perspectives about themselves as learners and about learning more broadly, so that they might engage more authentically and effectively with their teaching practice. Examples are provided that highlight the benefits of cultivating spaces where teachers can reflect individually and collectively on the learning of their lives, and build a foundation on which a shared understanding of learning and teaching can be critiqued, reimagined and practiced. I conclude with reflections on the inquiry as it unfolds its knowing.

TENSIONS WITHIN VET

Within the context of the global economic firestorms of recent years, and as variously elected state and federal governments wrestle for control, policymakers in vocational education attempt to balance the needs of industry and Australia as an economic force with the ideal of a socially just and egalitarian society (Brown, 2004; McGrath, 2012). It is well acknowledged within the sector that the pedagogy of VET is industry focused, competency-based training (CBT) and assessment (Billett, 2011; Forward, 2013; Government, 2016; Rushbrook, 1995; VTA., 2010), and many researchers critique its industrialised, instrumental approach to learning (Adams et al., 2014; Freire & Shor, 1987; Robinson & Aronica, 2015). Although based on a constructivist paradigm, according to Wheelahan (2009), instrumentalism ‘plunders’ constructivism, undermining critical thinking and knowledge acquisition about the self and the focus of learning. Furthermore, “knowledge must be placed at the centre of curriculum, and … because CBT does not do this, it excludes working class students from access to powerful knowledge” Wheelahan (2009), p227.

There are many who fight to have the voice and contribution of these learners and workers included, none more so than Freire (1972), a celebrated critique of ‘banking’ education. Freire vehemently opposed educational policy and practice that trains people only to the extent required of them to perform their job. Many critical pedagogues echo his critique of this industrialised approach to education that advances the reproduction of existing ideologies (Forward, 2013; Robinson & Aronica, 2015).
Reproduction is a notion discussed in various guises by many critical pedagogues (Bourdieu & Passeron, 1977; Brookfield, 2005; Carr, & Pruyn, 2012; McLaren & Kincheloe, 2007; Shor & Freire, 1986). My doctoral research explores the conditions that differentiate spaces of reproduction from spaces of transformation, and attempts to understand how spaces are reproduced or transformed. That is, the differences between learning spaces designed to perpetuate the status quo, and learning spaces whose design is cultivated to transform learners’ and teachers’ knowing.

Given the nature of VET as deeply grounded in industry, it is prudent to draw on one of industry’s giants for insight into ways of conceiving how space informs knowledge creation within this context. ‘Known worldwide as the guru of Knowledge-based Management’ (University., 2016), Ikujiro Nonaka is a Professor Emeritus at Hitotsubashi University, Japan, and has been described as one of the foremost business thinkers (Witzel & Warner, 2013).

In optimising knowledge creation, Nonaka (1998) draws on a Japanese concept known as ‘Ba’ that translates roughly into the English word ‘place’, referring to it as a shared space for emerging relationships. Space can be physical, virtual, mental, or any combination of the three, and is “conceived as the frame, made up of the borders of space and time, in which knowledge is activated as a resource for creation.” (p. 41). Nonaka relates this to the organisation honouring the worker on the ground, and the tacit knowledge they hold - creating spaces where Ba can flourish to allow individual and/or collective knowledge to be shared and enhanced by newly emerging, collaborative perspectives. Ba is a rich space that acknowledges the individual as key to the organisation’s success, and where the individual realises himself as part of the environment on which his life depends. Nonaka defines Ba as a concept and a context that harbours and grows meaning and potential, differentiated from ordinary human interaction because of the concept of knowledge creation. Ba is a space of cultivating, recycling and reordering of knowledge resources to enable the re-formation and emergence of new knowing (Nonaka & Konno, 1998).

Nonaka’s application of Ba provides a clear example of how inclusion of honouring spaces within our industry-driven VET sector might promote learning and knowledge about self that can be cultivated in a way that contributes to the success of the whole, and to the knowledge creation process.

Typically, vocational teachers come to VET after an extended time in industry and hold tertiary qualifications ranging from post-graduate degrees to industry trade credentials (Miles & Court, 2013). To enter teaching in VET, they undertake the minimum qualification for vocational teachers - Certificate IV in Training and Assessment - and to achieve career progression beyond this, they are subsequently required to undertake a Diploma level qualification in vocational education and training, with a teaching practicum.

Over many years of facilitating these professional development programs, anecdotal evidence has identified a number of authorising conditions commonly reported across these diploma learning
spaces. Many reports relate to the benefits of social learning and the development of small communities of practice that support the successful navigation of the individual and the collective through often disorienting learning programs (Miles & Court, 2013). Overwhelmingly, the conditions reported that cultivate success for these adult learners relate to social, intrapersonal and interpersonal connections and the impact these have on learning and the new kinds of personal and vocational knowing that arise.

**RESEARCH METHODS**

Against this background, my research emerges. It employs narrative methodologies to draw out the phenomenological lived experience, learning and identity work amongst experienced vocational practitioners who returned to study in a post-compulsory VET teaching diploma program. Participants were recruited via a short questionnaire distributed through social media, to gather demographic information and to identify an indication of any significant perspective transformation experienced while undertaking the VET teaching diploma. Those who had no such experience were excluded, as the focus of the inquiry was to identify catalysts to change – conditions that promoted new ways of seeing themselves as critical learners and teachers. Additional data was collected from participants through in-depth interviews, focus groups and final reflective interviews.

Participants were initially asked to reflect on the ways in which identity work and the environmental conditions in their diploma learning spaces facilitated critique of identity construction as a learner. They were then encouraged to identify any consequent transformed perspectives on their learning and teaching process and practice. Finally, to share their experiences ‘on the ground’ as they learned and practiced within the fluctuations in opportunity and challenge of the times... how they navigated and negotiated the unrest that is ever present within the changing landscapes of VET.

**STORIES OF TRANSFORMATION**

Transformative Learning Theory (Mezirow, 2000) asserts that from a disorienting dilemma in life – an event that throws one off the familiar course of existence and knowing to that point – a process of self-examination emerges that causes the questioning of long held values, behaviours and world views. From this new questioning standpoint, a growing discontent and alienation can emerge from what has been traditionally accepted as social norms and structures. A greater critical awareness of others, both within and outside of the individual’s morphing view of the world ensues, that critiques and transcends previously accepted social roles and expectations, and the habitual ways in which these assumed roles are enacted. Mezirow (2000) frames this process and describes how reinterpretation and reconstruction of meaning attached to past experiences, and awareness that our lived experience and discontent has been shared and acknowledged by others, can support an openness and willingness to construct a new and unique frame of reference.

Storytelling is a tool for helping people to find a place to start on this journey to self – a beginning point where they can extend their understanding of the impact of cultural and environmental influences on their sense of identity. In addition, storytelling provides a space where uncontested assumptions about broader cultural narratives can be unpacked, critiqued and linked into, or rejected. Van Manen (1997) speaks of examining lived experience through a phenomenological lens, not as a way of finding universal truths, but as a means to understanding the experiences, personal truths and meaning-making of our own lives... the storyteller as the human scientist researching and claiming what is meaningful to them.
PRELIMINARY FINDINGS

Many participants referred to reflective exercises required throughout the teaching diploma and the powerful impact these exercises had both during and following the course. One participant identified a 'light bulb moment' she experienced after completing a critically reflective essay on her early learning experiences. She described herself as a social girl at school (not always applying herself to her studies), and recalled a particular event - a comment from a teacher in her high school years - that had been a critical point in her development. She had, uncharacteristically, submitted an assignment that she had passionately and diligently applied herself to, and gained a grade of 100%. She was however ridiculed by the teacher, and accused of submitting work that was not her own. After reflecting on this in her VET diploma essay, she discussed her sudden realisation that this incident had impacted her whole life – she recognised that she had spent a lifetime since, working diligently behind the scenes in all her vocational roles, so that her high quality work could never be brought into question. In addition, she recognised that the time was right to step forward in all her power. She expressed that this small but powerful truth was incredibly freeing for her, and allowed her to release old ways of behaving.

Two other participants spoke of validation of things they had known but had not been able to name, and an emerging awareness in the time since the course of new ways of seeing and practicing learning and teaching. They articulated that the safe, social learning spaces that were cultivated during the diploma program resulted in a process of personal unfolding that revealed significant meaning making. Both the participants identified new ways of applying transformed perspectives to supporting learners in their own turbulent journeys. It is my early observation that these responses resonate strongly with Mezirow’s process of transformative learning (2000) and with Nonaka's argument for Ba as an emergent foundation for relationships and knowledge creation (Nonaka & Konno, 1998).

As a passionate critical pedagogue, the beginnings of my research focus were on the participant’s classroom experience. Specifically, I explored the dynamics between the learners and facilitators of that space, and the physical, social and emotional spaces that lay beyond. What I hadn’t consciously considered was that rich learning might come ONLY from spaces external to the site of formal learning. For one of my participants, these external spaces related to the teaching practicum where learning truly came alive for him. As an experienced learner and teacher, his decision to undertake the VET diploma was purely related to career progression. He participated in the formal learning spaces without any conscious perspective transformation, but was highly engaged and changed by the diverse perspectives and approaches he was exposed to during his hours observing others’ classes, and in receiving feedback from his teaching peers.

THE STORY THAT CONTINUES

My research continues and is a story still in the telling. This paper has explored the methodological approach to the study, unpacking the theoretical foundations that have founded the inquiry, and highlighted a few emerging themes of interest. Deeper investigation, analysis and synthesis of the stories told by the participant teachers will reveal much that is yet to be heard and understood.

For those who come to VET to share the learning of their trade, and experience conditions in learning spaces that are transformative, my continuing investigation will seek to provide insight into the ways in which engaging with learning spaces in the VET diploma opened them to new ways of seeing and knowing; how they continue to navigate the complex intersections between the needs of industry, governments and the world of their learners in a system that threatens to treat people and education like a production line (Robinson & Aronica, 2015), and how they experience their power and their voice within
the context of contradictory perspectives, competing agendas, and the difficult realities of Australian VET. Ultimately, how transformations in perspective have impacted their practice and outcomes for their learners.

The findings of my research will contribute to the growing evidence base that acknowledges the immense value, at an individual and societal level, of a pedagogical approach that fosters and promotes transformative, life-altering learning (Dirkx, 2000; Forward, 2013; Freire, 1972; Garvey Berger, 2004; hooks, 1994; Mezirow, 2000; Miles, 2011; Taylor & Cranton, 2012; Wink, 2011). I argue that cultivating spaces where teachers can reflect individually and collectively on their learning provides a platform on which a shared understanding of learning and teaching can be critiqued, reimagined and enacted.

*The work of a transformative teacher is first to help students find the edge of their understanding, second to be company at that edge, and finally help students construct a new, transformed place. Ultimately, this process will help students find the courage they need to transform.*

*Jennifer Garvey Berger (2004, p1)*
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CHILDREN’S GENDERED USE OF SCHOOL GROUNDS: THE ROLE OF THE PHYSICAL ENVIRONMENT

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ABSTRACT

School grounds are increasingly valued for the freedom of choice they give children for operating their preferred activities. However, the physical characteristics of these places appear to provide unequal opportunities for boys and girls. This study shows that school grounds are mostly qualified for certain types of activities which are more of boys’ interest and their activities can constrain girls’ use. It explores the physical characteristics which can alleviate the negative impact of boys’ activities on girls’ and provide more opportunities for girls to use and explore the environment. Three methods have been applied in this multi-case qualitative study involving three Australian schools: (a) behaviour mapping of school grounds during the recess and lunch time period; (b) walking tours guided by children around the school grounds; and (c) focus groups of 3–5 children in each school. The results outline three main themes which centre on the physical characteristics of school grounds: (a) the design of enclosed spaces; (b) the organisation of multiple activity settings facilitated by the spatial arrangement of school buildings; and (c) incorporating natural environments in the design of school grounds. The discussion argues that these physical environments need to be valued in the design of school grounds because they can provide girls with more freedom of choice to get engaged in their preferred activities.

KEYWORDS: CHILDREN’S ACTIVITIES, GENDER, PHYSICAL CHARACTERISTICS, SCHOOL GROUNDS.

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INTRODUCTION

According to the Melbourne Declaration on Educational Goals for Young Australians, the social context of school environments should promote equity, encourage children to build a sense of responsibility and act creatively to master new skills (Barr et al., 2008). Exercise of responsibility and expression of creative potential are part of the definition of agency (Bandura, 2001). School environments are one of the first arenas where children learn to negotiate their agency (Rainio, 2008). Their expression of agency is not necessarily confined to their experience of formal school environments (Kumpulainen, Lipponen, Hilppö, & Mikkola, 2014). School grounds tend to give children more freedom of choice for operating their preferred activities independent of the formal education.

There seems to be a tension between girls’ expression of agency and the nature of activities facilitated by the school grounds. The organisation of schools strongly values activities through which girls may not be able to express self in a way that is interpreted as being agentic by the school structure (Rainio, 2009). Boys have more freedom of choice in the use of school grounds because they are provided with the traditional play courts in which girls may not be interested to use in the same way (Dyment, Bell, & Lucas, 2009). The physical environments of schools may fail to support the richness of girls’ own way of self-expression in their activities.

Many studies elaborate on boys’ and girls’ use of different parts of school grounds (J. Dyment & O’Connell, 2013; J. E. Dyment et al., 2009; Mårtensson et al., 2014; Rönnlund, 2013; Samborski, 2010). Although a few of these studies draw attention to the gendered use of school grounds, their results are mostly based on periodic observations of children in predetermined target areas (J. Dyment & O’Connell, 2013; J. E. Dyment et al., 2009). Almost no study adequately explores children’s perspectives on the physical characteristics which can reinforce the social constraints girls might experience in the use of school grounds.

The current study argues that the design of school grounds can impose limitations on girls’ activities while giving more opportunities to boys. Firstly, it identifies the differences between preferred activities of Australian boys’ and girls’ within school grounds. Specifically, the current research focuses on the nature of boys’ activities which interfere with girls’ free use of school grounds. Further, the analysis proposes the physical characteristics which alleviate the negative impact of boys’ activities on girls’.

BACKGROUND

Many studies highlight gender differences between the nature of boys’ and girls’ preferred activities within school grounds. Findings suggest that children’s aim of freely chosen activities within school grounds is socialisation, and boys’ and girls’ ways of socialisation are different (Baines & Blatchford, 2011; Fromberg & Bergen, 2006; Paechter & Clark, 2007). Boys socialise more through competitive rule-bound sports (J. E. Dyment et al., 2009; Hyndman & Lester, 2015). In contrast, girls often view school breaks as an opportunity for intimate verbal interaction (Hyndman & Lester, 2015; Paechter & Clark, 2007). They are more engaged in open ended play, sedentary or moderate physical activities which are creative, more cooperative and less competitive (J. E. Dyment et al., 2009). They can speak easily during moderate physical activities while vigorous physical activities make them breathe harder and faster which impedes their verbal interaction (Australian Government Department of Health, 2014).

Literature on the use of playgrounds and schoolyards informs gender differences in the spatial dimension of their activities. Girls often operate a wide variety of activities in small groups (two or three girls) (Karsten, 2003). They tend towards occupying more confined territories in play, suggesting that many girls do not need much space for their preferred activities (Karsten, 2003; Paechter & Clark, 2007;
Rönnlund, 2013). Boys, in contrast, usually play in larger groups and in more limited types of activities (Karsten, 2003). Because they tend to play in large numbers, they arguably control more extensive spaces than girls (Karsten, 2003).

A few studies challenge the design of school grounds which reinforce the exclusion of girls from the use of space (Barbour, 1999; J. Dyment & O’Connell, 2013). While boys dominate the play space girls and less physically competent children are observed to use the sidelines, unable reluctant or not willing to participate in the dominant activities (J. Dyment & O’Connell, 2013; J. E. Dyment et al., 2009). Peripheral spaces and hidden corners seem to provide a safe refuge for boys and girls who do not want to engage in active, rule-bound play (J. Dyment & O’Connell, 2013; Mårtensson et al., 2014).

The nature of children’s activities within a setting tends to influence the behavioural patterns of that place. Previous literature shows that boys and girls tend to use different areas of the school ground totally separated from the activities of the opposite gender. Dyment, Bell, and Lucas’s (2009) observations of several target areas within Australian schools indicate that boys use the sporting areas, whereas the canteen courtyard is often used by many girls who choose to simply sit in circles, talk and play quiet games. The social characteristics of each target area seem to encourage certain types of activities resulting in the exclusion of a gender not interested in such activities.

The literature strongly argues for the natural environment which engages a high percentage of both boys and girls in moderate physical activities. Research suggested that projects of greening the school grounds resulted in more diverse types of activities in which both genders tend to involve (Jansson, Gunnarsson, Mårtensson, & Andersson, 2014; Mårtensson et al., 2014). Furthermore, both boys and girls participated in exploring areas hidden by trees and bushes, climbing over boulders, playing in the sandpit and crawling through long grass in imaginative play during school breaks (J. E. Dyment & Bell, 2008; J. E. Dyment et al., 2009). The natural environment seemed to be gender-neutral and offered good opportunities to promote gender equity within school grounds (Ånggård, 2011; Lucas & Dyment, 2010; Refshauge, Stigsdotter, & Petersen, 2013; Sargisson & McLean, 2012).

Findings from the literature on the gendered use of school grounds mainly points to the correlation between gendered activities and the physical characteristics of each setting. The results are mostly derived from observations of children indicating the intensity of activities in each setting. These studies fail to draw enough attention to children’s own perspectives on both the social and physical characteristics of the settings which influence this binary divide. Children might choose some settings for both the physical affordances and the social characteristics determined by boys’ activities. Although nature can afford activities of both genders’ interest, previous studies lack adequate explorations on the social characteristics of natural settings that encourage children’s use. This study explores the physical characteristics that can influence the social character of a setting, alleviating the negative impact of boys’ activities to afford girls’ use of the place.

THEORETICAL FRAMEWORK

The key theoretical framework of this study is guided by the ecological theories of affordances (Gibson, 2014) and behaviour settings (Barker, 1968). The association between children’s preferred types of activities and the socio-physical characteristics of their selected places within school grounds can be explained by these theories. The environmental characteristics of affordances within school grounds can support boys’ and girls’ preferred activities. The dynamic interplay between the social and physical environment of a behaviour setting can explain the role of the physical environment in the dynamic influence of activities within a setting.
METHODOLOGY

Three public primary schools were selected in Sydney to be involved in this multi-case qualitative study. The selected schools represent some contrasting features (i.e. vegetation, buildings’ spatial arrangement, and density) that help to assess the varying socio-physical characteristics of children’s selected places. Three methods were applied within school grounds and during the recess and lunch time periods: (a) 60 behaviour mapping sessions in three school grounds; (b) 24 walking tours guided by children around each school ground; and (c) six focus groups of three to five children in each school. Data was collected with open-ended, semi-structured questions in walking tours and focus groups about student’s preferred activities in their selected places within the school grounds.

Participants of this study were children aged eight to 10. Compared with younger children in primary schools (aged six and seven), there is a greater difference between the play patterns of boys and girls in this age group (Fromberg & Bergen, 2006). Their activities are more likely to provoke conflict in their selected places.

FINDINGS

TYPES OF PREFERRED ACTIVITIES AND THEIR SOCIAL CHARACTERISTICS

The patterns in the activities of boys and girls persisted across three selected schools. Findings indicated that there were some activities common to both genders including some vigorous physical activities such as tags around the trees and bushes, moderate physical activities such as playing on the climbing equipment, balancing, jumping and sedentary activities such as playing cards. On the other hand, children’s participation in other types of activities demonstrated a clear gender bias. Boys of three selected schools showed a strong preference towards ball games and the use of traditional playing courts (e.g. handball courts, soccer courts, basketball courts). Girls in this study, on the other hand, showed more preference towards sedentary and moderate physical activities which include verbal interaction. Within the three selected schools, girls were strongly interested in practicing gymnastics (e.g. do flips, handstands, and cartwheels) and socio-dramatic play (e.g. Mums and Dads, the Voice, Dragons). In addition, they engaged in conversations and story-telling about imaginary characters during play.

Although many girls expressed interest in playing handball and soccer, they frequently complained about boys reserving the courts that resulted in losing their opportunity to play.

The findings identified the nature of places where boys’ activities can influence girls’ use. A large group of boys dominated the main part of the grassed area big enough to play soccer or touch football. Their play, which involves physical intensity, intimidated girls into using the peripheral spaces or the corners to keep safe from getting struck by the balls or collisions with the boys. A great volume of evidence emerging from the analysis of the walking tours and the focus groups in this study included girls’ complaints about boys taking control of the grassed area in which they would like to practice gymnastics or play soccer. During the instances when both girls and boys play soccer in the same field, boys occupied the whole area making girls to stick to their half part. Overall, the activities of boys were described as rough by the girls forcing them to use confined peripheral areas or places away from their play.

KEY PHYSICAL CHARACTERISTICS OF ACTIVITY SETTINGS

The main contribution of this study is in identifying the key physical characteristics of the settings that reduce the negative impacts of boys’ activities on girls’. Three main themes emerge from the analysis of data suggesting that girls prefer to use enclosed spaces; the courtyards away from big grassed areas;
and the natural environment around grassed areas. These types of places are found to provide suitable
behaviour settings in which girls are able to use the affordances of the physical environment to express
their agency more freely without the intimidation of boys.

**ENCLOSED SPACES IN THE CORNERS**

Children, especially girls, choose to use enclosed spaces because the barriers provide them with
private settings where other children do not interrupt their play and run across. Compared to boys,
girls frequently express their sensitivity to crowds when using the central courts. Enclosed spaces such
as corners are of particular interest to girls because they are partly or completely away from grassed
areas where they are likely to be kicked by balls or hit by boys running everywhere. Figure 1 illustrates
examples of enclosed spaces in three selected schools.

**SPATIAL ARRANGEMENTS OF THE BUILDINGS**

A considerable amount of the school grounds in three selected schools is located in between school
buildings. The spatial arrangement of the school buildings results in the creation of multiple settings each
of which is used for certain types of activities not necessarily compatible with each other. For example,
children usually use the COLA (Covered Outdoor Learning Area) for eating and sitting down games
which can be easily interfered by ball games. On the other hand, boys do not usually choose this area for
running games because they might trip over people who sit there, playing cards or eating.

Although girls use the COLA more than boys, they express their preference for using the physical
affordances of the grassed area (soft ground, sunny in winter, open and next to nature) as well. Their main
reason for using the canteen courtyard including the COLA is to keep their activities away from boys who
usually leave this area to play on the grassed area. Figure 2 depicts multiple activity settings created in-
between buildings in three selected schools.

The creation of multiple settings also supports the establishment of multiple separate play areas. Children
prefer to play in separate fields instead of using one large area in which multiple groups play in the same
field. The larger the number of children in a space, the more rough their play tends to be and the more
children register feelings of crowding.

**THE NATURAL ENVIRONMENT**

Bushes and trees can work as barriers around grassed areas controlling the flying balls, and making
quiet places for the use of children who are sensitive to getting hit by the balls. In contrast to ball games
in grassed areas, the nature of boys’ activities around the trees and bushes is more similar to girls’ and
does not usually come into conflict with them. The natural environment gives children (mostly girls) a
safe setting to get engaged in playing with malleable materials (e.g. wood chips, sticks, leaves and mud) in
several constructive and imaginary types of play. Both genders play chasing games behind the trees and
between the bushes. Although girls are observed using the sidelines of the grassed areas, they repeatedly
express their strong desire to the use the central part of the grassed area because they think it is a large
field and everyone is entitled to use it. Figure 3 illustrates the lines of trees in three selected schools next
to the grassed area.
DISCUSSION

This study acknowledges the literature informing the nature of boys’ and girls’ preferred activities. Consistent with previous studies, boys are observed as being more interested in traditional games and sport based physical activities whereas girls indicate a greater interest in sedentary or moderate physical activities which include verbal interaction (Baines & Blatchford, 2011; J. E. Dyment et al., 2009; Fromberg & Bergen, 2006; Pellegrini & Bohn, 2005). Although boys dominate the ball courts and the grassed area, it does not necessarily mean that girls would not like to use them. Girls frequently complain about boys taking control of the grass and the courts inhibiting their use.

The current study also supports past literature that propose that girls are more likely to use the peripheral areas and the corners compared to boys (Dyment & O’Connell, 2013; Dyment et al., 2009; Karsten, 2003; Paechter & Clark, 2007). However again, their use of these places does not necessarily mean that they do not wish to use the main grassed areas. From girls’ perspectives, peripheral areas are less crowded and interfered with by others, particularly boys. Therefore, girls select these places due to privacy and control that is often not achievable in other areas.

The natural vegetation is also found to be more inclusive for the types of activities both genders are interested (Ånggård, 2011; Lucas & Dyment, 2010; Mårtensson et al., 2014). In addition to the affordances of the natural environment which supports natural play, it provides safe settings around the grassed area in which both girls and boys, who are crowd sensitive can play peacefully.

This study shows that the design of multiple activity settings within the school grounds can support the diversity of children’s types of activities. For example, the canteen courtyard and the main grassed areas are popular for different types of activities (J. Dyment & O’Connell, 2013; J. E. Dyment et al., 2009). Although the social characteristics of the COLA and the canteen courtyard are more compatible with girls’ activities, the affordances of this area are not adequately supportive. Girls prefer the soft surface of the grass to sit, eat, talk and play rather than the asphalt.

When the school ground provides opportunities for a variety of activities, children have more alternatives for engagement in their preferred activities. This reduces the probability of children being ignored or rejected by peers and increases the opportunity for children to initiate and sustain physical activities and social skills and develop their sense of agency (Barbour, 1999; Kumpulainen et al., 2014).

CONCLUSION

The results from this study illustrate that the main grassed areas are the most problematic places with respect to gendered use. Although girls would like to use the main grassed areas, they are afraid of getting struck by the balls flying in these areas or being involved in collisions with boys running around. They use enclosed spaces such as corners, sidelines around the grassed areas, alternative courtyards rather than the grassed area to keep away from boys’ activities. They find the social characteristics of these places more supportive for the nature of these activities although, they still prefer to use the physical affordances of the main grassed areas.

This study argues that school designers need to consider this dynamic interplay between the social and physical characteristics of a setting to support both genders’ activities. They need to use the physical characteristics that alleviate the negative impact of boys’ activities on girls’ to provide more equitable opportunities for each gender to use the school ground and express their agency.
Figure 1: Examples of enclosed spaces at the periphery of major play areas which girls prefer to use from all three schools

Figure 2: Multiple settings created between buildings used for different types of activities from three selected schools

Figure 3: The line of trees and bushes provides a safe setting next to the grassed area in all three schools
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TRANSFORMING LEARNING SPACES AND THE IMPACT ON PEDAGOGICAL APPROACHES: A BEGINNING TEACHER’S JOURNEY

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Beginning teachers have a range of concerns when they commence their first appointment. Foremost amongst these is classroom management. While beginning teachers aim to meet new curriculum challenges and develop their personal pedagogical approaches, these concerns are often made subordinate to their strong desire to maintain control at a classroom management level. As a result, educational spaces often operate as zones of containment rather than spaces of learning.

Using an auto-ethnographic approach that seeks to use personal experience as a means of illustrating broader cultural experiences (Ellis, Adams & Bochner, 2010), this paper will outline one beginning teacher’s journey from adaptations to a space of containment, to an understanding that pedagogical transformation also requires a transformation of spaces – both in their uses and their design.

This paper includes photographs and spatial drawings of a science laboratory built during the Building the Education Revolution era, to outline the evolution (Loughlin, 2013) of both the science laboratory space and the beginning teacher’s understanding of the dialogic nature of space and pedagogy. According to Blackmore, Bateman, Loughlin and O’Mara (2011), there have been few studies of educational spaces that focus on pedagogical change. This paper aims to contribute to this area as well as provide some practical suggestions for ways in which beginning teachers can be assisted in understanding the importance of space to pedagogy, and then in turn, the impact of effective pedagogy on classroom management.

KEYWORDS: TRANSFORMATION, PEDAGOGY, LEARNING ENVIRONMENT, BEGINNING TEACHER.

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TRANSFORMING LEARNING SPACES AND THE IMPACT ON PEDAGOGICAL DEVELOPMENT

Education and the professional practice of teaching others has been an ever-changing field of knowledge. In recent years, the focus of teacher practice and education has shifted from teacher centred instruction to student centred learning. More recently, the development of spatial changes for learning has matched this new approach to teaching. Notably the influence of recent theories and studies, such as Hattie’s ‘visible learning’ (2009), and the 21st century learning needs of students (Chism, 2006; Fisher, 2002; Temple, 2007) have impacted upon the design and intended use of teaching spaces. Much research, although some would argue not enough (DEECD, 2009), has been done into how effective these new learning environments are and their impact on teacher pedagogies (Blackmore et al., 2011). However, the research has primarily focused on established teachers, ones who are already working within schools and classes; teachers who have transitioned, with their classes into these new learning spaces, and limited research has been conducted on the impact of these spaces on beginning teachers. This paper employs an auto-ethnographic approach to illustrate the experience of one beginning teacher, the impact of learning spaces on the development of pedagogy, and how this may relate to broader cultural experiences (Ellis et al., 2010).

Research on the impact of new design teaching spaces, specifically, those typically identified as open plan or New Generation Learning Environments (NGLEs), has identified two key factors that affect the outcomes and pedagogical products of new spaces (Blackmore et al., 2011).

1. If teachers are involved in the design process of new spaces, a greater acceptance and transition of teaching occurs - often with more positive outcomes. However, if teachers are not consulted in the design phase, resentment can build and lead to a negative outlook resulting in unwillingness or inability to adapt to the new teaching space.

2. If supported with adequate learning and training in the use of new spaces, transitions can be improved. However, without this training teachers can revert back to “default” teaching methods. This ‘default’ practice, is often a practice centred on teacher driven instruction and the containment and confinement of students. The spatial manifestation of this default practice is often visible in teachers creating walls, blocking clearways and windows with student’s works; essentially rebuilding contained classrooms through the construction of physical boundaries.

While these findings are indeed important, it leaves a large group of the teaching population unrepresented. For instance, beginning teachers face a number of challenges both in their own professional development and attempts at assimilating into schools. A survey completed by the Association of Teachers and Lectures (ATL) (2015) has revealed that almost 50% of graduates leave the profession within the first five years due to the mental and emotional strain of the job emerging from the workforce climate and the classroom itself (The Guardian, 2015). In an industry that has an aging demographic, this raises the question: ‘how are do we best support and promote the professional development those entering the profession?’

However what does this have to do with space and its impact on pedagogy? As a beginning teacher, I can speak first hand of the forgotten pressures we face. Teachers who are transitioned into new learning spaces often have the training to accompany this transition, or years of experience to assist them, and a reputation and repour with the students to reduce the strains. As a beginning teacher, you lack both the training, experience and often pedagogical knowledge. Teachers working in senior schools and specialty areas often face the added pressures of sharing their learning spaces with others. This sharing of spaces, which requires an adjustment to each other’s needs, can seem inappropriate and time consuming.
So here are the issues. As a beginning teacher you are entering into:

- A space designed to be used in ways you are yet to be taught or shown
- A pressure to perform - thus anything that may cause student management issues is generally avoided
- The need to build your pedagogy within a space that is shared
- Learning to navigate the negotiation of shared learning spaces

Using an auto-ethnographic approach, I seek to document these challenges and the developments they effect in my experience as a beginning teacher. This approach allows for reflection not only on my practice but also on the inherent impact of space upon my pedagogical developments while highlighting areas that could have been supported during this process.

**EXPERIENCES AND LINKS TO PEDAGOGICAL DEVELOPMENT**

Beginning teachers often enter the practice of teaching with wide and varied backgrounds which greatly affect their development, views and ideas of the teacher that they wish to become. I, like many others, come from a varied background that has impacted on, and shaped my development. Coming from a Biotechnology background, I am now part of a pilot education program based on an internship model at the Melbourne Graduate School of Education. Within this program, after a rigorous selection process, I as a Masters student gain my initial teacher training over a seven-week intensive course before entering into the classroom on a point 8 loading for two years, interspersed with one-week intensive teacher education programs during the summer and winter breaks. To support our development as teachers, we are guided through our transition into teaching with a delegation of mentors and clinical specialists. These experts regularly watch and review our teaching practices and guide us through the process of clinically analyzing our personal practice and the consequent effects of student learning and outcomes.

Entering that first classroom, I had definite ideas on the teaching strategies and pedagogical developments I was going to employ in the coming months. However, as like many beginning teachers, I was faced with the reality of the classroom context. The desires to meet new curriculum challenges and develop my personal pedagogies were made subordinate to the strong desire and need to maintain control at a classroom management level. This desire was reflected by more experienced staff through the classroom layout and their construction of boundaries. Gislason (2009), talks about how school culture is the scaffold for practice - something that was reflected in my experiences, in that what I was presented with as a beginning teacher, the actions and behaviour of more experienced staff, unknowingly began to shape my practice.

![Recreation of original class space](image)
The initial space can be seen in the recreation figure 1. The space was cluttered, cramped and dangerous, with zones being completely unused, windows and doors blocked to reduce outside distractions, and reflected an attempt to revert to default pedagogies and solo practices. The space had the potential to be a functioning and inviting place, yet had caused so many headaches for my fellow staff members that it had been reverted to the best of their ability, to reflect previous approaches to teaching, rather than being utilised in the open and collaborative nature for which it was designed. As Graue, Hatch, Rao and Oen (2007) highlight, the changing of space does not equal a changing in practice, particularly without the professional development to support such a change.

Initially this room, although awkward to work within, caused me no identifiable troubles. It was not until my teaching was viewed by another professional that the impact of space on my pedagogy was highlighted. I had become comfortable within the norm of practice because I had not been trained in how to change it - I was lacking the knowledge of how to change the issues around me, let alone identify them. Tripping on cables, not being able to see students or their work, and having to stand on the legs of tables just to see all the students seemed to be a normal challenge for me. Even my presence in the class was said to look uncomfortable. I had not even considered that the issues in student management I was experiencing were a result of space - rather I thought it was simply my teaching practice and lack of experience. I subsequently began the process of awakening to the importance of space to pedagogy, and in turn, the impact of effective pedagogy on classroom management.

The cycle began with a reflection on what I wanted to achieve as a teacher, what pedagogical goals I sought, and how I might best meet the needs of my students. Magnusson, Borko and Krajcik (1999) described the development of pedagogical content knowledge as a non-linear and ongoing process that is influential in the reflection process, always aiming to improve and develop knowledge of practice and students. I was not the only practitioner to use this space, and thus consultation and consent was needed for me to experiment with the room. Fortunately, I was lucky enough to be given full rain on any changes I saw fit to implement within the space. For many beginning teachers, simply the knowledge that the space needs to change is not enough, they must be given permission and guidance through this process. Remember, beginning teachers are trying to assimilate into a school culture, not to stand out.

This process of reflection may seem a normal practice for established teachers in some instances, however not in all. Teaching has changed from teacher centred transition to student centred learning, and without adequate training, teachers are defaulting to earlier pedagogies and are failing to complete this process. Thus the positive impact of these new spaces is lost and they are being reverted back into spaces of confinement. To instigate change, I needed to be able to involve hands on tasks, see and move among my students to gather formative data on their learning. In addition, I wanted to raise the discussion levels within the classroom all strategies supported by Fullen and Langworthy (2014), in the report on new pedagogies to support deep learning. I knew these approaches would work with my cohort, as they had been methods of learning and engagement that they responded best to in previous classes.

Many of the pedagogical approaches I sought to develop were based upon literature and understandings of the learning outlined by Hattie (2009), Fullan and Langworthy (2014), Driver et al. (1994), and the 20 Principles of Educational Psychology along with the developmental progressions of the Structure of Observed Learning Outcome (SOLO) taxonomy (Biggs, Collins & Edward, 2014) and Bloom’s taxonomy (Anderson, 2010), among many others. This led to the development of phase two, of the space design and instruction (2).

After implementing some spatial changes, the functionality of the key teaching zone was improved, but many issues around space usage, practical activities, safety and teaching combined classes were still in need of review. This secondary layout did however change my pedagogical approach to teaching. The
use of peer to peer learning and timely teacher feedback are identified to be among some of the largest effectors in student education (Hattie, 2009), and by allowing my students to now access each other and for me to also access my students this methodology was easily implemented. The increased ease of access to students also allowed for regular observational and formative data to be collected throughout the class, and adjustments in tasks and instruction to occur in a timely manner. Combined with research into students’ misconceptions in Science by Driver (1994), early detection of student challenges became instrumental in developing lessons and scaffolding students through tasks (20 Principles of Educational Psychology, 2015). In addition to these instructional benefits, my increased access to students and my adjustable proximity to them working affected many of the student management issues that I was dealing with. With the revised layout, the use of a variety of student management methods became easier to implement, and challenges within the class were reduced, as was the strain on my voice.

Stage three (Image 3) of development required the assistance of a colleague James O’Toole, who, working as a classroom teacher and drama specialist, had recently completed his VIT on designing functional teaching spaces with a focus on drama. It became apparent in my discussions with him that drama specialists are one of the few, if only, teaching areas in which the manipulation of spaces for academic and pedagogical outcomes was explicitly taught. Mr O’Toole, presented with a varied understanding of students’ positioning in relation to the space, the patterns of where attention would be drawn within the space, and thus was able to facilitate in formulating a design that met all of my pedagogical and safety needs was.

The final design may seem more cluttered than previous layouts, but it is the most effective adapted layout version to date. The design configuration entails:

- Three separate zones of teaching within the classroom.
- Increased safety around practical activities and demonstrations
- Two zones of operation within a functional space to simultaneously teach multi-year level classes
- Retention of clustering students to continue the group learning and discussion
- Access to connection points for ICT integration has also been enhanced

Further stages in the development of a functional teaching space will seek to improve the visual presentation of the class - ensuring students feel ownership of the room. It is hoped that this will help to develop an engaging and welcoming learning environment, and reduce the clinical and containing aspects of the original environment.

Why did all these changes need to happen in the first place and why is it so important for a beginning teacher? Reflecting back to the introduction, if a space is not designed with the teachers input, and if
adequate training is not provided, then transition into new teaching spaces has the potential to negatively affect not only the teacher but also the students’ outcomes. Every new teacher enters into practice without input into the spaces within which they will operate, and without training in how to use the spaces they are given. Beginning teachers need, the right training and guidance on how to use the spaces in which they teach.

Beginning teachers also need to be given support on modifying space to meet pedagogical development needs. The best way for this to occur is through mentoring - pairing beginning teachers with people who are willing to push and develop the practices of their staff to meet the needs of their students. As Oblinger (2006) outlined, space has impacts upon pedagogy, and without guidance, the chance of meeting the full potential of any given learning area is unlikely to be met.
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ENTERING THE TARDIS: EXPLORING THE WORKING SPACE OF A TEACHER

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ABSTRACT

Studies of learning spaces commonly focus on post-occupancy evaluations of building performance (Cleveland & Fisher, 2014), and in reference to use, on the relationship between the physical space and student outcomes (Blackmore, Bateman, Loughlin, O’Mara & Aranda, 2011). However, the school is not only a (student) learning space, but also a (teacher) working space. This perspective appears to be under-reported, with the voice and experiences of the teacher in danger of being marginalised in spatial evaluations. In particular, specialist teachers seem to be silent participants, with a ‘generic’ teacher being the representative of the profession. This presentation draws on a pilot study that explores, using an observational metric tool and participant art specialist interviews, teacher topologies in the art room. This pilot study will lead to research that develops evidence concerning the similarities or differences between subject-specific teacher use of space, the relevance of this phenomenon to our current understandings, and, through teacher voice, will inform that previously elusive concept of subject-specific utilisation of learning spaces.

KEYWORDS: TEACHER PRACTICE, SUBJECT SPECIFIC SPACE USE.

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How school rooms should be configured, and the reasons for this has been debated for quite some time. From the constraints of classrooms designed for large groups of students sitting in rows of desks, through Dewey’s Laboratory School to the new learning environments of the early twenty-first century (Burke & Grosvenor, 2008; Cleveland & Fisher, 2014; Dudek, 2005; Imms, Cleveland & Fisher, 2016), the design of the classroom has been an important element in what educators think of when learning outcomes of children are discussed. Perhaps the most explicitly outlined was the ‘Third Teacher’ concept of the Reggio Emilia pre-schools in Italy, which describes a pedagogy of relationships between child and environment (Edwards, Gandini & Forman 1998; Strong-Wilson & Ellis, 2007). In the last decade, more overt connections between the physical learning space and learning outcomes have been made (Blackmore, Bateman, O’Mara, Loughlin, & Aranda, 2011; DEECD, 2008; Lippman, 2010). Responding to these, Australian governments have financed the building of new educational spaces in the hope of improving student outcomes.

The trends in the literature have pointed to an evolution from the term ‘classroom’ to ‘learning environment / learning space / creative space’ and other similar iterations within which the virtual and the physical may co-exist. With this terminological shift comes an allied shift to the outcomes for students, including the conscious presence of the student voice. An aspect of this growing interest in the relationship between the learning environment and learning outcomes has been an appreciation of the need to teach for creativity (though definitions of which can be fluid), leading to a commensurate interest in creatively designed spaces. If the space is creative, then, ipso facto, creativity will be elicited from the students. However, there appears to be a dearth of literature as to how the teacher is positioned within this equation, either becoming a cypher through which prescribed outcomes and behaviour may be monitored rather than an active participant within the educational environment, or not being considered at all. Without understanding how teachers’ perceptions of learning environments and their place within these intersect with their practice, development of educational building design will be lopsided in scope and outcome, and may be short-lived.

However, there is silence regarding how subject specific teachers actually inhabit their work space (Fisher, 2005). The notion of educational space being designed with specific spatial qualities for particular pedagogical activities, as proposed by Fisher (Boone, 2010), aligns with Boone’s (2010) suggestion that students have different learning styles that require classroom spaces with their preferred modality. In addition, specialist subjects, such as visual arts, require specialist spaces. However, little is known about the prerequisite affordances of such spaces and how these are utilised by the specialist teachers.

Anecdotally, visual arts teachers use their spaces in a different manner than other disciplines. Why this is so, is difficult to ascertain without evidence. Is it based on the individual teacher’s perception of their space, and the inhabitation of it? How does the process of teaching, and making art exist within the context of the perceived art space? Are there any connections between the perceived space and the design qualities and affordances described by Thomas (2010) - these qualities being considered intrinsic within an arts curriculum?

In my doctoral research I explore how visual arts educators use the educational space to enhance learning. To find a suitable measuring tool for my study, I took the opportunity to test one out during the transition from the old Melbourne Graduate School of Education art space to the new one, studioFive. This is a place where pre-service teachers, both generalist and specialist, are trained. In the current study, I present a small snapshot of the preliminary findings, focusing on one teacher’s practice.

The old art space was recognisable to any person who has either been a student or an art teacher. It was a rectangular box with a paint-spattered concrete floor, one wall with floor to ceiling storage next to a studio technician’s office. The opposite wall had the data projector, a teacher’s table with computer, and a
whiteboard. In between were closely-set tables and chairs that were seldom moved, being both heavy and noisy—so noisy that offices on the floor below complained when students moved their seats. The most surprising element for a visual art studio was the lack of windows. Any natural light came from skylights. This did, however, allow for the walls to have lots of art examples to peruse. I sat at the back of the room, observational metric tool at the ready. The students had been told about my presence - that I was there to observe their teacher. Other than a brief smile from one or two of them, I seemed to be ignored.

From the start, I noticed the dynamic movements of the teacher. She had set up the art experience previously but rather than positioning herself behind the teacher’s table, she moved swiftly from one area to another, asking questions, giving directions, and provoking discussions. A student’s question elicited a drawing on the whiteboard which required information from the internet, which led to processes being described, materials being handed out and further questions, from both the teacher and students. It happened so quickly that I had difficulty keeping up with the observational metric tool. This was not a clean, linear progression through a scripted lesson; rather it seemed more like a musical improvisation, punctuated periodically with discussion and mutual laughter. As the students became more focused on their own art works, voices became more muted. The teacher, walking between the tables, made suggestions and offered insights. When one of the students asked about a particular aspect, the group’s attention was sought to offer advice before retreating back to their works in progress. The effect was of a mentor working alongside apprentices, albeit in cramped circumstances.

I next viewed this teacher and her students after they had moved to the new area, studioFive. They had been there for only a short period and had to acclimatise rapidly to the new affordances the space had to offer. It had been designed to be flexible, adaptable and a place to model current art teaching practices to pre-service teachers. There was no designated teacher space and it was open to observers from many viewpoints as glass walls punctuate its rhomboid-like form. Walls can be pushed back whilst tables, chairs and easels can be moved easily. Three large, black C.O.W.S.—computers on wheels—are situated in the area, able to be plugged into a variety of points. Natural light from the eastern and southern windows suffuses the space and is bolstered with banks of lights.

The students had created their own areas of making and peer-teaching within the larger space. Interestingly, I was no longer drawn to the teacher as the primary focus. There were pockets of activity occurring in different areas and in different configurations. The teacher now moved more between groups and individuals, rather than directing the whole, as the responsibility had shifted from teacher to student. Moving between roles with seeming ease, she directed her students’ attention towards a particular task when needed, but rather than dictate their work, the students were given the space to explore their own responses. When a question was directed towards her that would benefit others, she called the group’s attention and discussed the issue with them, describing it to me as being akin to blowing up a balloon.

The ‘how’ of the teacher’s practice was clear but it was the ‘why’ that equally piqued my interest. She was an experienced teacher, having taught for over 15 years and had worked in a variety of schools. I wanted to know what was behind her methods in such disparate spaces and at the start of our interview I asked her what she perceived to be her role.

She was forthright in her view of herself as both an artist AND an art teacher. Part of this stemmed from her art teacher mother who had immersed her in the art world from an early age. This had then been further developed during her time in a fine arts college where she worked in huge open spaces, in a variety of art forms, curating both the space and the art. This experience directly led to how, as a head art teacher, she worked to achieve something similar for her secondary students. She viewed the understanding of the process of making art as vital, and the space where art was made as an important
part of this understanding. To this end, she worked closely with an architect in redesigning the art wing
to somewhat simulate the shared spaces of the art college. After initial hesitation from her colleagues,
they embraced the possibilities presented and students could fluidly move between classes to get feedback
from different audiences and teachers.

I asked her about how space impacted on her teaching, and her view was that she could teach art
anywhere, just as art can be made anywhere. She could, she said, even work in a shed. Her teaching was
not predicated on the space. She viewed an available space as the perception of its possibilities, rather
than its apparent constraints, that mandated its actual use. The question for me was, if she can teach
anywhere, could her students learn anywhere? Would their learning experiences be ‘better’ if the space
was designed for flexible learning? Is space important for learning or not? I was really interested in how
her students reacted to her practices within the space? Though her view of the room was positive, she felt
that it had not changed her practice. Rather, the ability for the students to move to their own space, to
work without interrupting others or being interrupted, to work individually or with others, and to touch
base with her when needed, fitted into her ethos of being a facilitator of knowledge. A particular aspect of
the new space that interested her was that the students were able to utilise the space to develop their own
projects and then share these with their peers and others.

The observation of one visual art teacher cannot lead to definitive, causative statements about how art
teachers as a group use classroom space. This representative did not consider space to be a container of
learning but rather as a place of possibilities for herself and her students. This experience has left me
with more questions than I initially had. The use of the observational metric tool allowed me to collect
evidence on how teachers work. However, it is also necessary to explore why they approach the space in
the ways they do, so that their positioning within the learning environments debate may be given a voice.
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I CAN SEE CLEARLY NOW THE WALL IS GONE: SITUATED PROFESSIONAL LEARNING IN A COLLABORATIVE INNOVATIVE LEARNING ENVIRONMENT

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ABSTRACT

The development of effective collaborative teacher practice within Innovative Learning Environments (ILEs) in primary schools forms a critical component that might underpin how successfully they operate. For many teachers, this shift into new and shared spatial settings may well coincide with increased levels of openness, visibility, deprivitisation of practice and opportunity to learn from their colleagues. Physical proximity, however, does not guarantee this learning, although professional exposure is perhaps more inherently assured. In such an environment, where does the difference lie between seeing and observing? And what role does feedback play between colleagues? ‘What’s working’ can perhaps therefore be constructed in terms of predominant cultural conditions, shared understandings, and teachers’ capacities to ‘be comfortable being uncomfortable’.

This article draws on material from a wider study on teacher collaboration in ILE, and presents findings from data conducted in one of the New Zealand primary schools case study sites. It utilises data collected through interviews with principals and teachers, and observations of teacher teams practicing in ILEs. It reflects the notion that while spatial proximity may well present opportunities for teachers, it also presents complex challenges at the professional, social, and cognitive level.

KEYWORDS: COLLABORATIVE TEACHER PRACTICE, MODERN TEACHING ENVIRONMENTS, SPATIAL PROXIMITY.

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INTRODUCTION

Considering teacher collaboration spatially in primary schools, typically has presented something of an oxymoron. Traditional classroom settings have perhaps remained true to their maternal brief, creating nested sets of compartmentalised relationships between teachers and students. The four walls of classroom ‘built pedagogy’ (Monahan, 2002), proliferated, have in turn optimised settings for high levels of professional autonomy within relatively isolated physical domains (DuFour, 2011; Elmore, 2012; Flinders, 1988; Lortie, 1975). Consequently, the traditional place of primary school professional practice has long been regarded as relatively private, moderately invisible, and one that encourages a level of individual teacher territorialisation (Little, 1982). All in all, not one that has necessarily been conducive to effective collaboration. Accordingly, collaboration and the professional learning that accompanies it, has been frequently noted as ‘visited’ activities - activities that teachers have left their individual classrooms to engage in (Forte & Flores, 2013; McGregor, 2003).

A shift into many ILEs potentially changes this. The adoption of design typologies (Dovey & Fisher, 2014) that afford up-scaling of student cohorts and co-location of teachers, along with the provision of pedagogically purposeful interiors, create fresh professional socio-spatial assemblages. In doing so, they challenge the traditional divide between public and private teacher practice, relationships with colleagues, as well as bringing a level of accessibility and the immediacy to learn from one another. Situated professional learning, a constituent of ILEs, has often formed a rationale for spatial change within primary schools (OECD, 2013).

This is not to say that individual and private practice should be construed as a negative virtue. While privacy may conjure notions of secrecy with its inherently undesirable and subversive undertones, there are countless examples of highly effective and innovative practices taking place in traditional spaces (Hattie, 2009). Spatially, however, as Clandinin and Connelly (1996) note, individual teachers’ classrooms have been frequently viewed as relatively safe professional spaces, located at the junction of theory and practice, an area of professional knowledge where “teachers are free to live stories of practice” (p. 25). In essence, teachers have been able to judiciously select what to share with colleagues; what Levine and Marcus (2010) refer to as our ‘face’ of practice.

VISIBILITY

The theme of professional visibility tracks across the literature terrain of contemporary learning environments; whether explicitly through architectural representations of space or implicitly through emerging understandings of contemporaneously relevant practice, changing pedagogy, and the nature of teacher collaboration. Frequently, it is underpinned by a systemic intention to create deprivatised and transparent practice (Fullan & Langworthy, 2014; Hattie, 2012). Corresponding parallel spatial innovations on one hand, therefore, send a message about the pedagogical intentionality of the space in terms of ‘opening’ practice (Hayes, 2006). Here, teaching and learning is ‘visible’, “exposed to the witness and critique of others” (Campbell, Saltmarsh, Chapman, & Drew, 2013, p. 212). Their design is considered symbolic of increased ‘openness’, in providing the antithesis of ‘single-cell’ classrooms (Horne, 2004).

Increased visibility within schools and between teachers has been viewed as a desirable affordance of new learning environments (Nair, Fielding, & Lackney, 2009; OECD, 2013). Consequently, it has often been implemented as a design element in many ILEs, often observed in the reduction of enclosed ‘classroom’ spaces and with the provision of internal glazing (Gislason, 2007). Visibility has also been noted as a mechanism that impacts on teaching practice in creating increased levels of scrutiny (Alterator & Deed, 2013). In assessing this, Alterator and Deed (2013) noted teacher concerns over reduced privacy, an
increased pressure to perform, as well as a sense of “being judged” (p. 322). Additionally, Prain et al. (2014) indicated that some teachers viewed this as an unwelcome change, due to perceived distractions and the idea that “visibility inhibited their usual personas with students” (p. 201).

PROFESSIONAL LEARNING

Increased visibility resulting from a move into ILEs with collaborative teacher practice appears to manifest in traditionally ensconced practice emerging into the public domain. And with this, the belief that the enlarged spatial setting will in turn provide a context for meaningful professional learning through observation of colleagues’ practice (OECD, 2013). Prain et al. (2014), noted that in ILEs characterised by larger open spaces and internal glazing, enhanced visibility gave rise to an increased capacity for teachers to observe through “vistaed visibility (or multiple framed visual perspectives)” that “acted as enablers for teachers to consider new ways to imagine and enact curricula” (p. 198). Additionally, Alterator and Deed (2013) identified that increased visibility afforded by closer proximity and open environments led to increased informal exchanges between teachers. Similarly, in the Campbell et al. (2013) case study, teachers reported a level of ‘incidental professional learning’ often mimicking or appropriating techniques and ideas. In addition, it was easier for teachers to see how experienced colleagues handled particular learning and behavioural situations with students. For Campbell et al. (2013), this meant that “new cultures of practice emerged that came to see teaching as a shared practice”. Here, professional learning is viewed as a reciprocal group knowledge production activity, characteristic of Lave’s (1991) community of practice, where teachers engage in joint problem solving with a shared focus. However, as Stoll, Bolam, McMahon, Wallace, and Thomas (2006) identify, undertaking learning with colleagues can entail a degree of risk.

Teachers are unlikely to participate in classroom observation and feedback, mentoring partnerships, discussion about pedagogical issues, curriculum innovation, unless they feel safe. Consequently, colleagues need to establish high levels of relational trust (Bryk & Schneider, 2003) between teachers working collaboratively - not always an easy goal to achieve when commonly collaborative teacher teams are constructed externally in a ‘contrived’ manner (Hargreaves, 1994). Hence, within ILEs where ‘deprivitisation’ is viewed as a fundamental motivation behind a shift towards new generation spaces through its capacity to expose and make visible teacher practice, attention is needed to the way this is enacted and mediated through cultural norms (Campbell et al., 2013).

OBSERVATION AND ‘SEEING’

Observation of teacher practice has become a characteristic of successful Professional Learning Communities when combined with reflective inquiry, openness and mutual respect (Bolam, McMahon, Stoll, Thomas, & Wallace, 2005). Furthermore, observation coupled with a feedback cycle that leads to ‘double-loop learning’ impacts on embedded mental-models (Argyris, 1976). In doing so, those that challenge incumbent teacher ‘theories of practice’ (Schon, 1983) are, as Hattie (2012) notes, more likely to lead to a sustained change in the way that teachers understand their practice. In this context, observation is closely associated with being planned, predetermined, and negotiated; at times associated with coaching practices, but also with appraisal and professional standards. In contrast, incidental learning enabled simply by being physically ‘present’, is unplanned, less predetermined and non-negotiated. For teachers within collaborative ILEs, much of the professional learning is encountered in this manner, although as Campbell et al. (2013) note it does not automatically lead to the development of effective learning communities, although, it may develop heightened levels of self-awareness through the act of
observing others (Gebhard, 1999). However, the immediacy and availability of access to a colleague’s practice may also present tension in terms of the role, and timing of relevant discussion and feedback, with individual teachers responsible for making decisions or seeking permission to discuss ‘what is seen’.

**SPATIAL PRACTICES**

Here, the distinction between observation and ‘seeing’ presents an interesting terrain for teachers to navigate through collaborative ILEs. Prain et al. (2014) noted that although new built environments acted as a catalyst for change, they did not automatically alter pedagogy or teacher behaviour. However, manifesting themselves in self-determined ‘anti-scrutiny’ practices, teachers’ efforts to avoid unwanted attention were well documented amongst accounts of resistance to open-plan classroom settings (Tanner & Lackney, 2006). More recently, as Saltmarsh, Chapman, Campbell, and Drew (2014) observed, “teachers had strategically positioned bookcases and other items of furniture to block the views of colleagues who were disliked or mistrusted, and to shield themselves from unwanted scrutiny” (p. 8). Spatially and pedagogically, this resulted in an effective co-habitation of teachers within space, rather than collaboration.

Notably, from a Foucaultian perspective, visibility or the privileging of visibility of one party over another, gives rise to a potential (and possibly intentional) power imbalance (Foucault, 1977). Although, historically, designs of school buildings have afforded passive surveillance over children (Dudek, 2000), many contemporary ILE teachers are as observable as the children. In addition, Prain et al. (2014) noted that a desire for transparency may create a sense of “unwelcome monitorial panoptic control over teacher behaviour in open settings” (p. 201). The extent to which professional exposure then becomes interpreted as ‘availability to be observed’, remains a feature that teachers will have to navigate and negotiate their way through, as well as to spatialise into an everyday practice (de Certeau, 1984).

**METHODOLOGY**

I illustrate some of the emerging findings from a three-phase study investigating the interrelationship between teacher collaboration and ILE. The first phase consisted of interviews with selected educational leaders across New Zealand to identify key themes as well as potential research sites. Subsequently, a set of snapshot case studies were conducted in six primary schools, with selection based on spatial settings, evolution of collaborative practices and recommendations from key informants. This built on the notion of Reputational Site Selection (Goetz & LeCompte, 1984; LeCompte & Schensul, 2010), as well as the practice of identifying and examining practice in exemplar learning environments (Blackmore et al., 2010; OECD, 2013). Data was collected through observations, semi-structured interviews with principals, and focus groups of teachers and students. Three of the schools were then identified for in-depth case studies (Stake, 1995), with data collected through field journal observations, interviews and documentation. Data was analysed using thematic narrative analysis (Riessman, 2008). The current data was gathered from one of the Phase 3 sites, Parkside Primary School.

**CASE-STUDY SITE**

Parkside Primary is a century old, Year 1-8 semi-rural primary school on the urban periphery, in a region that has seen major rebuilding following the 2010 and 2011 earthquakes that rendered existing classrooms unusable. The newly occupied ILE that formed the site of inquiry was home to approximately 140 students (Year 2 and 3) and five teachers. They were grouped in a 2 and a 3 teacher split across two large spaces in adjacent ends of the building, connected by a set of glass doors. Each space contained a central open area, surrounded by several smaller and larger breakout rooms. Between the two spaces...
was an additional room, accessible from both sides, as well as a shared teacher workspace. Each teacher had responsibility for a ‘class group’ of 25-29 students with opportunities taken to group in alternate ways. The team had invested significant work into establishing norms around collaborative practice and processes during the transition from traditional ‘single-cell’ environments. Except for one of the teachers’ team, a second year ‘beginning teacher’, all others had been staff members for many years.

**OBSERVING AND ‘SEEING’**

The spatial settings offered by the recently occupied ILE were seen by participants as more in tune with contemporary requirements, as well as playing a significant role in providing good models of learning and teaching practice. Teachers and leaders viewed enhanced collaboration as a positive step towards deprivatising practice in terms of professional growth, accountability, and an opportunity to share good practice. But the transitional stage from the relatively private realm of individually ‘owned’ classrooms to a shared space was reported to be a paradigm shift in thinking and practice by most teachers:

“We’ve always been the king of our own castle, and doing our own thing. And not seeing many other people doing what we do, because you’re in there on your own.” (Danielle)

Consequently, it was acknowledged that the inhabitation of the new space constituted a significant departure from traditional spatial practices and therefore presented attendant issues. Visibility was one of these issues. From the data, examples of how professional visibility altered or steered practice emerged. Contrasted with a classroom spatial setting, where teachers largely mediated what was seen, and by whom, there was a broad recognition that practice was now in the public domain. Noticeably, public was often appropriated as an adult-adult concept, generally exclusive of children. Accordingly, teachers’ concerns over the nature of their practice were frequently couched in terms of concerns over perceived quality of their own performance. For some teachers, this initial ‘fear’ prompted by a heightened level of professional exposure, had been significant in manifesting itself in self-questioning. As Lucy explained:

“We weren’t used to people observing us. We always got worried. Are they doing this? Are they doing that? Now it’s just such a natural thing.”

Some teachers were less comfortable with this, particularly when they regarded themselves as early in the stages of learning their craft. Danielle, a second-year teacher, remarked that although she recognised the ideal collaborative teaching approaches and appreciated having the support of others around, certainly in the initial months, she felt a heightened sense of nervousness when colleagues were present. As she reflected, “I think it’s just the feeling of having them there watching me. It’s not the children, it’s the teachers, and it’s taken me a while to realise that”. For Danielle, the occasions that caused concern were when she was leading learning with a larger cohort of students (approximately 80). Here, the notion of mistake making and ‘maintaining face’ in view of colleagues was a determining factor; “I don’t know, I think I’m afraid of probably making mistakes in front of teachers”. For Mary, her more experienced colleague, although “being exposed as teachers” had been an initial concern, she concluded that now “I feel comfortable in front of the team”.

Although teachers noted that they had not engaged in much formal observation, informal observations and incidental learning had been prevalent. Teachers acknowledged multiple examples of what they had incidentally seen occurring, and consequently, how their own practice as well as pedagogical content knowledge had changed. As Lucy commented “there’s just a lot of development all the time, and it could just be that you just spot someone doing something”. Specifically, teachers cited that this caused them to reflect on their own practice. Lucy continued:
At times, the gap between observation and adoption was recognised to be very brief, reminiscent of Campbell’s (2013) mimicked and appropriated practices. As Lucy noted:

“I was sitting over there and we were teaching a similar thing about vowel sounds but to different ability levels, and I saw Alison doing something, and thought, oh that looks good, I’m going to steal that idea, and just did it right there, and it worked with my kids. Great, it was just something that I hadn’t thought of doing.”

The relative openness that the ILE afforded, offered increased visibility both across space (the room) and through space (glass). Furthermore, the central open space was understood to potentially offer flexibility to create particular learning settings through the provision and layout of furniture. At Parkside Primary, the model of teachers adopting particular placements within this open central area, particularly for use as their ‘home-base’, was prevalent. In doing so, the placement of furniture could either intentionally or not, have created opportunities to be seen, or as Saltmarsh et al. (2014) noted, to avoid scrutiny and be more hidden.

In this case, the team of three teachers occupying one end of the building had intentionally identified new spatial arrangements to learn from one another. As Lucy noted, “we actually made sure we could all see each other from each angle”. In the central space of their ILE, the three teachers positioned themselves next to their teaching stations (flat screen TVs mounted next to small whiteboards), so that while sitting on the ‘teacher’s chair’ they faced the centre of the shared space, as well as each other. “I like the fact that we can see each other”, remarked Alison. The visibility was observed to have created connections and helped to support conditions that enabled cross-room verbal and non-verbal communications, and reflected a highly collegial approach where sharing of stories and incidental celebrations were highly valued. Lucy noted that:

“You have those awesome moments as well where you (and that’s why we’ve positioned ourselves so at the start of the day or whenever, in a teaching station area) - we can see each other, because there’ll be something that happens as you can just catch one another’s eye and having to giggle, or ‘yeah they got it!’ Or something like that. That’s the really cool part isn’t it?”

While this was perhaps more indicative of what Hargreaves (1994) might note as collegiality rather than collaboration, it reflected a high level of trust between the case-study teachers. A similar practice was observed between the pair of teachers in the other part of the ILE.

For teachers, both observation and seeing had quickly become understood as integral to the new spatial arrangements. Where the data revealed a grey area was between ‘what was seen’ and what was done as a result. Teachers often showed reservations about giving colleagues critical feedback in these ‘seen’ situations, and instead would more commonly determine feedback to be a component of pre-planned observations, particularly for appraisal and mentoring purposes. Feedback was reported to occur but was often self-sought, mirroring Campbell’s (2013) notion of the way the de-privatisation of practice is enacted and mediated through cultural norms. For example, there was recognition that Mary had particular expertise in writing. As Lucy explained:

“Because writing is probably my weakest area (and it always has been), and Mary’s amazing - and so often I’ll just say this is what I’ve done, I don’t think it was correct or I’m just not quite sure where to go next, can you give me some advice on how I could sort of take that to the next stage? So she’ll do that and that’ll just sort of spur me on a little bit more. Whereas in my own classroom, I may not have asked for her feedback because she wasn’t right there.”
Although school leaders commented that it was desirable for “teachers to be giving each other’s feedback and challenging each other’s thinking” (Stephen), it was recognised that, “it was still an area for growth” (Janet). Correspondingly, for school leadership, there was a desire to help create the conditions whereby teachers could be more ‘comfortable being uncomfortable’ in these situations.

**VISIBILITY AS A ‘THRESHOLD CONCEPT’**

With this in mind (or in sight), professional visibility may be advanced as a ‘threshold concept’ (Meyer & Land, 2003) for teachers cohabiting in ILEs. According to Meyer and Land (2003), a threshold concept “represents a transformed way of understanding, or interpreting, or viewing something without which the learner cannot progress” (p. 1). To use Meyer and Land’s definition, threshold concepts are transformative, possibly irreversible, and integrative; transformative in that understanding can lead to shifts in perception or thinking; irreversible in that they are “unlikely to be forgotten” (p. 4); and integrative in that it exposes interrelatedness to other key ideas, here to aspects of professional learning. Correspondingly, difficulty in understanding threshold concepts may well, as Meyer and Land (2003) suggest “leave the learner in a state of liminality, a suspended state in which understanding approximates to a kind of mimicry, or lack of authenticity” (p. 10). Furthermore drawing on Foucault (1977), Meyer and Land (2003) suggest that threshold concepts may well, “exert a ‘normalising’ function” (p. 10). The evidence from the Parkside Primary suggests that professional visibility had become a ‘normalised’ practice.

**CONCLUSION**

As teachers shift from classrooms to collaborative ILEs, teacher practice and behaviour emerge from relatively private into the public domains. Primary school spatial settings with desired affordances of openness and transparency, while responding to contemporary pedagogical beliefs and a determination that the co-location of teachers is optimum, create new and complex socio-spatial assemblages, in which professional visibility comes prominently into question. For many teachers, observation brings with it connotations of having been predetermined, premeditated, and negotiated, often associated with appraisal and more formal feedback requirements. In contrast, ‘seeing’ is more closely connected to the incidental, the unplanned, and the undisussed. Within the case study ILE, there was a recognition that both observation and seeing had quickly become understood and normalised as integral to the new spatial arrangements. Consequently, for teachers, the capacity to be ‘comfortable being uncomfortable’ in terms of being both observed and observer, seen and ‘seer’, would appear to be a bottom line expectation.
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DON’T SHOOT ME, I’M ONLY THE ARCHITECT: EXPLORING THE COMPLEX INTERACTIONS BETWEEN DESIGN, PEDAGOGY AND SCHOOL CULTURE

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ABSTRACT

Architects and school leaders are integral to the process of procuring, designing, constructing and using innovative learning environments (ILE’s). However, the following questions arise: How much do they know of each other’s professions? What can both groups potentially contribute to the development of ILE’s? Is it only luck that results in a successful ILE project?

There is a groundswell of support for schools to move towards the development of student-centric pedagogies and many schools and educational organisations are procuring new, flexible environments to support and enable this change. However, as schools become aware that the construction of a space is not necessarily the key factor in modifying teaching and learning practice, the focus is shifting towards the analysis of complex non-design factors that impact the successful inhabitation of the space.

There are critical moments in the school procurement process during which architects and educators could work more closely with each other. Early engagement enables the architect to develop a deeper understanding of the pedagogical vision to inform the architectural brief and schematic design. Concurrently, while working with the architect the school community becomes more aware of how space and pedagogy are interlinked. A relative blind spot in current research is an understanding of the complex cultural and organisational factors that have an impact on the end-use effectiveness of physical spaces.

Using a recently completed single school project and drawing on professional experience and a critical review of current literature, this paper proposes an early outline for a PhD thesis investigating the complex relationship between the key stakeholders that contribute to the design of both the physical and social factors that shape new learning environments.

KEYWORDS: ARCHITECT, SCHOOL LEADER, DESIGN, PEDAGOGY, SCHOOL CULTURE, REFORM, LEADERSHIP, CHANGE MANAGEMENT.

David Clarke is a Principal of Clarke Keller Architects, a Canberra based practice focused on the design and delivery of innovative educational, community and residential environments. Gained through more than 15 years of working with schools on the design of new facilities, David has developed a real insight into the interplay between space, technology and pedagogy and has a strong understanding of how these factors can be modelled to develop truly collaborative learning environments. He has a special interest in the broader application of design theory to problem solving and project parameter determination within the education sector. He is a PhD candidate in the Graduate School of Education and LEaRN at Melbourne University. His research is focused on the alignment of organisational and cultural factors that can impact upon the successful utilisation of contemporary teaching and learning spaces.
INTRODUCTION

This paper is based on observations from private professional architectural practice work within the primary and secondary school sector. The paper provides a review of relevant literature and sets out a possible methodology for the author’s own research into the topic. Still at an early stage of research (Year 2 of a 6 year part time PhD), this paper asks more questions than it answers.

THE ISSUE

According to the Australian Bureau of Statistics, approximately A$4 billion dollars of construction work is completed in the combined private and public education sectors each year in Australia (ABS, 2016). With the current focus on the development of flexible, student-centric teaching and learning spaces, it is reasonable to expect that such investments are intended to support current teaching and learning practices and outcomes. Anecdotal evidences, and observations by the researcher, suggest a possible mismatch between the anticipated and real outcomes in the utilisation of innovative learning spaces, and that this discrepancy may stem less from the physical environment and more from the cultural and organisational one in which a project is commissioned and delivered.

The proposed research is intended to inform and help determine strategies to assist school leaders and architects in improving newly constructed teaching and learning environments so they may be successfully utilised, in keeping with the way they were briefed and designed.

ARCHITECTS AND SCHOOL LEADERS – THE KNOWLEDGE CROSSOVER

In what amounts to an extraordinary, unquestioned leap of faith, the design of new teaching and learning environments relies upon architects who may have little or no understanding of the pedagogical underpinnings of the environments which they are designing – and concomitantly being briefed by school leaders, who may have little or no understanding about the impact of building design upon the pedagogies they are promoting.

Consequently, it is somewhat common for a project’s educational framework to be ‘unstated, or unknown to, or unshared’ by those for whom it is being designed (Jamieson, Fisher, Gilding, Taylor, & Trevitt, 2000). If the effectiveness of ILEs appears to be more successful when aligned with pedagogy (Cleveland, 2011) and if learning activities in a learning space need to be underpinned by pedagogy to be effective (Ling & Fraser 2014), is it critical that the pedagogical intention forms the fundamental basis of learning and teaching space design? Are the roles of the two most critical members of the process of creating new learning environments clearly understood and defined? And if not, then why?

The way in which educational projects are procured plays into this dilemma. Acknowledging that in a system made complex by funding frameworks and restrictions, delivery pressures, educational expectations and pedagogical divergence, the most fundamental decisions that affect project outcomes are made during the briefing stage (Blyth & Worthington, 2010). Organisational and cultural factors within a school community may also have an impact on project outcomes and reinforce a transition from a teacher-centric to constructivist student-centric pedagogy.

CONTEMPORARY LEARNING ENVIRONMENTS – THE CHALLENGE

If the space that enables constructivist pedagogies is flexible, future-proofed, bold, creative, supportive and enterprising (JISC, 2006), then the question arises – to what purpose? Who, or what, is at fault if spaces designed for these attributes are manipulated by teachers to re-create familiar single cell classroom environments i.e. all doors / screens closed, furniture arranged in rows, teacher at the front
etc? The spatial design? The teachers? The pedagogy? The school? Or is it more complex than that? Is it beyond the claim that it is old pedagogies being played out in new spaces? What role might architects and school leaders play in the success or failure of such projects?

If, as Elmore (2016) states, ‘learning has already left the classroom’ as a consequence of ubiquitous student access to mobile technology, and if Zhao’s (2015) assertions about the requirement for a fundamental paradigm shift in education are true, then schools and their teachers have an enormously complex change management task to manage. They need to respond to global shifts in skills requirements and employment opportunities, to technology that can both enable great learning and simultaneously obfuscate and distract from it, and recognize that teachers must become both guide and learner in a new arrangement of school hierarchy.

When teachers have to adapt to new, untested, unrehearsed ILE requirements, it may not be surprising that it is not always embraced and often instils fear and resentment even among the highly principled professionals in our society.

**IS HISTORY REPEATING ITSELF?**


The schools developed at the time with the Plowden principles are now widely considered to be failures (Adelman & Walker, 1974). Critical hindsight revealed that there was misguided focus on physical space as the generator of educational reform, and deficient focus on the changes required by the people within the system. Furthermore, Plowden’s expectations that the vision espoused in the report would be taken up widely was similarly unwarranted, as it was based upon a small number of innovative teachers’ observations in a small number of schools (Brogden, 2007).

Shining contemporary examples of schools exist in our region where spatial affordances and pedagogical reforms are fundamentally aligned (e.g., Northern Beaches Christian School, Sydney NSW; Stonefields School, Auckland NZ), and form the inspirational focus of many learning/space design conferences. However, my observations, supported by dialogues with school leaders across Australia and New Zealand, leads me to believe that there are more failures than successes, and it is my assertion that failure, at its core, is due to a lack of focus on the human aspect of educational reform – reflecting the Open Plan movement to the 1960-70s.

Historical interpretation of events within educational research is critical in ‘a paradigm that argues about the social construction of knowledge’ (Popkewitz, 1998, p. 339). Furthermore, ‘swings in the pendulum’ of educational reform (Sherman, 2009) and ‘innovative panaceas, often unrecognized for their similarities to past reforms...’ (p.44) should be heeded and responded to proactively.

It would be a great pity if current educational reforms falter because of fast-tracked capital development programmes that are completely out of step with those for whom they are instigated.
What then are the possible factors outside the spatial design that may impact on the successful occupation and inhabitation of an ILE? My observations have led me to three areas that I believe require further research to determine what role they may play in the successful occupation and inhabitation of an ILE:

- Cultural and organisational change
- Leadership
- Teachers’ professional development

**CULTURAL AND ORGANISATIONAL CHANGE:**

The constructionist principle of the appreciative inquiry philosophy states that “human knowledge and organisational destiny are interwoven” (Cooperrider & Whitney, 2001, p. 416). To be effective as executives, leaders, change agents etc., we must be “adept in the art of understanding, reading, and analyzing organizations as living, human constructions” (Cooperrider & Whitney, 2001, p. 416). The reason that this seems applicable to educational reform lies in its acknowledgement of the ‘human’ in organisational change. Appreciative inquiry suggests (amongst other things) that reality is socially created, change can start with questioning the status quo, and that human systems move in directions of their images of the future. How then can sustained and positive reform within schools be supported?

Within the educational reform literature there is considerable support for the encouragement of change in teacher practice at the core of reform efforts (Woodbury & Gess-Newsome, 2002). There is also recognition of several barriers to that change:

- Failure to recognise need for change (Greenberg & Barron, 2000);
- Previous unsuccessful efforts & fear of the unknown (Greenberg & Barron, 2000);
- Threats to expertise (Greenberg & Barron 2000; Fullan, 2001);
- Threats to social and power relationships and resource allocations (Robbins, 2000)

These are not easy barriers to overcome. In a school where there is a known appetite at the executive level for pedagogical change, these barriers can become entrenched within the teacher cohort unless each one is comprehensively addressed. To do so requires that systems and structures be put in place to “enable staff at all levels to collaboratively and continuously learn and put new learnings to use” (Silins, Mulford, & Zarins, 2002, p. 616), as well as to recognize that reformers’ main challenge must be viewed as structural reorganization, not of stable tasks with a stable purpose, but of redefinition of purpose within a changing environment (Argyris & Schon, as cited in Mulford, 2005).

This research suggests that fostering a culture of change within a school may impact the success of a new ILE project. If that is the case, then what is the evidence for the above mentioned assertion? And can an architect validly play a role in the process of the school seeking to use a new building project to transition to a contemporary pedagogical model? What might that look like, given the perception of the architect’s role within the process?

**LEADERSHIP**

Whilst there are concerns that discussions around leadership with a focus on individual sovereignty marginalises relevant contextual conditions (Wilkinson & Kemmis, 2015), there is considerable evidence to suggest that individual leadership has a significant impact on a school’s pedagogical trajectory.
Fullan’s (2002) concept of the Cultural Change Principal suggests what is necessary from a school leader if cultural transformation is to occur. Fullan proposes that school leaders need to be sophisticated conceptual thinkers attuned to the big picture, collaborative and people-focused. He notes that charismatic leaders are unlikely to foster sustainable change and fostering great teachers is at the core of enabling a pipeline of positive future leadership. Hallinger (2003) also supports this idea and posits that school Principals that exhibit ‘transformational’ rather than ‘instructional’ leadership are more likely to positively encourage changes in people rather than promote specific instructional practices.

If, as has been discussed previously, pedagogy must be the driver for change within a school, and if new building projects are commissioned because of their perceived ability to enable pedagogical transition, then pedagogical leadership could be the key to cultural change because it is pedagogy that “peels back the veneer of teaching methodology to expose the conscious and unconscious” and enables teachers to become “agents of enculturation” (MacNeill, Cavanagh, & Silcox, 2003, p.4).

But, what sort of change is required to successfully transition from traditional to contemporary teaching and learning models, and what sort of leadership best equips a school community to make the transition? Good school leaders that articulate an organisation’s moral purpose, provide a level of managerial support and create an appropriate sense of collaborative effort towards a shared goal are one thing. But what occurs when ‘second order change’ is being instigated that is “disruptive and...chaotic, fraught with uncertainty and ambiguity” (Knuth & Banks, 2006, p. 14)? Does such change require leaders that can address barriers to change through their ability to calm fears and inspire trust in the teacher cohort?

Based on such assumptions, the proposed research aims to:

- Investigate what role school leaders should play in shaping the success of ILE projects;
- Determine whether any definable leadership styles are more effective than others; and
- Explore the impact of the roles and relationships between school leaders and architects on the success of ILE projects.

PROFESSIONAL DEVELOPMENT

Teachers are at the coalface of the shift towards contemporary student-centric pedagogy. In a school making this transition with the aid of new learning spaces, high expectations are often placed upon them by school leadership teams.

Teachers may be required to move from traditional teaching spaces, where they have typically employed previously learned teaching practices, into often more open and flexible spaces. Frequently this is accompanied by an expectation that their practices will change simply because they are in a changed environment.

Architects are not usually involved in the discussion around teaching practice and professional development. In fact, many educators might consider it completely inappropriate that architects take an interest in what is a professional activity that is outside their typical sphere of influence. If however, as posited earlier in this paper, the success of a particular design is dependent upon factors other than simply the physical environment, then it is suggested that such factors must be considered within the context of any project’s early design thinking.

Again, reflecting upon the Open Plan movement, one of the factors contributing to the demise of the Plowden ideals was the project’s enforcement by local education departments upon Principals and teachers with little or no attention to professional educational training (Brogden, 2007).
As Little (1993) argues, teachers are crucial to any major reform process, as it is through their engagement that the “broader consideration of the educational enterprise” (p.17) can be developed within a school’s organisational structure and culture. If that is the case, efforts to support, encourage and alter teacher practice within an atmosphere of change is likely to have a positive impact the success of an ILE project.

However, professional development (PD) needs to be more than simply a vehicle for reforms. It must become a reform in and of itself to ensure that it becomes an integral part of both teachers’ work and the school culture; that is, it must become part of an organisational learning effort (Scribner, 1999). Only when this situation exists can teachers create optimal conditions for students’ learning (Ontario Royal Commission on Learning, as cited in Mulford, 2005).

The Victorian Department of Education (2005) set out seven principles of highly effective professional learning:

- Focused on student outcomes (not just individual teacher needs);
- Focused on and embedded in teacher practice (not disconnected from the school);
- Informed by the best available research on effective learning and teaching (not just limited to what they currently know);
- Collaborative, involving reflection and feedback (not just individual inquiry);
- Evidence based and data driven (not anecdotal) to guide improvement and to measure impact;
- Ongoing, supported and fully integrated into the culture and operations of the system – schools, networks, regions and the centre (not episodic and fragmented); and
- An individual and collective responsibility at all levels of the system (not just the school level) and it is not optional.

The idea of effective professional learning as being open, integrated and immersive is also reflected in the principles espoused in the Australian Institute for Teaching and School Leadership’s analysis of global trends in professional learning (2014).

There is consensus on what constitutes good professional learning for teachers and the consequent benefits of appropriately targeted learning opportunities and techniques in assisting reform efforts. However, there appears to be a gap, both in the research literature’s consideration of and professional learning opportunities available for, actual practices required to adapt from traditional to contemporary teaching practices.

Practically, how can teachers learn to move from the front of a classroom to confidently curate a class of collaborative group work? How do teachers accustomed to technology in static ways learn to embed technology in the co-creation of knowledge? How do teachers learn about the changes in their ‘emotional geographies’ (Hargreaves, 2001) to enable the careful transformation of often strongly held pedagogical philosophies?

From my perspective these are fundamental questions that are at the heart of contemporary pedagogical reform efforts. Analysis of their impact on a new ILE as first occupied and then inhabited must form part of the consideration of a holistic approach to contemporary educational building design.

**PROPOSED RESEARCH QUESTION**

The following question forms the basis of the proposed research:

What role do architects play in the complex interaction between design and non-design parameters in the development, occupation and inhabitation of successful ILEs?
In this light, the proposed research will seek to:

1. Review the availability and focus of existing PD courses / activities;
2. Investigate whether integrated and well-planned professional development (PD) strategies can have a positive impact on teachers’ ability/willingness to change their pedagogical practices in ILEs;
3. Investigate the extent of exposure provided to educating students about contemporary pedagogical theory and practice as part of teacher PD strategies; and
4. Collate evidence for the most effective PD strategies/activities, including assessment of their impact on changes to teacher practice.

PROPOSED METHODOLOGY

A regional independent K-12 school has recently completed a large senior school building project, designed by the author’s practice. Observation of its occupation and inhabitation reflected some of the issues discussed above. This school is anticipated to provide an opportunity for investigating the issues at the core of this research project. The Principal who commissioned the project left to take up another position after one term of the building’s inhabitation. An experienced Principal took up the role of temporary school leader for three terms until a permanent Principal could be recruited. The new Principal is scheduled to take up the position at the start of the 2017 school year.

The proposed research will employ qualitative research and adopt an ethnographic methodology involving field-based data collection in a single case study school (as identified above). The participants are expected to be three school leaders and a group of teaching staff. The changes in school leadership – mentioned above – offered a unique opportunity to consider the project and its position within the school’s organizational structures from three different perspectives, enabling a range of considerations to be investigated at different temporal moments in the process of procuring, designing, constructing and using the ILE’s at the school. At each moment the following key issues will be explored and thoroughly interrogated: design, leadership, learning theory and teaching practice.
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DEVELOPMENT OF AN OBSERVATION METRIC FOR LINKING PEDAGOGY, TECHNOLOGY AND SPACE

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ABSTRACT
The current interest in innovative learning environments has generated considerable investment in spaces designed to transgress the boundaries of learning set by an ‘architectural deterministic’ mindset. Such a mindset assumes that the act of occupation of these spaces itself will cause the desired change to teaching and learning. However, a design-orientated approach often neglects to monitor what actually happens once these spaces are inhabited. The evidence base is yet to show how these spaces invoke pedagogies that support the desired types of learning that the design was intended to support. Because there are relatively few methodologies and metrics available to measure the impact of the space on pedagogy in situ, the Linking Pedagogy, Technology, and Space (LPTS) observational metric was developed. The LPTS metric provides instantaneous visual feedback to teachers on their practice and tracks its subsequent impact on their students. This paper reports on the conceptual development of the metric.

KEYWORDS: SINGLE SUBJECT RESEARCH DESIGN, CLASSROOM OBSERVATION, EMPIRICAL EVIDENCE, INNOVATIVE LEARNING ENVIRONMENTS, TEACHER DEVELOPMENT.

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INTRODUCTION

It is an assumed truism that teachers’ utilisation of space makes a difference to pedagogy, which therefore must impact on student learning outcomes (Joint Information Systems Committee, 2006). Brooks (2011) and Stadler-Altmann (2015) claim that there is currently limited empirical evidence to support adequately such a claim (for exceptions see Brooks, 2011; Byers & Imms, 2016; Byers, Imms, & Hartnell-Young, 2014; Imms & Byers, 2016). This lack of understanding stems from the fact that teaching and learning is a profoundly complex and contextual field (Boddington & Boys, 2011; Lee & Tan, 2011; Woolner, McCarter, Wall, & Higgins, 2012). There is currently an absence of rigorous experimental methodologies (Painter et al., 2013) that have been able to delineate adequately between the architectural and physical affordances of spaces and how these affect the teaching and learning (Gislason, 2010).

Much of the evaluative frameworks around ascertaining the impact of contemporary or innovative learning environments has focused on identifying those physical or tangible aspects of the spatial design that are optimal for student learning (Blackmore, Bateman, O’Mara, & Loughlin, 2011). The work by Barrett and Zhang (2009) and Barrett, Zhang, Moffat, and Kobbacy (2013) established those tangible elements of the physical environment that are optimal for student learning. However, exactly what happens when teachers and student occupy these different learning environments and how this affects the teaching and learning are yet to be determined with any degree of certainty. There is little evaluation tracking how teachers and students navigate the significant spatial transitions from conventional classrooms to innovative learning environments. Thus, it is unclear if, and how, the occupation of such environments realises the envisioned changes to teacher pedagogy and student learning experiences and outcomes.

The development of the LPTS real-time observation metric sought to provide a mechanism for providing empirical evidence that could evaluate the impact of spatial interventions on key aspects of learning and teaching. The design of the LPTS observational metric as a macro-enabled Microsoft Excel program accommodates recording and compilation of data, and then the production of a visual representation of the proportional breakdown of the observed lesson in terms of time spent on every activity across five domains (pedagogy, learning experiences, communities of learning, and student and teacher use of technology). When applied through a quasi-experimental approach, facilitated by a Single Subject Research Design (SSRD), the metric tracks and then compares the degree of change of the same student and teacher (as a class) activity and behaviours in different spatial settings (intervention) through the collection of repeated measures. Through the collection of repeated quantitative measures of the same class (unit of analysis) through the independent variable of time, the metric seeks to reduce the influence of observer inference (Clarke et al., 2006). At the same time, the real-time visual data produced by the metric can be shared with teachers as a means of feedback to enable them to understand their practice through continuous and in-situ professional development.

REVIEW OF CLASSROOM OBSERVATIONAL APPROACHES

Classroom observations have been a ubiquitous element of both teacher appraisal (Stronge, 2006) and profession development (Warwick, Vriikki, Vermunt, Mercer, & van Halem, 2016; Wragg, 2013). Done well, they can benefit both the observer and the teacher observed, and can enhance the collective professional skill set at the particular school (Wragg, 2013). O’Leary (2012) writes that teacher effectiveness has become a common theme of the current focus on the use of observations. Authors have attempted to link teacher effectiveness as one of the mediating factors that impact student achievement (Campbell, Kyriakides, Muijs, & Robinson, 2004; Danielson & McGreal, 2000; Montgomery, 2002).
As the conception of student learning has changed, so too has the view of the quality teaching (Danielson & McGreal, 2000). Historically, classroom observations have been seen as a relatively blunt process undertaken by an administrator who measures teacher performance against subjective rating scales (Danielson & McGreal, 2000). These ‘snapshots’ evaluations of teacher practice are often more like a test, with little opportunity for reciprocal dialogue and top-down feedback provided. In many instances, this process has been galvanised under the recent accountability and policy frameworks. Frameworks, such as the Australian Institute for Teaching and School Leadership (ATSIIL), Office for Standards in Education (Ofsted – the UK) No Child Left Behind (USA), favour standardised and systematic teacher appraisal and lesson evaluations as an authentic way to ascertain classroom practices and processes (Stronge, 2006; Wragg, 2013). The nature of these top-down accountability reforms has reinforced classroom observations as the dominant measure of teacher quality in recent years (O’Leary, 2012; Pianta & Hamre, 2009).

Given the growing importance placed on the evaluative capacity of classroom observations, the work of Wragg (2013) has highlighted the importance of the reliability and validity of the process and metrics around observations. Wragg is critical of observational practices that are largely subjective activities (O’Leary, 2012), with the assessment of teachers construed through the “interpretative lens of the observer” (Foster, 1996, p. 14). Here the assessment of what is ‘good’ or ‘bad’ resides more in the subjective judgement of the observer, rather than what is observed (Wragg, 2013). Also, these more subjective forms of appraisal are often influenced by the tautology of “proxies of degrees or experience” that correlate to student learning outcomes as a measure of teacher effectiveness (Pianta & Hamre, 2009, p. 109). Pianta and Hamre (2009) suggest that more objective, standardised approaches to classroom observations move the historical measures of teacher quality to a more reliable and valid status.

Empirical approaches have the potential to demonstrate the continuing professional growth of teachers over time through the longitudinal evaluation of classroom observation data. However, to be an effective professional development tool, they cannot be one-off snapshots of practice (O’Leary, 2012; Pianta & Hamre, 2009) nor involved hierarchical grading systems (Wragg, Wikeley, Wragg, & Haynes, 1996). In their longitudinal study, Wragg et al. (1996) found that one-off observations were unable to identify incompetent teachers, as many rehearsed lessons to avoid detection. Wragg et al. (1996) concluded the need for a series of observations carried out over an extended period so that a fair and more genuine picture of a teacher’s competency in the classroom can be constructed. Further to this, the Wragg et al. (1996) study also found that the consistent and uniform interpretation of grading systems, and the assessment criteria that underpin them, led to inter-rater reliability issues. Finally, the climate around the observation is critical to foster professional conversations post the feedback (Danielson & McGreal, 2000).

**CLASSROOM OBSERVATIONAL TOOLS**

The recent emphasis on empirical data and evaluation in education has led to the development of various classroom observation metrics, tools, and systems. The Enhancing Professional Practice: A Framework for Teaching (Danielson, 2011), Classroom Assessment Scoring System (or CLASS) (Pianta, La Paro, & Hamre, 2008), Practical Observation Rubric To Assess Active Learning (or PORTAL) (Eddy, Converse, & Wenderoth, 2015) and Reformed Teaching Observation Protocol (Sawada & Piburn, 2000) represent tools with a specific focus on teacher pedagogical practices. Of these tools, Danielson’s (2011) framework has enjoyed the greatest systemic implementation, as it is considered to “encompass the essential components of the teaching practice” (Elmendorf & Song, 2015, p. 3). Collectively, these tools reflect the trend towards the utilisation of classroom observations, with responsive integration and improved feedback mechanisms, to better support teacher growth and development through a greater emphasis on formative evaluation (Danielson & McGreal, 2000).
There are a smaller number of observational tools that focus on the integration of technologies in the classroom. The *Integration of Technology Observation Instrument* (Arizona State University West, 2002), *Observation Protocol for Technology Integration in the Classroom* (or OPTIC) (Northwest Regional Educational Laboratory, 2004) and the *International Society for Technology in Education (ISTE) Classroom Observational Tool* (or ICOT) (Bielefeldt, 2012). The design and function of the ICOT enabled the observer to collect real-time “information on setting, student groupings, learning activities, teacher roles, and time and type of technology use” (Bielefeldt, 2011, p. 3). The ICOT, aligned with ISTE’s *National Educational Technology Standards for Teachers* (NETS-T) provided a novel approach in the use of timed activity to measure “teaching practices for designing, implementing, and assessing student learning, engagement, and improvement” (McPherson, 2009, p. 5). The ICOT represented a move away from the provision of observation feedback by standardised and static rubrics. Its dynamic timekeeping design afforded an observer a means by which to evaluate the extent to which are students engaged in learning and the pedagogical advantage associated with the integration of empirical data by way of digital technologies (Hayden, Ouyang, Scinski, Olszewski, & Bielefeldt, 2011).

Of the classroom observational tools reviewed, there were none that focused on the impact of the physical learning environment on teachers and students. As a consequence, the review was extended to the literature surrounding *Post Occupancy Evaluations* (POE), as some approaches integrate observations as a data collection approach. Hadjri and Crozier (2009) define a POE as a “process that involves a [rigorous] approach to the assessment of both the technological and anthropological elements of a building in use” (p.22). Within the literature surrounding POEs, the works of Finch (1999) and Whitemyer (2009) suggest the use of observational methodologies as a replacement to the use of questionnaire or survey methods often found in the POE process. The observation process, similar to that of an ethnography, provides a higher definition account of how people interact with the built environment and the manner in which it supports, or curtails envisioned activities and behaviours of its occupants (Hadjri & Crozier, 2009; Whitemyer, 2009).

**LINKING PEDAGOGY, TECHNOLOGY, AND SPACE METRIC DEVELOPMENT**

The notion of the LPTS observational metric was derived from the quasi-experimental studies using an SSRD that investigated the impact of different learning spaces on teachers and students (see Byers, Hartnell-Young, & Imms, In review-a; Byers & Imms, 2014; Byers & Imms, 2016; Byers et al., 2014; Byers, Imms, & Hartnell-Young, In review-b; Imms & Byers, 2016). These studies identified trends that suggested a tangible link between the occupation of innovative learning environments and improvements in student attitudes to various aspects of their learning that manifested as academic gain. Even though these earlier studies produced sound empirical evidence that advanced the possible relationship between the different spaces and their impact on teaching and learning, the deeper analysis suggested that space was the only factor in this relationship (Imms & Byers, 2016).

The cumulative evidence indicated that the pedagogical impact of the various learning spaces was not a simple cause and effect relationship. The evidence suggested the classroom teacher was a mediating influence. Moreover, the transition from the conventional or traditional classroom space to a more ILE space benefited those teachers who are able and/or willing to align the affordances of the physical learning environment with the potential of digital technology and pedagogy more purposefully (Byers et al., In review-a; Byers et al., In review-b; Imms & Byers, 2016). For others, however, the spatial transition did not have a tangible impact on their teaching practice from their students’ perspective, and little change in their learning outcomes was evident (Byers et al., In review-b). It seems that it was primarily the ability of individual teachers to harness the digital and physical affordances of particular spaces that
had a significant bearing on the resulting pedagogical effectiveness. It is this pedagogical change that had altered student learning experiences by having a statistically significant impact on student engagement and consequently, learning outcomes (Byers et al., In review-a; Byers et al., In review-b; Imms & Byers, 2016).

The inconsistent effects at different stages as evidenced by a significant number of teachers, made it clear that a better understanding of how, and to what effect, teachers navigate the spatial transition was of importance. At the time, the literature review of Blackmore et al. (2011) suggested that little attention had been directed to developing means to track teachers and students’ inhabitation of an ILE in order to ascertain its pedagogical impact. The mediating role of the classroom teacher was identified by Lackney (2008) in the concept of teacher environmental competency. Lackney suggested that the ability of teachers to effectively utilise the physical learning environment for pedagogical advantage is varied. The differences in teacher environmental competency could underlie the argument that a spatial change does not equate to an automatic change in pedagogies (Cleveland & Fisher, 2014; Hattie, 2009; Hattie & Yates, 2014; von Ahlefeld, 2009). With little evaluation of the impact of teacher environmental competency on learning outcomes done or available, particularly in regard to the transition from conventional to innovative learning spaces, it is unclear if, and how, the envisioned pedagogical changes theorised to occur as a consequence of the adoption of an ILE are actually realized in practice (Blackmore et al., 2011; Mulcahy, Cleveland, & Aberton, 2015; Willis, Bland, Hughes, & Elliott Burns, 2013).

CONCEPTUAL DEVELOPMENT

To better understand how the occupation of different learning environments impacted upon teachers and students, it was essential to track their activity and behaviour in each setting. A qualitative descriptive account of behaviour was considered untenable because of the myriad of actors and interactions that take place in a typical classroom and the issues associated with keeping track of all of them. As a result, the LPTS metric is designed to enable a single observer the capacity to record the time spent on a targeted activity. Furthermore, the use of a more quantitative approach is likely to improve the objectivity of the observation by reducing the potential influence of observer inference (Clarke, Keitel, & Shimizu, 2006).

The quantitative nature of the design of the LPTS metric was informed by both the Learner’s Perspective Study (Clarke et al., 2006) and ICOT tool (Bielefeldt, 2012). These earlier examples employed a more numerical approach to tracking the difference in activities and behaviours in specific situations. In a similar vein to the ICOT, the LPTS uses the timed breakdown of activity and behaviours distinguishing it from other approaches that use standardised criteria or rubrics. On the other hand, unlike the observation protocol of the ICOT tool, with which the observer records teacher and student activities in a cyclic 3-minute pattern (Bielefeldt, 2012), the design of the LPTS metric enables a more real-time or live recording of what occurs in the observation.

OBSERVATIONAL INTERFACE

The use of a macro-enabled Microsoft Excel (Figure 1) provides the ability of a single observer to time the activity and behaviours associated with five domains: pedagogy; learning experiences; communities of learning; and student and teacher use of technology. The metric uses a simple checkbox system to record the duration of time of an observed activity or behaviour. When the observer sees a particular activity and/or behaviour, they simply click on the associated checkbox, which starts a corresponding timer/stopwatch. When that activity and/or behaviour ended, they click the box again, stopping the timer/stopwatch. At this point, the macro-enabled feature of the metric adds the recorded duration and produces a cumulative time at the end of the observation.
At the conclusion of the observation, the LPTS metric uses a three button process to collate the total duration of the lesson observation and various activities and behaviours in each of the domains; calculate the proportion of each against the length of the observed lesson and clear the data from the observational interface.

**ANALYSIS**

For easy interpretation and comprehension, the design of the LPTS metric produced a single and/or paired observation visual breakdown in the form of bar graphs (Figure 2). Using a simple drop down menu, the observer could easily access any of the recorded observations. This design feature enables the observer to readily share a single observation or series of observations with the observed teacher.

The metric’s design enabled a single observer to collate numerous observations of the same teacher, Faculty and school. The collation of data over repeated observations (or measures) provided the ability to engage a Single Subject Research Design (SSRD) approach to the subsequent analysis. The nature of the data collected by the metric enabled the combination of conventional visual analysis and Tau-U
calculations. In combination these means of analysis could identify the occurrence of functional and sustained changes in activities and behaviours over a series of observations. Furthermore, the addition of either a time-series A (Baseline)-B (Intervention) or A (Baseline)-B (Intervention 1)-C (Intervention 2) afforded the opportunity to measure the change in learning space (independent variable) on the communities of learning, learning experiences, pedagogies, and technology usage (dependent variables) over the same group of teachers over an extended period of time (Byers, 2015).

The combination of the visual and nonparametric (Tau-U) analysis provides the opportunity to engage in a statistically rigorous and reliable approach to the evaluation of the effect of spatial transition on teachers and students (see Byers, 2015). The application of visual analysis is a relatively common occurrence in SSRDs. The process seeks to identify statistically significant changes in activities and behaviour between phases (i.e. A-B, B-C, or A-B-C). The criteria used to determine them usually consists of observed changes in level; apparent trends; the immediacy of the effect and variation in effects observed (Byers, Reichle, & Symons, 2012; Kratochwill, 2013). Examples of such observations are outlined in Figure 3. The visual analysis data displayed is from the observation of one teacher in a traditional setting (A); with same class in an Interactive Learning Environment (B); and with a different class in an ILE but following the same curriculum in phase A (C). The application of the criterion suggests that there was a significant change in the observed instances of Mode 1 (Teacher-Centric), Mode 3 (Informal) and Outside Classroom occupation in the B and C phases. However, the lack of visual change in the Mode 2 (Student-Centre) occupation between the A-B-C phases suggests no significant change occurred for this teacher.

![Figure 3: Examples of the Visual Analysis process from an A-B-C study using the Linking Pedagogy, Technology, and Space Observational Metric.](image-url)
Tau-U analysis provided a measurement of the degree of non-overlap between the phases to justify the decisions of the visual analysis (Parker, Vannest, Davis, & Sauber, 2011). Tau-U calculations suited the non-conforming nature and the absence of distribution norms typical of small sample size observational studies. Each of these issues violated the assumptions (i.e. constant variance, normality, power, and serial dependency) of traditional regression-based (i.e. ordinary least squares) approaches (Rakap, 2015; Wolery, Busick, Reichow, & Barton, 2010). The Tau-U method is based on the sampling distributions employed by the Mann-Whitney U and Kendall’s Rank Correlation, resulting in \( p \)-values and CIs (Parker et al., 2011). Unlike simpler non-overlap techniques, it provides control for a trending baseline phase (Parker et al., 2011; Rakap, 2015). For this purpose, the repeated measures data from each phase was entered into the Tau-U calculation, with resulting \( p \)-values produced to indicate whether statistically significant changes occurred between the relevant phases. Furthermore, the application of weighted average in Tau-U calculations enables the observer to compare between different phases (i.e. A-B and A-C phases) (Parker et al., 2011). The application of weighted averages provides the opportunity for the observer to evaluate short- and longer-term effects of occupying different learning spaces.

**PILOT TESTING**

Before the application, the LPTS metric was piloted by three observers. Using the recommendations made by Bielefeldt (2012), the chi-square frequencies were calculated on the lesson breakdown of 9 teachers (not participants in this study) by three observers on a total of 18 occasions. There were no statistically significant differences (\( p > .05 \)) in the times recorded for the five domains. This pilot testing suggested the LPTS metric had adequate interrater reliability, similar to that found by Bielefeldt with the original ICOT tool (Bielefeldt, 2012).

**CONCLUSION**

The premise underpinning the current interest in ILEs is the assumption or claim that they will facilitate a desired pedagogical change. However, there has been limited empirical evidence showing how these spaces have caused the envisioned change. In many instances, the lack of substantiation stems from the limited number of empirical metrics able to ascertain the quantitative impact of different learning environments. The LPTS metric seeks to address this shortfall both in its design and use and the quantitative analysis of the resulting data.

The initial testing and application of the LPTS observation metric, analysed through an SSRD approach, shows that it has the potential to evaluate teacher and student experiences in different learning spaces (see Byers, 2015). However, to improve the generality and validity of both the approach and the metric, a longer-term evaluation of teacher change and the effects of different contexts/spaces is required.
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A BRIEF FORAY INTO THE FIELD OF LIGHT: POSSIBILITIES FOR GENERATING AFFECTIVE DATA

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ABSTRACT

The deliberate use of light to evoke an emotional response in artist Bruce Munro’s (2016) environmental installation *Field of Light* at Uluru entices visitors to join in an ephemeral experience that promotes a shared connection with the world at large. In this way, *Field of Light* can be seen as an example of a potentially affective learning environment, with the affective being a key component of the art installation; a component that invites emotive engagement with such things as the landscape, weather, and the transitions through sunset and sunrise. I argue that sites like *Field of Light* encompass a range of educational and pedagogic practices that contribute to pedagogic and curricula assemblages. As such, they provide unique and valuable learning experiences worthy of further investigation by educational researchers interested in how emotional affordances of particular learning environments may lead to affective pedagogic moments. This paper discusses a formative tool for generating data that will help us to better understand the affective pedagogic moment, with a view to applying it to a variety of heterogeneous learning contexts. At the heart of the tool is the development of an approach for identifying affective moments within the pedagogic assemblage and mapping their trajectories.

KEYWORDS: AFFECT, ASSEMBLAGE, LEARNING ENVIRONMENT, PEDAGOGY, EMOTION, DATA GENERATION.

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INTRODUCTION

According to online promotional material, artist Bruce Munro “is noted for his immersive site specific installations that employ light to evoke emotional response, often in an outdoor context and on a monumental scale” (Munro, 2016b, p. 4). Munro’s (2016a) installation Field of Light at Uluru has been said to move some people to tears, with the affective qualities of the artwork working in tandem with the affective resonance of Uluru itself. Affect, understood from a Deleuzian position as an intensity, force or flow, is a key component of the art installation – with the artist applying emotive qualities of light on a vast, environmental scale to entice visitors into an ephemeral experience that promotes a shared connection with the world at large, and can be engaged with as an affective learning environment. The affective learning environment can in turn be conceptualised as a pedagogic assemblage, with affect becoming a key component of that assemblage. In this way we can begin to see Field of Light as an affective pedagogic assemblage that invites emotive engagement with such things as the landscape, astronomy, weather, transitions through sunset and sunrise, seasons, and cultural histories.

The purpose of this paper is to explore the possibilities of an affective method to be applied to research concerned with the affective pedagogies created by broadly conceived learning environments such as Field of Light. It discusses a formative toolkit for generating data that will lead to better understandings of the affective realm and how it contributes to pedagogic assemblages and pedagogic encounters. Field of Light is used as one richly situated example to explore how the toolkit works and the kinds of data it may produce.

RECONSIDERING BODIES, EMOTIONS, COGNITION AND THE AFFECTIVE

Zembylas (2007) argues a historical mind/body Cartesian split has led to bodies and affect in education being largely ignored. Yet, in what has been dubbed as ‘a turn to affect’ in social theory (Clough & Halley, 2007), there has recently been a marked increase in the recognition of the affective registers of learning environments and the bodies that inhabit them. Hickey-Moody (2013b) notes, “The lived experience of learning is always affective; whether learning how to conjugate a verb in a classroom (Watkins 2012) or how to dance in a nightclub (Henriques 2010), our bodies and their affective registers are the flesh of pedagogy” (p. 126). Interestingly, the field of affective and social neuroscience also reveals how the processes of learning and feeling are inextricably entangled, with the act of being ‘moved’ supporting learning because emotion and cognition are linked by interdependent neural processes – so much so that it is said deep learning is impossible unless the emotions are engaged (Immordino-Yang, 2016). Altogether, this points to the importance of accounting the role of affect and emotions in the learning environment and sets a premise for future research into how learning environments can work to foster particular affective intensities that lead to certain emotions – with emotions being understood as “the mindful expression of bodily affect” (Watkins, 2016, p. 73).

One possibility for working with affect in education is to follow Wetherell’s (2015) lead in adopting a socio-psychological account of affective practices. However, in the act of foregrounding “human energies, bodies, subjectivities, minds and meaning-making” (2015, p. 141), I would argue Wetherell’s approach is insufficient for those with a commitment to other-than-and-more-than-human entities at play in the affective domain. Instead this toolkit follows a Deleuzian philosophic legacy to working with affect that is rooted in Spinoza’s notion of affect “as both force (affectus) and capacity (affectio)” (Watkins, 2016, p. 72).
AFFECTIVE PEDAGOGIC ASSEMBLAGES

In conjunction with ‘the affective’, I also utilised the Deleuzian concept of ‘assemblage’ as an analytic tool. I draw on it to conceptualise the pedagogic force of affect laden learning environments in terms of an affective pedagogic assemblage that is, to an extent, embedded within a broader curriculum assemblage. In a Deleuzian sense, assemblages “consist of multiple, heterogeneous parts linked together to form a whole” (Muller & Schurr, 2016, p. 28) and have relational, agentic, generative, heterogeneous, dynamic, open-ended and temporal characteristics (Bennett, 2009). I argue that learning environments can be understood as other-than-and-more-than-human pedagogic assemblages that are formed by the coming together of social, material, and discursive entities for a given period of time. Affect is said to be the pulse of such assemblages, becoming the source of their power; “the tertium quid of the social and the material, making the socio-material hold together or fall apart” (Muller & Schurr, 2016, p. 9). The intent of the toolkit presented here is to set the conditions for generating data that enables an analysis that attends to the relations within a pedagogic assemblage such as Field of Light. In so doing, I plan to map the affective ebbs and flows within it, while inviting “the (previously) inaudible voices of the non-human” to the table (Weaver & Snaza, 2016).

THE CHALLENGE OF RESEARCHING AFFECTIVE LEARNING ENVIRONMENTS

While affect in education and social theory has become a source of increasing attention, there are many issues associated with affective research. Methodological literature on affect is beginning to rise to the challenge of studying the ephemeral (Coleman & Ringrose, 2013; Timm Knudsen & Stage, 2015; Vannini, 2015; Zembylas & Schutz, 2016) however, there is still much work to be done in this sphere with affective methodologies and methods largely occupying an experimental and emergent space. Although this might seem problematic, it provides an opportunity to develop research strategies that have previously been obscured or overlooked, and presents new possibilities for researchers wishing to explore the intersection between theory-building, applied research and artistic concerns through a focus on the sensory, experiential and affective (Pink, 2015).

METHODOLOGICAL LITERATURE

Informing the development of this toolkit is recent methodological literature associated with non-representational methodologies (Vannini, 2015), affective methodologies (Timm Knudsen & Stage, 2015), and Deleuzian Methodologies (Coleman & Ringrose, 2013). In particular, I pick up on what Timm Knudsen & Stage (2015) acknowledge as the importance of attaching research to bodies in specific affect laden contexts in order to generate ‘embodied data’ that effectively “grasps the affective qualities” of a research context (Timm Knudsen & Stage, 2015, p. 5). Embodied data are important because they bring attention to the sensory, textured, moving, fleshy natures of the phenomena under investigation (Pink, 2015). Another trend in emerging affective methodologies is to take established qualitative techniques and adapt them specifically for generating data that is suitable “for tracing the presence of affective forces” (Timm Knudsen & Stage, 2015, p. 9). Examples include Waterton and Watson’s (2015) heritage study using photography (somewhat paradoxically) as a way of being in the world; Bissell’s (2012) auto-ethnographic study into the uncertain geographies of pain; Bohling’s (2015) use of field notes as an assemblage in an investigation into the bodily and affective dimensions of drinking and dancing; and Stewart’s (2007) ethnography attending to ordinary affects of the everyday. I use these as guides for how existing methods may be recruited in ways that are sympathetic to the affective realm.
THE PROCESS OF DEVELOPING A TOOLKIT FOR GENERATING AFFECTIVE DATA

This toolkit was developed through a highly auto-ethnographic process. Initially, I conducted a series of informal observations at Field of Light, immersing myself in the complete experience from hotel pick-up to drop-off. I attended the exhibition on three occasions over two days for approximately six hours in total. I went on all Field of Light experiences on offer (Sunrise, Sunset and Star Pass), attending as part of a public tour group on each occasion with my eight year-old son as ‘research assistant’. While there, my son and I took photographs, made sound recordings of the ambience, and collected marketing material. After each visit, I wrote a detailed reflexive account of my experiences, paying particular attention to the undulations in atmosphere and build-up to moments of affective intensity. Analysis of the immersive experiences of Field of Light along with observations, soundscapes, images, documentary evidence, and publicly available data from the Twittersphere and Facebook allowed the emergence of a toolkit for formal data collection at the site in the future. It also has given rise to a process that can be adapted to future research in other (diverse) affective learning contexts such as heritage sites, sports clubs and museums.

THE DATA GENERATION TOOLKIT

TOOLKIT OVERVIEW

The toolkit itself is a three-stage iterative process involving 1) the identification of the affective curriculum generated by the site; 2) the identification of the role of affect in the curriculum with a particular focus on pedagogy; and 3) mapping the affective trajectories that run through the affective pedagogic assemblage. Each stage informs the others and will, at times, operate simultaneously. While the toolkit is presented in a procedural manner, the data generation process is understood as iterative in nature and not linear. By invoking assemblage thinking, the research demands a non-methodocentric approach (Weaver & Snaza, 2016) and as such cannot be fully known at the outset of the project.

For the purpose of the toolkit, I conceptualise pedagogic affect as operating in two ways. The first uses the notion of the affective pedagogic moment in time and space (Watkins, 2016, p. 71). This occurs where affect demands attention creating an affective peak or crest on a wave of affective intensity. The second accounts for the less obvious affective hum, the underlying atmosphere or ambience that on occasions becomes palpable. The evidence of the experience of significant affect (and, just as notably, when affect is significant in its insignificance) can be found in the effects of the affects. Important effects of affect are the affective residues that are commonly felt as emotions (Watkins, 2016, p. 73). Therefore, indications of affective residues, or lack thereof, are sought after in the generated data. Particular attention is given to the evidence of affective pedagogic moments and the hum of the affective atmosphere of a given research context. The remainder of this paper engages with Field of Light to demonstrate how the toolkit works across the three-stage process.

STAGE 1.

Identify the affective curriculum (body) generated by the site. Is it affect laden or, in other words, could it be described as a ‘felt’ curriculum?

Schubert (2010) contends that developing notions of ‘outside curricula’ run parallel with developing understandings of the pedagogies that broadly conceived spaces of learning outside the institution of schooling produce (p. 10). Following this relationship between outside curricula and their pedagogies further, I argue that sites like Field of Light generate their own curricula assemblages and encompass a range of educational and pedagogic practices. As an affect laden space, Field of Light affords affective
pedagogies that can be framed by the curriculum body it generates – with the curriculum being broadly defined as what is taught and how (Alexander, 2001, p. 549). This broad definition is used as a starting point from which to analyse data generated by informal observations, Twitter feeds, Facebook pages and publicly available documents to identify the body of Field of Light’s ‘felt’ curriculum. By thinking in assemblage terms, it becomes clear that the ‘what’ and ‘how’ of the curriculum can be understood as being entangled and are borne out of the interplay of social, material and discursive entities in the curriculum assemblage. For example, Field of Light simultaneously teaches about shared connection with other bodies and teaches through shared connection with other bodies – human and non-human, social, material, discursive and ephemeral. Field of Light can also be understood to teach about and through the:

- Relation between self, others (human and not so), past, present and future becoming part of something greater than the individual, the land, the stars in the night sky, and thought itself
- Transitions (dawn and dusk, colour to colour, emergence of the rock, the blooming of Field of Light) and how those transitions alter perspective – creating conditions to see things ‘in a new light’
- Interactions between art, the natural environment, the human visitors and non-human inhabitants to create something greater than the sum of the parts
- Aesthetics used to convey and magnify affect (Hickey-Moody, 2013a). This applies not only to light but also experiences of scale, colour, movement, composition, pace of rhythm, modulation through colour range, and constant change
- Atmospheres such as those created by the time of day, the mood of the group, the climate, and even the persistence of the flies
- Astronomy – the removal of light pollution, constellations, Venus, movement of sky, and astrological narratives
- Photographic techniques – mediating experience, becoming experimental
- Logistics – Field of Light in awe inspiring numbers and statistics
- The dynamic immersion in nature and the affective rhythms of being in the desert – constantly changing light, temperature, weather, vegetation, isolation and connection
- Geography – location, affective resonance of the land
- Reflective space
- The discursive affects of marketing, media and program guides – building expectations and preliminary understanding
- Interactions between all of the above – mediation of one thing through another.

**STAGE 2.**

**Identifying the role of affect – how is the curriculum being taught with and through affect?**

It is ‘the how’ that this research is most concerned with. This concern works in tandem with the assumption that affect plays a key role in how the curriculum is conveyed or taught albeit implicit, explicit, intended or otherwise creating a context where affect becomes a pedagogy in and of itself. This can be conceptualised using Baker’s (2008) notions of didactic and delirious affect, whereby the didactic is the intended and the delirious is the wildcard of an affective experience. The questions at the forefront of this second stage of data generation are: How do we know an encounter was affective? Why focus on a particular encounter or moment? What kind of ‘moments’ are we looking for? How do we ‘bracket’ moments in time (Watkins, 2016)? And how do these work in relation to the underlying affective hum? Bearing these in mind, I seek evidence of the likes of moving moments, connecting moments, memorable moments, ‘aha’ moments, surprising moments, shifting moments, chaotic moments, and contemplative
moments. The evidence of these moments include: spontaneous responses (in the moment) such as observations, Twittersphere, Facebook, sound bites, and photography; and reflective responses (after the fact) such as focus groups, interviews, reflexive researcher accounts, and publicly available documentary data.

At this point, it is useful to discuss the types of data being generated and the purpose they will serve. Timm Knudsen & Stage (2015) note that affective data may be etic or emic. Etic data, produced outside the body by, for example, an observer, would include observations, photo-stories and soundscapes produced by the researcher at Field of Light, along with reviews and other documentary data. It plays a crucial role in establishing the affective atmosphere of a site and identifying affective rhythms, transitions, voids, the building of affective intensities, its flows and even their sudden rupture. Etic data is an excellent resource for presenting the affective components of a particular context and its associated assemblages however, its weakness is that it only provides circumstantial (inferred, representational) evidence that an affective pedagogic encounter has taken place for anybody other than the researcher-body. This research aims to move beyond a primary attachment to the researcher-body and attach itself to participant bodies also.

Hence, the additional need to generate emic data, data produced by affected bodies. This is particularly important if we are to ‘capture’ a range of embodied responses to the affective. To achieve this focus groups and interviews can be conducted in a way that connects the participants with residual effects of affect (feelings). Affective moments and atmospheres from Field of Light can be presented at the focus groups and interviews by using soundscapes and photography to create an affective charge, eliciting a more embodied and ‘felt’ response from participant-bodies and researcher-body, while providing an avenue connections with other-than-and-more-than-human bodies in the research such as the crickets, flies and artwork. This embodied data can be augmented with data that is more characteristically representational, such as tapping into social media such as Twitter feed comments. An excellent example of this is the self-reported ‘aha moment’ experienced by Nobel Prize winner Frank Wilczek (2016) who says his experience of the Field of Light installation (desert garden iteration) gave him the flash of inspiration whereby he could finally envision what thought looks like. Wilczek was so taken with his experience of the artwork that he was moved to create a video documenting this pedagogic moment and the value of using the likes of Field of Light as totally immersive learning environments (http://www.wsj.com/video/nobel-laureate-frank-wilczek-aha-moment-at-field-of-light/3404331D-ED39-41DC-8189-D00C39B2361B.html).

Stage two of the data generation process would not be complete without asking how we know whether an affective moment is pedagogic? Pedagogy could be inferred from the identification of pedagogic intention, pedagogic design or discernable curriculum. It could also be indicated by an identifiable pedagogic force or the presence of pedagogic vernacular. However, these types of indications are more accurately positioned as pedagogic affordances or potentials rather than guaranteed outcomes. Evidence of the pedagogic lies in the learning experience and what visitors to Field of Light do, say, think or write that indicates some kind of learning has taken place. Wilczek’s self-proclaimed ‘aha’ moment is a good example of the kind of evidence that may present itself on the Twittersphere, however, it is unlikely many moments such as this will be uploaded onto the internet in such an accessible way. Thus, it is important to be alert for more subtle pedagogic moments that risk remaining undisclosed; for example, connecting moments, reflective moments, and surprising moments. It is the focus groups and interview that will be used to identify in what ways and to what extent those pedagogic affordances of Field of Light actually manifests through embodied data and how this interplays with the affective hum of the assemblage.
STAGE 3.

Mapping the affective trajectories through the assemblage

Stage three of the data generation process involves mapping affective trajectories of the pedagogic assemblage. These trajectories are temporal, multi-dimensional and multi-scalar. They can take shape as gradual building of intensities, ruptures, rhythms, patterns, transitions and cycles. For example, Field of Light demonstrates how the affective resonance of the land affected and continues to affect the artist’s career in a profound way over many years, coming full circle with the Uluru iteration of the art installation, which in turn triggers new affective trajectories – some of which are evident relatively soon and some of which we may not see evidence of for years, if ever. In this way affect and affective pedagogies become an integral part of the curriculum. In a type of double-back, it is thought that the process of mapping the affective trajectories will further inform understandings of the scale, rhythm, intensities, ruptures and flows of affect and how this produces the pedagogies at play within the self-generated curriculum of the site.

CONCLUSION

Sites like Field of Light provide unique and valuable learning experiences worthy of further investigation by educational researchers interested in how the emotional affordances of particular learning environments may lead to affective pedagogic encounters. While fields like neuroscience are making valuable contributions to understandings of emotion, learning and the brain, approaches to researching ephemeral phenomena like affect in naturally occurring educational contexts have proven to be challenging for (post) qualitative researchers with the field still occupying a largely experimental and emergent space. This paper presents a toolkit that proposes the adoption of existing qualitative methods and adapting them for use in an iterative three-stage process that aims to generate affective data within affect laden pedagogic contexts/assemblages. The pedagogy is defined by the curriculum the sites themselves produce and can be mapped in multiple ways by tracing the ebbs, flows, ruptures, rhythms and hum of affect in the pedagogic assemblage which in turn sits in dynamic relation to the curriculum assemblage.
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CHANGING THE ARCHITECTURE OF EDUCATING

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ABSTRACT

School design occurs within a complicated matrix of divergent aspirations of the stakeholder community, changing ideas on education pedagogy and uncertainty on the most effective environments to facilitate learning. There are many contributors in the school design processes, each with their own objectives, creating a challenging climate for the architects to design within. Through research, exemplar case study analysis and reflection on school architecture projects that I have completed over the last ten years, I have identified three key relationships in the school design processes between the School Community, Architect and Pedagogy. The roles, interactions and participation of these three parties can impact the architectural outcomes. A series of deficiencies and reoccurring issues were identified by this study, which potentially inhibit the development of the three key relationships. To assist the architect in navigating these issues, my PhD research has focused on the development of School Design Tools, which provide strategies and approaches that can be used at different stages of design to assist in bridging the areas of deficiency. The tools identify key aspirations and objectives at each design stage, and evolved with the development of the project. They aim to capture and build on the three key relationships through facilitating and structuring the briefing process with the school and creating a balance between the School Community, Architect and Education Pedagogy, so as to support the design of more effective school architecture.

KEYWORDS: LEARNING ENVIRONMENT ANALYSIS AND EVALUATION, POST OCCUPANCY USE, SCHOOL DESIGN.

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INTRODUCTION

School design occurs within a complicated matrix of divergent factors such as the aspirations of the stakeholder communities, changing ideas on education pedagogy and uncertainty about the most effective environments to support learning. There are many contributors in the school design process, each with their own ideas and objectives, creating a challenging environment for the architect to design within. The stakeholder community encompasses a broad range of parties, from government, through to school communities of teachers, students and their families - each with a different understanding of what constitutes a school (Bonnor, 2012). For education pedagogy, there are different schools of thought, as well as constantly evolving theories on the most effective way of educating students (Encyclopaedia of the Sciences of Learning, 2012). Architecture has a role to play in designing new types of education spaces that align with current thinking around education pedagogy (SOV DEECD, 2008; SOV DEECD, 2009a).

Between 2000 and 2014 in Australia, government funding for schools increased by approximately 74 percent (POA DOPS, 2013). Between 2000 and 2012, however, Australia's international education ranking dropped (Lokan, Greenwood & Cresswell, 2001; Thomson, De Bortoli, & Buckley, 2013), in part due to a decrease in education standards, but also due to a rapid improvement in performance in countries in South East Asia. These results have raised concerns about our education system, and influenced changes to Australian Government school policy to focus on initiatives to improve learning outcomes (MCOEETAYA, 2008; DEECD, 2012). In evaluating the effectiveness of schools, there is a recognition by the government that many factors impact on learning environments and outcomes. 'New learning environments are always welcome for schools and their communities. However, the most awarded designs will seem to be failures if the activity and behaviours of the people who occupy them are not innovative and characteristic of 21st century education (SOV DEECD, 2009b).

As an architect, I’ve spent 10 years working on the architecture of schools with practices including HASSELL, Y2 Architecture and in my own practice. I’ve experienced the complex environment surrounding school design and observed a range of inconsistent architectural outcomes emerging from what are fairly regulated school procurement processes within the Victorian Government sector. These experiences raised questions around my past school design approaches and prompted the development of this PhD as an avenue through which to explore new approaches to designing school architecture, it’s relationship with education pedagogy and the needs of the school community. It is hoped that this research will facilitate a more conscious way of working through design issues within my practice.

COMPARATIVE ANALYSIS DIAGRAMS

Through a series of comparative analysis diagrams, I reflect on school projects undertaken at HASSELL and Y2 Architecture, prior to commencing the PhD research. The focus of these diagrams is on the relationships between the architect and key stakeholders in the school design process. The aim of the diagrams was to see if I could identify similarities across all projects that might be impacting on the architectural outcomes. These projects are compared with exemplar school projects across government, Catholic and independent school sectors. My research interest focused on the different school project outcomes that were produced under similar design and procurement processes. Through this process I was studying three things;

- Firstly, the role that each party played;
- Secondly, how they interacted with the other collaborators; and
- Thirdly, how each collaborator influenced the development of the brief which informed the architecture.
In total 12 school projects were studied, including two projects I worked on with HASSELL: Bendigo South East College and Crusoe Secondary College. The others were projects that I had worked on with Y2 Architecture: Keysborough Springvale Regeneration Project, Mt Egerton Primary School, St Josephs Catholic College, Ballarat Regeneration Project, Croydon Regeneration Project, and Mt Ridley P-12. My projects were compared with the exemplar projects Preshil, Dandenong High School, Melbourne Grammar School and St Frances de Sales Primary School. In the diagrams I’ve mapped the relationships between collaborators such as the school principal, parents, the department of education, the project manager, architect, education consultants and the builder – each of which are represented through the different colours within the diagrams (figure 1).

**Figure 1: Comparative analysis diagrams.**

**SCHOOL DESIGN RELATIONSHIPS**

The reflection diagrams mapped collaborators in the school design process, revealing the complexities and variations across projects. Once mapped and analysed for similarities across the projects, I identified that the collaborators represented three key relationships between the architect, school community and education pedagogy (fig 02). The school design process seemed to hinge on the balance between these three parties and each party’s ability to perform its role. However, there were clearly challenges and issues impacting on the interaction of these three relationships, as represented in the Three Key Relationship Diagram (figure 3).

The diagram represents how the school design process can work effectively in an ‘ideal’ project. The school community, architect and education pedagogy are viewed as three different poles, which push and pull against each other in the school design process. In the context of this diagram, the School community pole includes students and their families, teachers, school leadership, councils, and
government bodies as the main stakeholders contributing to the school design. The Education pedagogy pole describes the method and teaching practices used by a school for the education of its students. The Architect pole includes the role of the architect as designer and the architecture of the learning environment. In the diagram, the role of each pole in the school design process is outlined and, in an ideal design process, there is a balance between the three poles, with each pole actively contributing to the design.

Through recognising that school design is not just about designing architecture, but the building of these three key relationships in the school design process, I realised that I needed to develop a new approach to how I design schools. This led to the development of the School Design Tools, to assist the Architect in navigating this space and working through the different objectives of the school community, architect and education pedagogy.
SCHOOL DESIGN TOOL IDENTIFICATION

The Sandringham College case study was a turning point in my PhD, as it enabled the development of my idea for the School design tools through practice work with an existing school community. Sandringham College is a government school and had missed out on government funding, including BER, for a number of years. The school was operating in a mix of traditional general-purpose classroom buildings from the 1940s to 1990s, in various stages of disrepair. The school was expecting funding for new school buildings and its school community was keen to start thinking about how to approach a new school design.

Sandringham College is made up of three campuses: two Middle School Year 7–10 campuses at Bluff Rd, Sandringham and Beaumaris and its Senior Year 11–12 campus in Sandringham. Students for the two middle schools are generally from the local area, but the senior campus is a large specialised school, offering strong links to tertiary institutions, and attracting students from right across Melbourne due its extensive subject range.

In the development of the School design tools, I completed a number of projects with Sandringham College, including the Facades master plan project, Site observation work, Design studio teaching, School design advice, Prototype spaces and speculative design in the Sandringham project (figure 4).

Figure 4: School design tool projects.
The development of the School design tools initially began through diagramming the design process on the Sandringham projects. The projects were reflected on through the three key relationships I’d identified earlier in the PhD between the school community, architect and education pedagogy. This earlier diagram formed the basis and point of comparison for my aspirations on how the relationships in the school design process could ideally work (figure 5). When I mapped the relationship interactions on the Sandringham Projects, I looked at how the relationships worked and what was inhibiting them from working in the desired way I’d initially diagrammed. I was interested in an increased understanding, firstly of the role each party played and, secondly, how they related to and influenced the other two parties in the school design process.

Through the School Design Tool Identification diagram I started to document recurring issues between the school community, architect and education pedagogy. These issues then became points of intervention, whereby the architect could do focused work through the School design tools to strengthen these areas and bridge the gaps between the three key relationships. In this way, the School design tools operate in-between the three key relationships, to assist in facilitating how they can work more effectively together.

Through this process five potential issues arose in the areas of school identity, observation, communication, design intent and prototyping – areas in which the School Design Tools could facilitate the participation process with the school. These terms are broad and I selected them to assist in engagement with the school, but also to empower them. This means the focus of each tool needed to be clear, easily understood by the school, and encourage their engagement in the discussion. The tool names are deliberate, avoiding jargon or overly technical language, to assist the staff in engaging with the issues.
The School Design Tools are used by the architect in a loop-type process and are designed to assist in identifying and articulating briefing information to inform the development of the architecture. The School Design Tool loop describes the interactions between the use of the tools and their relationship to the design process. The interaction between the tools on each loop is a central part of the process. There are three stages in the use of the School Design Tools, indicated through three loops. The process begins through working around the inner-loop, with a pre-brief development of the school identity and observation of education environments in the existing school. This is followed by communication of the key information and establishment of the design intent. The architect works with the school in a cyclical process around this loop until a clear design intent is established. This first loop can be used at each traditional procurement project stage, such as master planning and sketch design, in working through the development of design issues. The middle loop takes the design intent into a testing phase, through the development of prototype spaces. This could occur in sketch design and design development phases, allowing experimentation before the final design is committed. The tests in the prototype space can be reflected on and evolved upon. The outer loop involves the development of successful ideas in the prototype to be evolved into the final design and documentation. This outer loop occurs during the design development and documentation project phases. The tools employ techniques such as observation, listening, reflection, communication, clarity and testing to discover new information to inform the school design process. The School Design Tools also assist in communicating the key steps for the school and architect in the design process - identifying key information that needs to be established before proceeding to the next step. The School Design Tools make the thinking in the design process visible and assist in communicating where and how the school community, education pedagogy and architect need to contribute to the project.

Figure 6: School design tool loop.
The loop process of the School Design tools also assists in managing the design process and assists in facilitating school participation by making it easier for them to understand and contribute. The loop acts as a communication device in the design process, with the arrows indicating the sequence of steps. The visibility of this process allows reflection on the decisions which have been made, and ensures the message is being heard. This could also provide a new model for a return brief to the school, where the information collected from each design tool can be communicated back to the school. This could work to empower the school to be more involved in the participation process and encourage teachers to be willing rather than resistant participants. This assists school leaders in getting teachers on board. In this way, the school design tools and loop process empower the school community and assist the architect in listening to the feedback from the school. The aspiration being, that the increase in dialogue enabled through the communication tool will contribute to the design of more effective schools.

**SCHOOL IDENTITY TOOL**

![School identity tool diagram](image)

To assist the architect in developing an understanding of the School Community, I created the School Identity Tool. In my past practice projects, I had found that many schools had an underdeveloped sense of their identity, which also impacted on their capacity to develop an education pedagogy which responded to the needs of the School Community. This tool provides a way to develop the School Identity of the School Community so it can inform the architecture (figure 7).
The second tool is the Observation Tool. In the development of the architectural brief, architects run many consultation sessions with teachers at schools to develop an understanding of the types of learning environments they would like. However, teachers found it difficult to sometimes describe what it is they do, and the types of environments they need. Through use of the Observation Tool, I aimed to bridge across the gaps between architects and educators and reveal what was implicit in their practice by observing how they use space (figure 8).

COMMUNICATION TOOL
The third tool is the Communication Tool which assists in communication and the bridging of knowledge domain gaps between architects and educators. Architects think and communicate in visual and spatial ways - such as through drawings, and physical or digital 3D models. But these can be challenging for teachers to read and understand. This tool aims to create ways of communicating using boundary objects, which act as a communication bridge between the education and architecture subject areas (figure 9).

**DESIGN INTENT TOOL**

![Design Intent Tool Diagram](image)

The fourth tool is the Design Intent Tool. In many school projects I have worked on, there is an abundance of influences which inform the architecture. These can push and pull the project in many directions, and the design intent of the architecture can become muddied. Through the assistance of diagrams, this tool aims to bring together all the information gathered using the other tools, and ensure that they clearly are represented in the design intent in the architecture (figure 10).
The fifth tool is the Prototype Tool. This provides the opportunity to test the design intent before the design is finalised. This allows teachers and students to experience the spaces, and provide feedback to inform the design, assisting the architect in refining the design (figure 11).

**DISCUSSION**

The School Design Tools present a new method of working for the architect in the school design process. This method recognises that creating a school is not just about designing architecture, but also about the development of the relationships between stakeholders. The School Design Tools facilitate the building of these relationships by assisting in bridging the gaps between those involved in the process through the provision of strategies and approaches to some of the recurring design process issues identified within this PhD research.

The series of projects completed with Sandringham College allowed the exploration of these issues and the development of the School Design Tools. Through the extraction and recording of briefing information, these tools can be utilised in the school design process to assist the architect to develop a deeper understanding of the clients’ needs and the complexities of the interactions between stakeholders.

The suite of tools acknowledges the complexities of school design and the messiness of the process, suggesting different ways of working with the mess, rather than trying to organise it into a format we can understand and ignoring the parts we don’t understand.

The School Design Tools represent a shift in my understanding of the role that the architect, school community and education pedagogy play in the school design process. I recognise that the architect can play a more active role through the use of the School Design Tools to develop the three key relationships and their capacity to effectively collaborate with each other. Through this PhD research, I recognised that each party has two roles to play—an independent role and a collaborative role. In the independent role,
each party has specialist knowledge in the subject area it represents. The stakeholders understand and define the school community, the teachers and school leaders create and practice the education pedagogy and the architect has specialist knowledge in designing architecture. Whereas in the collaborative role the emphasis changes with each party needing to actively contribute to create a shared project vision.

The School Design Tools provide guidance and direction for the architect and school community through a clear loop process, identifying objectives that need to be resolved before the next step can take place. This provides greater clarity on each party’s role, as well as when and how each group can effectively contribute. The information collected through the tools is of reciprocal benefit to the school and the architect. The tools assist the school in developing a leadership role in the development of their school identity and education pedagogy. At Sandringham College, the school learnt from the information collected through the School Design Tools, providing the school with a different perspective and a new understanding of their school community. The School Design Tools benefit the architect through increasing their understanding of the school community and education pedagogy and focusing on how they can effectively inform and be revealed in the school architecture. In this process, the school learns about design and the architect learns about education.
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UNDERSTANDING AFFORDANCES IN MUSEUM EDUCATION CONTEXT

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ABSTRACT
The notion of a space presenting a set of inherent affordances for a range of possible actions has gained some traction in recent discourse on learning spaces. However, there are few studies that investigate affordances in the museum context. Far too little attention has been paid to understanding how affordances can inform the pedagogical approach of museum educators. This paper focuses on how educators can utilise the affordances of the museum learning environment in a way that may contribute to impacting more deeply as part of student learning. I argue that understanding affordances is critical in maximising the pedagogical possibilities of learning in museums. Furthermore, examining how museum educators achieve this success may have significant ramifications for suggesting how school teachers may curate learning by intentionally organising the classroom’s physical space and adapting pedagogy to suit.

KEYWORDS: AFFORDANCES, INNOVATIVE LEARNING ENVIRONMENTS, MUSEUM, MUSEUM EDUCATION, PEDAGOGY.

Ethel Villafranca is a PhD candidate at the Melbourne Graduate School of Education, the University of Melbourne. Currently a recipient of the Melbourne International Research Scholarship, her research interests include museum education, visitor studies and evaluation, and audience development. She completed her master’s in Museology, on a Fulbright Scholarship, at the University of Florida and her bachelor’s in Philippine Arts (major arts management), at the University of the Philippines. Ethel has been involved in various aspects of museum/cultural work in the Philippines and the USA since 1998.
INTRODUCTION

At the Australasia Regional Conference of the Association for Learning Environments, held from 29th of May to the 1st of June 2016, Professor Kim Dovey stated that, “Every environment is a learning environment”. This statement resonated strongly with my research interest. An array of features found in any environment has potential agency in the learning process. Imagine how a toddler who is just learning how to walk could interact with the objects in an ordinary living room – a space that was not intentionally designed to teach toddlers how to walk. The room has certain features and elements that could be used to assist the learning-to-walk process. He could use an ottoman to pull himself up into a standing position. The edges of the sofa could offer the toddler balance as he glides from one end to the other. Other children currently within that space can also offer him support as he takes his first few steps. These features and elements are called ‘affordances’.

THEORY OF AFFORDANCES

The concept of affordances takes its roots from psychology where it originally pointed to human and animal perceptions of their surroundings. When the term was utilised by Gibson (1979) within the field of ecological psychology, he used it to refer to environmental properties that allow the actor within that environment possibilities for action. He proposed that fundamental elements of the environment such as the substance, medium, surfaces and their layout, objects, other persons and animals, and finally, places and hiding places, have affordances. He gave the following examples to illustrate this concept: air affords breathing, unimpeded movement relative to the ground, and visual perception. Water, on the other hand, affords drinking, pouring from one container to another, bathing, or washing. A surface, such as the ground, affords support, walking, running, or standing.

It is important to note that the existence of affordances does not automatically lead to a specific action or behaviour but rather they contribute to the possibility for those actions to occur (Greeno, 1994). For example, when a person enters a room with a staircase, it does not mean that he will use this to ascend or descend to a different level. However, it allows him the capacity to possibly do so. The same object can also have multiple affordances. The same staircase can be used for sitting and other actions. Also, the same staircase can offer different affordances for other persons with different abilities.

The theory of affordances has been used and applied to various disciplines such as architecture, technology, special education, and even communications. Although it is more popularly employed in design and information and communication technologies (ICT).

If every environment offers affordances for learning then it follows that spaces intentionally designed to stimulate learning, such as museums, would offer even more teaching or learning affordances. However, there are few studies that investigate affordances in the museum context.

One study by Trondle et al. (2014) found that curatorial decisions related to the exhibition space (such as specific arrangement of artworks, choice in wall colour, and differences in floor surface) affect visitor attention and inform their behaviour within that space. Another study by Achiam, May, and Marandino (2014) that followed 12 visitors in a natural history museum concluded that affordances of the exhibition space dictate the interpretive strategies they employ in their meaning-making process. For example, the museum’s discovery room affords the action of touching and manipulating objects, which in turn affords active examination of said objects. They also found that being able to stand close to displays in the exhibition galleries offers visitors with a sense of authenticity in terms of the size and feel of the items on display. Also, putting similar objects closely together in a cluster affords comparison and the ability to examine the similarities and differences between them.
The lack of research on affordances and museum learning is a critical oversight. In many cases museum curators and educators intentionally manipulate the museum environment to curate learning with, arguably, considerable success. I contend that understanding affordances is vital in maximising the pedagogical possibilities of the museum learning environment. Furthermore, examining how museum educators achieve this success is likely to have significant ramifications for understanding how school teachers can curate learning by intentionally organising the classroom’s physical space and adapting pedagogy to suit. This is a gap that my research seeks to address.

**ABOUT THE RESEARCH**

For the purpose of this study, I assume museums to include art, history, natural history, cultural, heritage, and children’s museums as well as science centres. I use the term educators to refer to individuals who purposely and actively engage students in a learning activity when they visit museums during school field trips. This includes, amongst others, curators, museum education staff, docents, volunteers, as well as school teachers who bring their students to the museum and accompanying parents.

Programmes for students in museums are either held within the exhibition galleries, in purposely built classrooms or lecture halls, or in both. These spaces are the focus of my research and I refer to them as the museum learning environment. However, in defining what encompasses this learning environment, I take into consideration not only the physical and built aspects of the space where the museum educator teaches and students learn. Instead of treating these spaces like classrooms, I move beyond the bounded notion of the classroom as container (Healy, Grant, Villafranca, & Yang, 2015) and embrace Soja’s (2014) view that space is multi-dimensional, simultaneously encompassing the “real-and-imagined” (p. 177), the social and material. Hence, I take a more holistic view of the learning environment as the interaction of the material, social, cultural, digital, conceptual, personal, emotional, and cognitive aspects.

The combination of museum objects, wall colours and arrangements, light levels, sounds, smells, digital media, presence of other museum visitors, conversations with peers, wall texts and captions, as well as the emotional responses elicited by the exhibition narratives (or by just being in that space) are part of what makes the museum learning environment unique. However, far too little attention has been paid to investigating how this impacts on the pedagogical approach of museum educators or how they are utilising these environmental features to improve student learning. I will use Gibson’s theory of affordances as a lens with which to examine what the museum environment can offer to assist pedagogy.

My research will focus on understanding what affordances the museum environment offers and examine how museum educators utilise these. The main question this research study will attempt to answer is: *What can school teachers learn from museum educators in maximising affordances of the museum environment to contribute to students’ deep learning?*
The research question separates into four sub-questions:

1. What pedagogical affordances does the museum environment provide?
2. Are museum educators aware of the pedagogical affordances and will enhancing their awareness of these lead to increased/improved use?
3. What strategies are museum educators employing that maximise these pedagogical affordances to contribute to students’ deep learning?
4. How can these strategies be applied in a classroom setting?

SIGNIFICANCE OF THE RESEARCH

My research aims to contribute to an emerging body of evidence-based research on the valuable contribution of museums to student learning. Specifically, I plan to examine museum educators’ strategies for utilising affordances of the museum environment that support students’ deep learning.

This research is embedded within a larger ARC Linkage Project, Innovative Learning Environments and Teacher Change (ILETC, LP150100022), that aims to investigate how school teachers across Australia and New Zealand can utilise affordances of innovative learning environments (ILEs) including museums and other alternative spaces to improve pedagogy and impact students’ deep learning. The four-year ILETC project will work in partnership with education departments in New Zealand, Queensland, the ACT and NSW, as well as key industry partners such as furniture designers, ICT and acoustics specialists, school designers and their professional bodies, museums, and leading research-focused schools.

Through the ‘Building the Education Revolution’ (BER) programme implemented in 2009, the Australian Federal Government committed $16.2 billion to construction and refurbishment of Australian school facilities that foster 21st century learning among its students (State of Victoria [Department of Education and Training], n.d.). However, Blackmore et al. (2010) found little empirical evidence indicating that the built learning environment contributes to improved student learning. Furthermore, Hattie’s (2008) synthesis of over 500,000 studies on influences that result in improved student learning in school indicates that space barely makes an impact on student achievement. He notes that one of the biggest contributing factors is the teacher; specifically “what the teachers know, do, and care about” (Hattie, 2003, p. 2). It is, therefore, the teachers’ mind frames, or ways of thinking, that ILETC will focus on and regard as the dependent variable and affordances as an intervening variable. The project argues that changing the learning environment does not automatically result in improved teaching.

Do teachers teach the same way when there is a change in the learning environment? In his opening address for the Terrains 2015: Mapping learning environment evaluation across the design and education landscape international symposium, Hattie says “If you take teachers out of their egg crates and put them into fascinating and innovative designs, they teach the same way; it makes no difference”(Terrains, 2015, p. 11). This proposition is echoed in the framework hypothesis of the ILETC project, which posits that unless teachers change their mind frames about how students can better learn in these spaces, their teaching practices will remain the same.

One of the issues that the ILETC project is trying to address is that school teachers, it would seem, are not maximising the affordances of ILEs to improve student learning. My research will focus on another type of learning environment, museums, that appear to have some success at utilising the environment to positively affect student learning. By investigating museum educators’ use of the museum environment, I aim to identify pedagogical strategies that they employ to maximise the potential of the environment.
in contributing to deep learning in students. The primary contribution of this research to the ILETC project, therefore, is in exploring if and how these strategies of museum educators can be applied by school teachers to their classroom practice.

**TAXONOMY OF AFFORDANCES OF THE MUSEUM ENVIRONMENT**

Identifying affordances of the museum environment will be the initial step in understanding how these can be effectively used and adapted to classroom pedagogy. However, what is meant by the term has become muddled by the various interpretations of the theory and definition of affordance that have been put forward since Gibson first articulated the concept in 1979. Oliver laments that “it is now too ambiguous to be analytically valuable” (Oliver, 2005, p. 402).

A more suitable definition of affordances for use in a museum context is put forward by Pea (1993). He argues affordances to be the perceived and actual functional properties of an object that determine how it could possibly be used. However, this definition is still limited as it only accounts for the physical elements of the environment. What about elements that do not have physical or material manifestations but are also critical to learning and teaching such as prior knowledge? Falk and Dierking’s (2013) *Contextual Model of Learning* proposes that learning in the museum is influenced by the interplay of the following three distinct contexts: the personal context, the socio-cultural context, and the physical context. Decisions museum visitors make are “filtered through the personal context, mediated by the sociocultural context, and embedded within the physical context” (Falk & Dierking, 2013, p. 30). Therefore, for this research, a definition of affordance that encompasses the personal, social, and physical elements of the museum environment has to be developed.

Rather than attempt to identify the infinite number of affordances of every element within the museum environment, a taxonomy of museum affordances will be established that draws on the work of Conole and Dyke (2004), who put forward a taxonomy of ICT affordances. Their taxonomy outlines 10 categories that support teaching and learning within the ICT context. Understandably, not all categories are applicable to the museum context. However, some (such as diversity, communication and collaboration, and reflection) can be applied to both ICT and museums. My initial thoughts on other categories for museum affordances include choice, authority, experience and immersion, and emotional resonance. These categories require further development before they can be utilised in the field. When refined, such a taxonomy may help in understanding how affordances are utilised by museum educators and how these may also be applied to classroom pedagogy. Consequentially, a checklist of affordances may also have implications on how museum curators design exhibitions, particularly those specifically created for schools.

From my own experience curating exhibitions, some elements within the exhibitions are used by visitors beyond my curatorial intentions. This repurposing of elements can be seen as consequential affordances. Hence, under each affordance category are two sub-types, intended and consequential. It is important to note that one affordance can have both sub-types. The proposed taxonomy will also articulate with the relevant learning theories – particularly the Contextual Model of Learning (Falk & Dierking, 2013). Development of the taxonomy will be in accord with a process of testing and refinement.
REFERENCES


ABSTRACT

This chapter reports on research being undertaken to develop a model to facilitate the evaluation of innovative education practices in innovative learning environments. The research is based on the premise that better judgements about evaluation tools, techniques and methods will be made if people are able to tailor evaluative approaches to meet a variety of purposes and needs. The research is developing a process that allows users to develop a situational profile of significant issues appropriate to their particular innovative education project in an innovative learning environment. The profile can then be aligned with the evaluation needs and purposes matrix developed by the E2I LE research project to help identify the most useful evaluation approach.

KEYWORDS: INNOVATIVE LEARNING ENVIRONMENTS, INNOVATIVE EDUCATION PRACTICES, EXPERT ELICITATION, SITUATION PROFILE, CLUSTER ANALYSIS, EVALUATION.

Graeme Oliver is studying a Doctor of Education at Melbourne Graduate Schools of Education. Graeme’s research is developing a model to facilitate the evaluation of innovative education practices in innovative learning environments. The model is making links between education and architecture perspectives in the ways innovative learning environments are developed and implemented. This research will complement a range of other activities within the E2I LE ARC project, especially in providing an interface with specific evaluation tools and techniques.

Graeme has extensive professional background in this area having been the deputy principal at the Australian Science and Mathematics School (an OECD Innovative Learning Environments global case study school) for over a decade from its foundation.
IDENTIFYING ISSUES IN THE EVALUATION OF INNOVATIVE EDUCATION PROGRAMS IN INNOVATIVE LEARNING ENVIRONMENTS

The need for further work in the field of learning environment evaluation has been advocated by a range of research papers presented through the Evaluating 21st Century Learning Environments (E21LE) project, an ARC Linkage project, conducted through the Learning Environments Applied Research Network (LEaRN) at the University of Melbourne. Cleveland (2016) suggests that the rich growth in a variety of new education facilities across Australia and internationally has created a need “to evaluate these learning environments to determine which are best supporting desired teaching and learning practices, activities and behaviours” (p. 92). Cleveland and Fisher (2013) suggested that evaluation of learning environments need to become more sophisticated and should include the following features: more rigorous methodologies and methods, an interdisciplinary approach that includes the perspectives of both educators and education space designers, and use formative evaluation methods that support the evaluation of educational facilities throughout their lifecycle (pp. 24-25).

Cleveland emphasises that the purpose of evaluating learning spaces is to assess the effectiveness of physical learning environments in supporting pedagogical activities (2016, p. 92). However work by Jill Blackmore and her colleagues (2012) highlights the complexities that exist within this relationship, and gives caution about the need to develop a more nuanced understanding of this complexity. She argues that learning spaces are social spaces as well as places of formal instruction and that a range of interactions constantly change the nature, use and experience of space. The relationship between learning space and practices of pedagogy are only one factor among many in the complex relationships of teaching that inform learning outcomes. Blackmore also argues that the relationship between learning spaces, their uses and student learning outcomes is not linear, and that learning spaces can create conditions and mediate relationships that will influence student learning along a range of indicators. Blackmore also proposed that there is a temporal dimension to the production, use and effect of learning spaces. When considered over time there are likely to be organisational changes as well as pedagogical changes that will influence the nature and outcomes of student learning.

Lee and Tan (2008) highlight that evaluation of learning spaces is not normally done by “experts” in the field and that evaluations of learning spaces have been “limited in depth, rigour and theoretical grounding, and heavily reliant on informal and anecdotal evidence” (p. 3). Imms (2016) suggests that recent work in the field has been “too particular in focus and method, and therefore being limited in its usefulness to practitioners” (p. 19). The E21LE approach recognises the existence of many effective evaluation strategies while also being aware of the field’s evident weakness in utilising these in real world circumstances (Imms et al, 2016. P. 13).

The research reported in this chapter is addressing the issues raised above by developing a model to facilitate the evaluation of innovative education practices in innovative learning environments. The model deliberately brings together the perspectives of architects and educators working in the field with an orientation to promoting pragmatic strategies for dealing with the particular situational profile that is described.

The model was initially developed through a review of literature in the field and has been informed and refined through an expert elicitation process. The outcome will be an interactive model that will allow people wanting to undertake an evaluation of the effectiveness of implementing innovative education practices in innovative learning environments to develop a situational map of the issues of most importance to them, to identify the evaluation tool or technique most appropriate to their situation, and to monitor how they conduct the evaluation.
This chapter will report on three key elements of the research: the initial development of the model, the research to refine the model, and strategies for the use of the model. The overall research approach being undertaken to develop and refine the model mirrors the possible evaluation approaches that could be taken to utilise the model by practitioners in the field. This concept, based on the work of Alkin & Taut (2003) and Carden & Alkin (2012), is represented in the diagram below. Alkin and Taut point out that research and evaluation proceed in a similar fashion but for different purposes and uses. In the case of research, the goal is generalizable knowledge that contributes to the body of knowledge in a particular field whereas for evaluation the purpose is context specific with the knowledge being intended for use by a particular group of people in a particular setting at a particular point in time (p. 3). Hence, while the project reported here is still in the research phase, it is modelling the likely approaches to be used in the evaluation phase that will follow.

![Diagram of the relationship between research and evaluation](image)

**Figure 1: A representation of the relationship between research and evaluation.**

**DEVELOPING THE MODEL**

The initial need for a model that could help provide a situated connection between the design of innovative learning environments, the use of innovative learning environments and evaluation of the effectiveness of innovative learning spaces in promoting and sustaining innovative education practices was identified in the E21LE ARC project. The development of the model relates to the overarching research question “How can we determine which learning environments best support 21st century pedagogies” (http://e21le.com/project/). The development of a model is to map the terrain so practitioners can best identify their particular situation and circumstances for evaluation of the complex field of relationships between learning environments, teaching and learning practices and learning outcomes. The approach does not develop or identify a specific evaluation tool or technique, but helps users identify what tool, technique or approach to evaluation from a known suite in the field would be most appropriate to their purposes.

The conceptual organisation and details of content for the model were developed from a literature review of the field. There have been a series of substantial literature reviews in the field published in recent years (Higgins et al, 2005, Temple, 2007, Lee & Tan 2011, Blackmore et al, 2012, Fraser, 2013, Cleveland & Fisher, 2014). The purpose of the literature review was to gain an overview of the field and an understanding of the specific issues that were being reported as significant in the field. An examination of the extant literature reviews was the starting point for this research as they each provided slightly different perspectives and foci through their studies.

The report “Research into the connection between built spaces and student outcomes” (Blackmore et al) used a methodology of declared database and website searches that was a useful model. The report identified 154 references of more than 700 initially located as being significant to their declared field. The report by Higgins et al was commissioned by the Design Council, UK, and although they commented on the “relative paucity of research on effective learning environments” (p. 03) they identified 174 references as relevant to their building design orientation. Cleveland and Fisher presented
a critical review of the literature and through this approach identified conceptual relationships between the 88 references they identified. Fraser built on the work of Lee, Tan & Tout and both studies presented extensively annotated bibliographies with 105 documents in the former and 114 in the latter.

These reviews provided an extensive overview of the field under consideration for this project; provided some significant critical analysis of the literature; helped identify literature that was seen as significant in multiple instances and helped in developing a model for organising and analysing the literature in a manner appropriate to this project. It should be noted though that these reviews did not have a strong orientation to evaluation theory and practice, and subsequently more targeted searches were carried around this topic for this project.

Four key concepts were derived from the literature review that formed the basis of the proposed model that was developed to facilitate the evaluation of innovative education practices in innovative education environments:

1. Such evaluation needs to be cross-disciplinary so that it can combine the perspectives of academics and practitioners in the fields of architecture and education
2. Evaluation needs to be carried out over a period of time in order to recognise the ongoing interactive developments that occur between space, its occupiers and its uses
3. The model needs to be able to organise the multitude of complex issues that interact in this field in a manner that allows users to make appropriate sense of their particular situation
4. The model needs to help identify approaches to evaluation that will be most appropriate to the particular situation identified by the users.

The model thus developed has the following elements:

- **PHASES** – Four phases in the cycle of evaluation (Design / Transition / Consolidation / Re-appraisal).
- **FOCUS** – Two foci for framing consideration of issues (Learning Environment Focus / Education Practice Focus).
- **PERSPECTIVES** – Key perspectives declared within each focus at each phase of the evaluation cycle. The perspectives represent the orientations of Learning Environment Designer / Education Leader / Education Practitioner / Education Consumer.
- **ISSUES** – The issues are the specific points for consideration flowing from each perspective at each phase of the evaluation cycle. There are 18 issues presented at each Phase of the framework for a total of 72 issues for the entire model.

The derived model is represented in figure 2; an overview that shows how the phases, foci and perspectives are situated, but does not give details of the issues that are a part of the model. The issues are presented in the subsequent figures that show the details for each separate phase (figures 3, 4, 5, 6 and 7).
The importance of addressing evaluation of learning environments over a period of time is highlighted in the more recent literature, especially that of Blackmore et al (2012) and Cleveland & Fisher (2014). The time phases used in this model are defined in the following manner.

Phase 1 – Design – is defined as the period of planning the physical and educational features of the new learning environment facility. This would typically focus on sound architectural principals, contemporary educational philosophies and principals and concepts of best practice from both architectural and educational perspectives.

Phase 2 – Transition – is defined as the period of first occupation and use of the new learning environment facility. In this phase there is a focus on moving in to and occupying a new facility, organising services and resources necessary for the use of the facility, and developing new organisational arrangements such as rules and protocols that will direct people’s use of the facility.

Phase 3 – Consolidation – is defined as the period of implementing the ongoing education practices of the new learning environment facility. There is diversity of opinion as to how evaluation can best be implemented in this phase of the cycle as researchers move away from a deterministic premise that lends itself to traditional post occupancy evaluation approaches to more socio-spatial approaches that emphasise qualitative studies of how the uses of learning environments change through a range of iterations over time.

Phase 4 – Re-evaluation – is defined as the period of exploring future options for the educational use of the learning environment facility. While most literature in the field suggests that this phase looks at sustainability of practices that have developed in the new learning environment, this model proposes that there could also be a desire to deliberately change these practices. Such change could involve consideration of the capacity of the facility to be reconfigured in some significant way, and for education practices to be changed in response to internal or external pressures.

The conceptual framework for the model is drawn from a range of sources. Lee and Tan (2008) use design/build/occupation as the phases to organise their literature review. Blackmore et al (2012) use
design/transition/consolidation/sustainability & re-evaluation for their framework. The phases of design/transition/consolidation/re-appraisal used in this model are elaborated with the consistent use of a learning environment focus and education practice focus at each phase, each with declared key perspectives. The nature of the foci and key perspectives in the model are derived from the model presented by Gislason (2010) who proposed ecology/organisation/student milieu/staff culture as a framework for researching school design, and the Innovative Learning Environments project of the OECD (2013) that used resources/learners/content/educators as its core framework with a range of iterations of the framework that were applied to different innovative learning environment perspectives. The model presented here is significantly different from these sources in that its purpose is to facilitate evaluation, rather than be a framework for descriptive coherence.

There are 72 issues presented in the model in a regular pattern derived from the key perspectives at each phase. These issues were selected from a pool of over 300 issues identified through the literature review. The criteria for selecting the issues presented in the model were the same as those for establishing the overall framework for the model (i.e. they represent cross-disciplinary perspectives, they represent the declared time phases of the model, they represent significant contemporary issues in the field, and they lend themselves to meaningful evaluation). The 72 issues are not considered as a given set for evaluation in every situation. The purpose of the model is to help a user group identify the set of issues that they consider most appropriate to their circumstances. This individual profile of issues spread across the phases and perspectives of the model will provide the basis for a user group to determine what evaluation strategy will be most appropriate to their circumstances.

Figure 3: Detail of Phase 1 (Design) of the model for the evaluation of innovative education practices in innovative learning environments showing detail of issues.
Figure 4: Detail of Phase 2 (Transition) of the model for the evaluation of innovative education practices in innovative learning environments showing detail of issues.

PHASE 2
TRANSITION

EDUCATION PRACTICE FOCUS
(Key perspectives)
Occupancy & operation
Orientation & adoption
Operation & management
Engagement & relationships

LEARNING ENVIRONMENT FOCUS
(Key perspective)
Occupancy & operation

Occupancy evaluation
Building performance
Cost efficiency
Technology provision
Furniture function
User comfort

School operations
User adaptability
Stakeholder buy-in
Professional engagement

Teacher capacity
Spatial awareness
Pedagogic adaptation
Teaching programs

Student engagement
Student well-being
Social milieu
Learning activities

Figure 5: Detail of Phase 3 (Consolidation) of the model for the evaluation of innovative education practices in innovative learning environments showing detail of issues.

PHASE 3
CONSOLIDATION

EDUCATION PRACTICE FOCUS
(Key perspectives)
Quality assurance
Spatial competence
Learning experiences

LEARNING ENVIRONMENT FOCUS
(Key perspective)
Sustainability

Facility sustainability
Realisation of affordance
Operational refinement
Occupancy adaptation

Consolidated practice
Quality indicators
Stakeholder consultation
Cultural profile

Pedagogical flexibility
Spatial optimisation
Professional practice
Operational alignment

Student achievement
Student ownership
Student voice
Learning connections
IMPLEMENTING THE MODEL

The model is available for response through an online questionnaire in SurveyMonkey ©. The full questionnaire has 93 questions. The first five question gather respondent consent and identifier data. The following 88 questions relate to the 16 perspectives and 72 issues of the model. Respondents are asked to give their view of the significance/importance of the issues as it relates to the implementation of innovative education practices in a new learning environment development project. Responses are given on a Likert type rank of significance. The data gathered can be used to identify patterns of most significant issues for any designated user group through a cluster analysis process.

Trialling for refinement of the model was undertaken through a process of expert elicitation. The general concept of expert elicitation is a process of gathering information and data from qualified individuals that can be interpreted to solve problems and make decisions in the designated field of investigation (Meyer & Booker, 2001). Expert elicitation gathers responses from experts to a designated technical problem or issue. Experts are generally considered to be people who have a substantive background in the subject area and are recognised by peers or by those conducting the study as qualified to answer the questions. Expert elicitation is seen as gathering an expert’s best representation, or snapshot, in response to the question. While it isn’t generally considered as verifiable research, the process of collating multiple expert opinions can be valuable because it is an efficient method for obtaining wide ranging responses that can be compiled to reflect the most up to date consensus on the issue.

The expert elicitation for this research has a focus on looking to build common understanding and validity of the assumptions around designing and implementing 21st century learning environments and a framework for evaluating 21st century learning environments in relation to these assumptions. The methodology of expert elicitation is seen as most applicable to this scenario as it has the capacity to work across different disciplines – education and architecture in this case. It is intended that the use of expert elicitation will help clarify conceptual understandings, the use of language, and the procedures for evaluation in the field in a cross-disciplinary manner.
While this rationale for the research methodology seems well founded there do not appear to be any previous instances of such a methodology being used in this particular context for this specific purpose.

It is intended that this research will achieve two major outcomes: developing a new methodology for research in the field, and developing a new framework for understanding the evaluation of 21st century learning environments that has a truly cross-disciplinary perspective.

The analysis and interpretation of the data is a process separate from the elicitation. The particular processes of quantitative and qualitative interpretation of the data can be developed and adapted as patterns in the data emerge. Since this research has an orientation to situational analysis and model building the analysis of the data will have a qualitative orientation using non-parametric techniques for cluster analysis.

Cluster analysis will identify the most appropriate profile of significant issues for a particular group to work with in a particular situation. Cluster analysis does not ascribe a value to an identified profile. It is
up to the user group to identify parameters for the set of issues to be included in the profile. Nor does cluster analysis give meaning to the profile in its own right. It is the role of the user group to determine the meaning appropriate to their particular situation and declared evaluation purpose (Norusis, 1988).

An example of a cluster profile for a particular group is presented in figure 8. In this profile it was decided to cluster all of the issues that were rated as “extremely significant/important” by 80% of the respondents. This process reduced the initial set of 72 issues to 14 that are presented on the profile. For this profile it was decided to present one consolidated view of the time phases and to present one consolidated view of the respondents. It is possible to present profiles for different combinations of these variables: e.g. a profile for phase 3 only, or a profile for architects only as respondents.

The aim of this research is to develop an interactive model that will allow people to develop a situational profile of the issues of most significance to them in planning to undertake an evaluation of implementing innovative education practices in innovative learning environments. While the model describes the field in a particular way it does not define the specific profile that any group should see as most significant. The cluster analysis process allows a group to identify a profile most appropriate to their own circumstances.
The process at this stage does not prescribe a particular evaluation approach, technique or tool, either. The profile helps the users identify what approach to evaluation might be most appropriate to their circumstances. Strategies for helping refine this process of best fit evaluation are being developed through other research streams within the E21LE project and the follow up project Innovative Learning Environments and Teacher Change (www.iletc.com.au).

The profile will help the project team better identify the possible scope of their evaluation and to align this with the matrix that plots the purpose of evaluation in conjunction with the identified needs of evaluation presented by Imms (2016). This matrix, presented in figure 9 below, is being populated with specific tools, techniques and methods of evaluation through the work of the ILETC project. The profile of key issues in the implementation of innovative education practices in innovative learning environments developed through the cluster analysis modelling done by the survey tool developed in this research project will help get best fit alignment with the options presented in the evaluation matrix.

The aim of this research is to develop an interactive model that will allow people to develop a situational profile of the issues of most significance to them in planning to undertake an evaluation of implementing innovative education practices in innovative learning environments. While the model describes the field in a particular way it does not define the specific profile that any group should see as most significant. The cluster analysis process allows a group to identify a profile most appropriate to their own circumstances. This addresses the E21LE project goal of tailoring evaluative approaches to meet a variety of purposes and needs.

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<th>The purpose of evaluation research is...</th>
<th>Meeting the needs of those who wish...</th>
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<td>To improve</td>
<td>Formative analysis (judgment)</td>
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<td>To audit</td>
<td>Summative analysis (appraisal)</td>
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<td>To generate theory</td>
<td>Predictive analysis (analysis)</td>
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<th>To describe</th>
<th>To classify</th>
<th>To identify causality</th>
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Figure 9: E21LE matrix of evaluation research ‘purposes’ and ‘needs’, (Imms et al., 2016, p. 11).
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