

TRANSITIONS

INHABITING INNOVATIVE LEARNING ENVIRONMENTS

SYMPOSIUM PROCEEDINGS

AUSTRALASIA 2017



WHAT IS NEEDED TO HELP TEACHERS BETTER UTILIZE
SPACE AS ONE OF THEIR PEDAGOGIC TOOLS?

TRANSITIONS 2017: AUSTRALASIA

*What is needed to help teachers better utilize space as one of their pedagogic tools?
An international symposium for research higher degree students.*

Symposium Proceedings
Editors: M. Mahat, W. Imms.

Friday June 2nd, 2017.
StudioFive, Level 5, 234 Queensbury Street, the University of Melbourne.

Organized by ILETC, the Innovative Learning Environments and Teacher Change.
ARC Linkage project (2016-2019).

Abstracts and full papers were subject to peer-review in line with HERDC specifications.

Hosted by ILETC.



Australian Government
Australian Research Council

This research is supported under Australian Research Council's Linkage Projects funding scheme (project LP150100022). The views expressed herein are those of the authors and are not necessarily those of the Australian Research Council.

The opinions stated in this publication are those of the listed authors and do not necessarily reflect the opinions of ILETC.

This publication is copyright ILETC, University of Melbourne. Except as permitted under the Australian Copyright Act 168 no part of this publication may be reproduced, stored in a retrieval system, communicated or transmitted in any form or by any means without written prior permission. Material contained in abstracts remains the intellectual property of individual authors and may not be copied or reproduced without the permission of the author.

All contributors have declared research represented in this proceedings was conducted under the supervision of the appropriate ethics bodies (where required); and that they own copyright, or have copyright permission for all tables, figures, diagrams and images used in their papers.

All enquiries should be made to the ILETC Project Manager:
Joann Cattlin
Melbourne Graduate School of Education
234 Queensberry Street, PARKVILLE 3010, Victoria AUSTRALIA.
joann.cattlin@unimelb.edu.au
+61 3 9035 8694

ILETC Chief Investigators: Professor David Clarke, Dr Ben Cleveland, Associate Professor Kenn Fisher, Professor Lisa Grocott, Professor John Hattie, Associate Professor Wesley Imms (Lead Chief Investigator), Professor Tom Kvan, Associate Professor Clare Newton.

We would like to thank Joann Cattlin, Kirra Liu, and Lachlan Stewart for their contributions to Transitions. The project would also like to thank the ongoing support of its partners.

ISBN 978 0 7340 5398 5

Cover photo: Marshland School, Stephenson & Turner / Hayball. Photography: Paul McCredie.
Design & layout: Lachlan Stewart.





AUSTRALASIA 2017

What is needed to help teachers better utilize
space as one of their pedagogic tools?

An international symposium for graduate
and early career researchers



Contents

Introduction	7
Dr Marian Mahat and Associate Professor Wesley Imms University of Melbourne - Australia	
Wonder-Ful Schools? Keynote address	11
Mary Featherston	
Session one: Inhabiting design	17
Inhabiting educational design: Intentions, tensions and implications	19
Dr Anna Peterson Queen's University - Canada	
The Gadfly: Doing data differently	25
Sarah Healy & Carol Morrison University of Melbourne - Australia	
The pure and the polluted: A spatial study of one co-located special school	31
Peter Walker Flinders University - Australia	
Session two: Teacher practices	39
Addressing the challenges of Innovative Learning Environments for practicum: Socio-spatial entanglements	41
Emily Nelson & Leigh Johnson Eastern Institute of Technology - New Zealand	
Learning without boundaries: Reconceptualising the curriculum in Innovative Learning Environments	47
Janet Buchan Lourdes Hill College - Australia	
Teaching Space: Does a teacher's spatial competency affect their teaching and effect the different types of learning that takes place in a classroom?	57
Vicky Leighton University of Melbourne/Anglican Church Grammar School - Australia	
Session three: Change and risk	65
Into the great wide open: Navigating teacher opportunity, agency and structure in a collaborative ILE	67
Chris Bradbeer University of Melbourne - Australia	
Mitigating perceptions of risk and improving impact in ILE	73
Tamara Jones University of Auckland - New Zealand	
Reconstructing senior science education in flexible learning spaces	79
Suzanne Trask University of Waikato - New Zealand	

Session four: Measuring impact	87
What does teaching and learning look like in different classroom environments?	89
Dr Terry Byers	
University of Melbourne/Anglican Church Grammar School - Australia	
The relationships between learning space and student learning in higher education	97
Ji Yu	
University of Cambridge - England	
Teacher adaptation to ILEs: Identifying key skills for teachers in 21st century ILEs. We're going through a phase.	103
Dr Scott Alterator	
La Trobe University - Australia	
Closing remarks	113
Professor Tom Kvan	
University of Melbourne - Australia	

Dr Marian Mahat and Associate Professor Wesley Imms
University of Melbourne - Australia

In 2017, Transitions explored the overarching theme of *Inhabiting Innovative Learning Environments*. The symposia were held in three cities: Melbourne, Australia; London, UK; and Grand Rapids, Michigan, USA. Contributors to the symposia addressed the simple question; ***‘How are teachers making the transition into innovative learning spaces, and how does evidence of success inform future best practices?’***

While the provision of innovative learning environments, or ILEs, in many countries around the world is an exciting and overdue development, they are also presenting a number of new challenges. In particular, anecdotal evidence suggests that many teachers are resisting the need to adapt their proven ‘traditional classroom’ pedagogies to maximize the learning opportunities provided by such spaces. Transitions provided the opportunity for our graduate and early career researchers, often working in isolation, to come together through three international symposia, to be part of this quality discussion, and to be represented in a unique international publication celebrating this research. Through the careful sequencing of papers, and input after each paper by expert interlocutors, Transitions explored how well teachers are making this transition—are these spaces facilitating any improvement in teaching practices? What evidence exists that these spaces are improving student experiences and learning? What is needed to help teachers better utilize space as one of their pedagogic tools? Transitions was a working symposium, with new knowledge being generated from the exchanges of ideas occurring around each presentation.

The papers were grouped into four themes of Inhabiting Design, Teacher Practices, Change and Risk, and Measuring Impact. Participants presented an 8-minute synopsis of their research. There was no concurrent sessions—all participants listened to every presentation. At the end of the presentations in each theme, expert interlocutors discussed key themes that had emerged, drew inferences, and then elicited audience discussion on issues pertinent to each theme. Audience participation was encouraged and robust, drawing perspectives from various sectors including fellow researchers, industry representatives from design, building and ICT, academics working in this field, and those embedded in implementing new classrooms at a policy level. The day was an intense and highly informative exchange of ideas.

The papers included in this volume, Transitions Australasia, were selected for presentation through double blind peer-review. The symposium took place on Friday, 2 June 2017, at the award winning StudioFive, which is situated in the Melbourne Graduate School of Education at the University of Melbourne. The symposium was attended by 110 participants from industry, policy, schools and academia. Each paper was reviewed and the comments sent to authors in order to help them prepare a revised version to strengthen the continuity and congruence of the proceedings. The result of this revision process is the backbone of this volume and represents what we consider to be a stimulating and careful set of analyses about how teachers transition into innovative learning spaces. A selection of these papers will be invited to be re-worked and published in the peer-reviewed book, *Teacher Transition into Innovative Learning Environment*, edited by Associate Professor Wesley Imms and Professor Tom Kvan, scheduled to be published by Springer in late 2018.

Mary Featherston, a product and interior designer for 50 years, set the scene and context for the day. Seeking to create better schools and schooling for our students, she presented some of her work including those related to Reggio Emilia approach to education, and provided provocations and thoughts about the future. Professor Tom Kvan of the University of

Melbourne provided closing remarks. He urged us to not be complacent. Firstly, that discovery is not enough—that research findings need to manifest themselves into practice. Secondly, to recognize that the topic of our discussion has been around a long time and that we have not yet resolved it.

INHABITING DESIGN

Led by Richard Leonard, Director of Hayball Pty. Ltd, this session focussed on teachers' and students' experiences inhabiting new ILEs. Richard opened the session by quoting three key messages he drew from the Innovative Learning Environment and Teacher Change (ILETC) project's annual partner's meeting. Firstly, that we have undergone an education upheaval in rethinking the education model that best fits our students and that best fits them for their future. Enormous amounts of money have been spent on spatial definitions but sometimes it is just repeating what has been done before. Secondly, initial findings from the ILETC survey (Imms, Mahat, Byers and Murphy, 2017) indicate that approximately three quarters of our schools have traditional classrooms and are still using teacher-led pedagogy. Thirdly, as explained by one ILETC Chief Investigator, Professor David Clarke, innovative spaces only become innovative when teachers recognize the affordances within these spaces. These key messages capture the challenges and dilemmas faced in education today. He went on to say that education is a social process and that we cannot separate design from pedagogy.

Four presentations structured this session. While Peterson and Walker discussed the disconnect between intended design and eventual use of the ILEs, Healy and Morrison discussed the diversity of data-gathering methods once ILEs are occupied. Wheatley and Hansen¹ discussed the notion of introducing the concepts of disruption to develop more relevant and innovative co-created education masterplans.

Peterson used a qualitative, phenomenological, case study methodology to investigate the lived experience of educational design at two comprehensive schools in Helsinki, Finland. Her findings illuminated a disconnect between the intent of the design and the experience of those using the space. This led to the development of the Educational Design Intentions (EDI) Model, which re-affirmed the need for post-occupancy evaluations from an educational and humanistic perspective.

Healy and Morrison argued that methodological diversity in the learning environments field is critical in expanding horizons about research achievement possibilities. Utilizing Honan's 'Disrupting the habit of interviewing' as a model (Honan, 2014), and through a presentation aimed to initiate and facilitate a critical conversation, the assumptions about current research methods employed in learning environments were challenged.

Walker utilized Soja's Thirdspace (1996) as a lens to explore 'both place and space' in his analysis of the physical space, idealized space and ThirdSpace of a Flinders Special School. The findings revealed a significant gap in the intended purposes of the school design, and practical implementation and use, due to budgetary restrictions and spatial demands of transportation, increased enrolments, and increased school tensions.

TEACHER PRACTICES

The panel on teacher practices was chaired by Associate Professor Craig Deed of La Trobe University. Professor Deed opened the session by posing the question, *What is 'teaching practice'?* Teaching practice is the art or the act of being a teacher. Teachers do not work in a void, in a laboratory or in a vacuum. They work in a classroom—however it is that we define the word "classroom". They work in a context, in a space. That means that when we think about teaching practices, we have to think about teaching as a personal story, as a shared experience or as an ongoing narrative of practice. We can think of teaching as a community of practice, as a tradition or the socio-cultural processes that is occurring in any space where education is the dominant aim. We have to think about teaching as framed by the tools and processes that a teacher enacts in the "classroom"—the planning tools, the learning activities, the assessment tasks, the artefacts being created, the experiences that are being shaped and created by the teachers. We have to think about the teachers' expertise, knowledge, models and theories—and put them into practice in some way that matches the affordances, the possibilities and the constraints of the

1 Paper not included in this proceedings.

space that teachers are working in. We have to think about the key processes of transitions and adaptation into a space. He asked the audience to consider one key question throughout the presentations, *How can we understand and influence the relationship between the authority of the teacher and the authority of the teaching space?*

The presentations were varied and focussed on pre-service training, the impact of curriculum design and delivery, and teachers' spatial competency. Adopting a socio-spatial view, Nelson and Johnson explored the experience of preservice teachers on practicum teaching in ILEs, in order to understand more about the pedagogical and practical challenges arising from inhabiting ILEs. Key relationships were identified within dimensions of space including the university campus space, practicum space, theoretical and ideological space, and the virtual space using Lefebvre's (1991) construct of space as an analytical framework.

Buchan advanced the Dimensions Model of the Learning Environment to ask the question, *What should learning and teaching look like in our classrooms of the future?* By applying the spatial, social, technological, temporal and connectedness dimensions she developed as part of her doctoral research, insights into more holistic learning environment perceptions were obtained and how these can be applied to curriculum design and delivery.

With the evolution of ILEs, there is an emerging need to evaluate their efficacy, ensuring teachers have the environmental capability to guarantee the affordances are being utilized to maximize their potential. Through an exploration of the effect of her Teacher's Environmental Competencies (TEC) tool, Leighton aims to uncover a measurement for TEC, and subsequently refine the tool to aid teacher training in this area.

CHANGE AND RISK

The session on Change and Risk was led by Steve Cook, principal at Albert Park College. He reiterated the motto at Albert Park College, which is to Lead, Create and Inspire, and that teachers in his schools set themselves a challenge every single day to do innovative and exciting things. In reading the abstracts of the three presentations—coincidentally New Zealand centric—it reminded him of the challenges we face as educators in bringing together innovative learning environments and the quality of teaching and learning that can potentially occur in these spaces. He went on to say that bringing teachers into a space that they could be completely comfortable in is a big challenge that we are still confronting today. These presentations not only advance some of the challenges educators face but also some of the powerful solutions to the conundrum.

The transition into ILEs offers novel approaches for collaborative teaching. However, it is a complex and time-consuming task requiring organizational and individual efforts. In an investigation into the teacher collaboration in six New Zealand primary schools, Bradbeer found that while ILEs provide opportunities for team teaching, the reality of actualizing these in the classroom can cause significant tensions.

Jones, on the other hand, discussed teacher's perception of risk transitioning from traditional classrooms to ILEs. Research involving 73 teachers across three schools explored risk-taking behaviours of teachers, support factors for ILE engagement and the impact of risk perceptions on pedagogy. Her findings provide insights on how mitigating teachers' perceptions of risk can maximize the learning opportunities provided by ILEs.

In her presentation, Trask discussed the transition of one senior science classroom into an open learning space with walk in/ walk out spaces and no fixed seating. Her findings have uprooted her previous assumptions of what 'good' teaching is and redefined previous perceptions of science as purely a knowledge-based subject. These have implications for the design of science spaces, curriculum, assessment and teacher professional development.

MEASURING IMPACT

Laureate Professor John Hattie of the University of Melbourne led the last session on measuring impact, stating that despite research being undertaken about the impact of learning space some four decades ago, we are still grappling with it. While Professor Hattie's research findings showed learning environments as having little effect— he sees this as an incredible missed opportunity. We have to deliver 21st century skills, so how do we actually look at optimizing the nature of learning and optimizing the space that goes with it? He went on to say that we are obsessed about how to teach, rather than the impact of that teaching. These presentations, he concluded, provided three unique perspectives on what impact looks like.

In a longitudinal, multi-dimensional analysis, Byers utilized a newly developed Linking Pedagogy, Technology and Space (LPTS) observational metric, to observe teachers in traditional and innovative environments over 3 years to analyse how they used spatial affordances for student learning and achievement gains. The comparative analysis revealed two key findings: that different spatial types influence pedagogy and learning experiences and the importance of teacher environmental competency.

Yu employed a comparative case study design to explore the student learning occurring in a traditional, didactic, teacher-centred classroom and an ILE in a higher education setting. The findings revealed that the learning space is linked to various dimensions of student learning such as cognitive, regulative, affective and motivational and that individual student differences need to be taken into account.

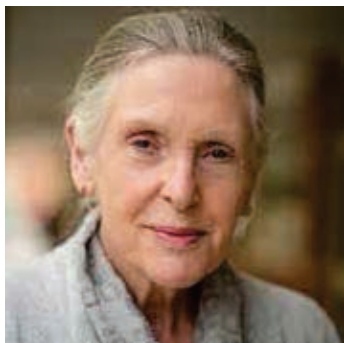
Alterator investigated the emergence of adaptive skills and the evolution of these pedagogical practices in teachers inhabiting ILEs in a multi-case study of Victorian secondary schools. Early phase skills included increased flexibility in assumptions and pedagogical practices, greater collaboration and comfortability with criticisms, with later phases encompassing more advanced skills such as team teaching and informed, reflective practice.

In summary, the presentations in Transitions Australasia 2017 had a strong focus on ensuing impacts of good design, such as spatial literacy, formative evaluation and iterative design. The presentations tended to argue that spaces have changed dramatically in recent years, so changes to teaching and practices must follow. One factor that hindered good practice was a perceived preoccupation with learning outcome metrics that dictated restrictive pedagogic practices, particularly in the senior years. The topics addressed in the Australasian symposium are questions that are globally relevant. These efforts by graduate and early career researchers—from Australia, Canada, New Zealand and the UK—have enabled practitioners and scholars to continue to work together to understand what we have delivered so far and how we can collectively progress toward our broader goal of improving student learning.

REFERENCES

- Honan, E. (2014). Disrupting the habit of interviewing. *Reconceptualizing Educational Research Methodology*, 5(1). Retrieved from <http://journals.hioa.no/index.php/term>
- Imms, W., Mahat, M., Byers, T. & Murphy, D. (2017). *Type and Use of Innovative Learning Environments in Australasian Schools. ILETC Survey No. 1*. Melbourne: University of Melbourne, LEARN, Retrieved from: <http://www.iletc.com.au/publications/reports/>.
- Lefebvre, H. (1991). *The production of space*, Trans, Cambridge, MA: Blackwell.
- Soja, E. W. (1996) *Thirdspace: journeys to Los Angeles and other real-and-imagined places*. Cambridge, MA: Blackwell.

Mary Featherston



Thank you for inviting me to be part of this symposium today.

I have been asked to present some of my work, provide some provocations and thoughts about the future. We are all here today because we are seeking to create better schools & schooling. And certainly, the clamours for change are growing louder and more urgent. Some argue that change is needed because student results are plateauing, some point to lack of student engagement (as detailed in the recent startling Grattan Institute Report), some argue for more creativity, more technology, more STEM etc.

But perhaps there is a more compelling reason. We are underestimating our young people with schooling that fails to respond to their capabilities and interests. If we were to start from a belief in children/young people as seekers after meaning and understanding – as ‘researchers’ - would we create happier people, more pleasurable and relevant learning experiences, better schools ... even better societies?

So, if we start with an image of young people as active protagonists in their own development, from birth, how then can we sustain their curiosity, their researching... and what kind of schools might we create?

‘LAURA’

Here is a very young child, Laura (I show this with thanks to the educators of Reggio Emilia who created these images in 1983). Laura is 11 months old and she has been in a Reggio school for 3 months. Her teachers have given her a catalogue to explore (at this time watches made an audible tick tock sound). Laura is a researcher involved in hypothesizing, observing, discovering and applying her findings. My own experience of observing and collaborating with many young people over the past 50 years leads me to the same conclusion about how we learn.

CHILDREN IN FEATHERSTON HOUSE

Here are children playing - or are they learning – as they have been doing in my house since 1970. This novel environment of interconnected platforms and garden provokes children in many ways and I have come to see that children learn through all their senses and intellect. They are curious, energetic, imaginative, gregarious, unpredictable, witty and are capable of very long periods of concentration. These experiences with children in the house also give me valuable lessons about the essential role of the physical environment as a ‘laboratory or workshop’ to support ‘research’.

EVERYBODY EXHIBITION

In the 1980s, I was involved in establishing the first children's museum (in the old Swanston St building). We had only eight months to develop and design the first interactive exhibition but I thought it was important to consult not only subject specialists but also young people from 6 to 16 yrs. I asked teacher friends to make available half a dozen children for a brief time in an informal setting – children were not to put their hands up to speak but just to have a conversation about what should be included in an exhibition about the human body.

Their ideas flowed – vivid memories – questions – a lot of laughter and many innovative ideas for interactive exhibit design. They also showed self-understanding and empathy for others points of view, for example, they wanted to see real things – actual human organs, but they recognized that their parents could have difficulties with this!

Listening to the recordings of these conversations revealed that the content all came from children's informal experiences, i.e. out-of-school. There was no reference to school learning at all. Also at the end of most of these sessions, the teacher (who had been observing) would express amazement about a particular student who had been an articulate participant in our discussion but had a very challenging behaviour problem in the classroom.

The exhibition was very successful (there was very little competition 30 years ago!) and observing the high level of engagement of children and families in the 'Everybody' exhibition raised the question of what could be learnt from this project – both the consultative process and design of the physical environment - about how to meaningfully engage young people in formal school education?

REGGIO EMILIA

With this question in mind, 25 years ago, I went on my first study tour of the educational project of Reggio Emilia in Northern Italy. This project has its origins in the aftermath of WWII when a group of parents set out to create a new school based on cooperation rather than competition.

With the guidance of an inspired educationist – Loris Malaguzzi – they chose to start by closely observing and documenting children and this led to their enduring belief that children are curious and capable—that they are active protagonists in their own learning rather than passive recipients of transmitted information. They also believe - based on the works of Vygotsky, Dewey, Hawkins, Bruner amongst others - that learning is a social process in which the curriculum is co-created by children and adults in a democratic and reciprocal relationship.

In response to these beliefs about children and learning, the Reggio educators have evolved, over several decades, their core educational philosophy and pedagogical practice of small group, inquiry projects (progettazione). These long-term projects are intended to engage children in deep and memorable learning experiences, which bring together a group of children with a teacher to collaboratively explore a topic or question of strong interest and relevance to the participants - and the larger community.

The teacher's role is to draw on the 'informal' concepts formed by each child from their unique everyday life experiences and to create connections with systematic knowledge - the concepts valued by adult society. It is the children's conflicting ideas and hypotheses that are central to ongoing dialectical discussion. With the guidance and questioning of the teacher, a sustained process of investigation and discovery unfolds over time – sometimes lasting for weeks or months.

The inquiry process is iterative and highly interactive and therefore responsive to the participant's developing interests and capabilities—a co-created curriculum which gives children agency. Knowledge and skills are highly valued and are developed in relevant contexts. The interconnectedness of all realms of knowledge is experienced through the transdisciplinary nature of curriculum content and deep exploration.

Learning is also understood to be active, experiential and to always involve emotion - head, hands and heart. Children are encouraged to express and communicate their ideas and understandings using a wide variety of symbolic languages in addition to the spoken and written word. Topics often involve natural phenomenon, everyday life and culture.

Documentation of the inquiry process is vital as a basis for reflection by the group and to assist teams of teachers in their collaborative planning of future action. It takes many forms – transcripts of discussions, children’s works, photos, video, performance etc. Documentation is also used as a form of embedded assessment. Displays of learning in progress and completed projects inform parents and school community, and enliven the environment.

The immersive experiences of children and adults in processes of inquiry provides possibilities for the development of strong personal relationships of trust and respect. Relationships between children and teachers is thus reciprocal rather than adult-controlled (as in traditional schooling) or student centred.

And from the very beginning, Loris Malaguzzi believed that pedagogy and design of the physical environment was inseparable. As well as many beautiful school buildings, the Reggio educators together with architects and designers have created ranges of furniture and ingenious equipment.

WOORANNA PARK PRIMARY SCHOOL

It was my interest in Reggio that led me fifteen years ago to Wooranna Park Primary School in Dandenong and to the remarkable educators Esme Capp and Ray Trotter. They had for many years been investigating ways to ‘do schooling better’ and had developed innovative practice based on their belief that children are not ‘empty vessels waiting to be filled’. Ray and Esme had come to the view that their physical learning environments were not fully supporting their inquiry-based practice and they sought my help to re-conceptualize and re-design their poor quality 1970s buildings. After many hours of discussion and observation, we sought the Education Department support and received a small amount of funding for a research project to examine the links between pedagogy and design of the physical environment.

‘INSIDE-OUT’ RESEARCH PROJECT - INQUIRY EXPERIENCES

The ‘Inside-Out Research Project’ involved all the Years 5-6 students and staff together with the school community to examine the richness of social and learning experiences involved in long-term inquiry projects. Together we identified approximately 12 discrete types of experiences. The students first investigated ‘what is design?’ and then looked in detail at the requirements of each social/learning setting. To expand the children’s ideas, we undertook a number of small group excursions.

Next, we examined whether the scope of settings was appropriate. Could each setting be available just when it was needed in the course of a project? Where should each be located and the circulation routes between? And would there be enough staff for some to be ‘dedicated’ whilst others could be available to facilitate as needed?

Three years ago, Esme Capp completed a PhD thesis, which establishes a theoretical basis and educational philosophy for this approach. The thesis is available online titled– ‘Collective Inquiry: using cultural-historical theory as a methodology for education reform’. I have continued this work with Esme since she has been principal of Princes Hill Primary School.

The same principles, which underpin the pedagogical practice, also determine all aspects of organization of people, curriculum content and time—and finally spatial organization and design of the physical environment. Each community of learners (50 – 120 children with their team of teachers) is grouped into a Neighbourhood or Home Base, timetables are negotiable and the physical environment is purposefully designed.

To support the wide range of concurrent social/learning experiences essential to Collective Inquiry, the spatial organization of each Neighbourhood comprises an assemblage of several discrete settings. Settings include: focussed discussions, wet and messy activities, large active groups, construction/making, quiet reading and relaxing and multimedia production.

The design of each setting (space, finishes, services and furnishings) grows out of an analysis of practical and psychological needs and is based on the optimal number of participants and the nature and duration of the experiences. Each is designed to attract, engage and sustain engagement by providing ‘cues’ for use, by minimizing distractions from adjacent activities and by placing relevant resources at point of use.

Whilst each setting has an appropriate degree of enclosure to minimize distractions etc they are all interconnected to create a sense of community, to enable supervision and to provide a fluid space for the flow of people and projects. Visual connection and clear circulation paths between all settings enables members of the community to feel connected and to know what is happening. Digital technology is integrated into all areas to support the significant relationship of learning in the real and digital realms. Wherever possible, close links are made to external play/learning areas.

These environments are relatively permanent rather than totally flexible, thus saving teacher's time and energy that would otherwise be spent in negotiating the changing use of space. Stability means that everyone knows where things are – important in a very dynamic program. Resources, artefacts and student works express the identity of each community of learners, reflecting their backgrounds, interests and development of ideas and building familiarity, emotional attachment and a sense of belonging.

COLLECTIVE INQUIRY - EXEMPLAR SCHOOLS

The school listed here are exemplar schools that have established a strong ethos around collective inquiry.

- Dewey LabSchool, 1896 (USA)
- Summerhill School, 1927 (UK)
- Eveline Lowe Primary School, 1960s (UK)
- Reggio Emilia schools, 1960s (Italy)
- High Tech High, 2000 (USA)
- Princes Hill Primary School, (Melbourne, Australia)

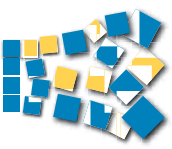
These schools/systems of schools all belong to a 'progressive' stream of education. They are dynamic, democratic and creative. They have clearly articulated principles and a strong belief that pedagogy and physical environment are inseparably related. I am inspired by these examples and believe they hold answers to the development of school education, which is responsive to young people's present lives ... and their needs in an unpredictable future world.

I am very concerned that the way we currently create new pedagogy and facilities is ad hoc and whimsical, lacking clearly articulated visions or principles and therefore lacking criteria against which to judge any pedagogical practice or design. And we know that physical facilities once built will remain for decades.

Now is a good time to make radical change—to re-imagine education. As there is a growing consensus between educational luminaries (Robinson, Yong Zhao, Elmore etc), industry and corporate leaders (Deloitte, PwC etc) and the ideas that young people have expressed over many years about their 'ideal school'.

Perhaps what is needed now is a collective, multi-disciplinary development—enabling each school to be a self-organizing system—evolving in response to their community and a rapidly changing world. They will not be cookie-cutter clones—as I can attest from the schools in Reggio—same principles but each with its own characteristics.

There is a rich legacy to draw upon. We have extraordinary experience and expertise—much of it in this room now—for creating wonder-ful schools.



Session one: Inhabiting design

Interlocutor

Richard Leonard

Hayball PTY LTD - Australia

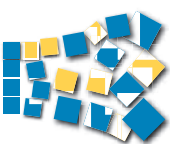


Richard is a Director of Hayball Pty Ltd, a Melbourne based medium-sized design practice offering architecture, interior design and urban planning services.

Richard has more than 25 years of architectural experience in Australia and the United Kingdom and is Director in charge of educational and institutional projects at Hayball. Many institutional projects have been completed under Richard's guidance including aged care and specialist facilities for the Commonwealth Scientific & Industrial Research Organisation (CSIRO) – however, education remains Richard's primary professional passion.

He is a strong advocate for the collaborative design process to integrate modern education philosophies into school facilities. In this capacity, he has collaborated with a number of leading education specialists in Australia, including Associate Professor Peter Jamieson, Mary Featherston and Dr Julia Atkin.

Richard plays an active role in the education field, as a past chair of the Australasia Region of Learning Environments Australasia and active member of A4LE internationally, through involvement with Department of Education and Early Childhood Development (DEECD, Victoria), the Boyd Foundation and the Learning Spaces initiative and also the University of Melbourne. He regularly participates in various education conferences and seminars including organizing events for Learning Environments Australasia . In 2010, he presented at the OECD conference in Vienna: "Imagine: Exploring radical visions for tomorrow's schools". Richard has participated as a Linkage Partner with the University of Melbourne in three Australian Research Council projects focusing on education and also in the LEaRN initiative (Learning Environment applied Research Network), including the Innovative Learning Environments and Teacher Change.



Inhabiting educational design: Intentions, tensions and implications

Dr Anna Peterson

Queen's University - Canada

ABSTRACT

When billions of dollars are invested annually in public education infrastructure, it is essential to know how design affects the lives and work of educational stakeholders. A qualitative, phenomenological, case study methodology was chosen to investigate the lived experience of educational design at two comprehensive schools (Grades 1–9) in Helsinki, Finland. Interviews with architects and principals involved in the design of these schools and photo-elicitation interviews with teachers and students identified a lack of congruency between the intended purpose(s) and users' experiences of the design of their schools. This insight led to the development of the Educational Design Intentions (EDI) Model, which provided understandings of participants' experiences of inhabiting their schools and the need for post-occupancy evaluations from an educational and humanistic perspective. This knowledge has the potential to facilitate change at participant schools, increase knowledge in the field, diversify school design and focus future research.

KEYWORDS: INHABITING; PLACE; DESIGN; POST-OCCUPANCY EVALUATION; IMAGE-BASED RESEARCH

Anna Peterson is an early career researcher specializing in learning environments design and evaluation. With the support of the Social Sciences and Humanities Research Council (SSHRC) Joseph-Armand Bombardier Canada Graduate Scholarship, Anna completed her PhD in Education at Queen's University, Canada. Intrigued by a lack of congruency between the intended purpose(s) and users' experiences of educational design choices, her doctoral research led to the development of a conceptual framework to capture and communicate evidence-based knowledge regarding the ways in which students and teachers inhabit educational design. Anna's research contributes an educational and humanistic perspective to the study of school architecture and provides a unique approach to the burgeoning field of post-occupancy evaluation using photography. Anna is a qualified elementary teacher and was an invited intern with the Organization for Economic Co-operation and Development's (OECD) Centre for Effective Learning Environments (CELE). Anna is a member of several international interdisciplinary research networks devoted to exploring the dynamic balance between education and architecture.

Educational theory and practice are changing rapidly in response to the needs of today's digital world and knowledge economy, although there is debate in the field regarding what skills and knowledge are needed and how best to structure teaching and learning (Davis, Sumara & Luce-Kapler, 2008; Noddings, 2003). Similarly, school architecture is evolving in response to the shifting purposes of public education (Burke & Grosvenor, 2008; Darian-Smith & Willis, 2017; Ellsworth, 2005; Imms, Cleveland & Fisher, 2016; Plummer, 2016; Taylor, 2009; Tuan, 1977; Woolner, 2015; Zumthor, 2005). Research regarding the affective and experiential domains of educational design is needed to complement and extend established research parameters by building 'inhabitation' evaluation mechanisms that inform a community-wide understanding of this phenomenon.

This paper briefly introduces a conceptual framework developed as part of my doctoral research supported by the Social Sciences and Humanities Research Council (SSHRC) of Canada. Following an overview of the research questions and methodology, this paper describes the development of the Educational Design Intentions (EDI) Model, presents key findings and a discussion of implications for people, place and pedagogy.

PURPOSE AND RESEARCH QUESTIONS

The overall purpose of the study was to explore students' and teachers' lived experience of educational design. Specific research questions included:

1. What can be learned from the experiences of architects and principals involved in the design of two exemplary public schools?
2. How do students and teachers experience the design of these educational environments?
3. How can their experiences inform educational design?

Examining the experiences of those involved in designing, living and working in educational facilities contributes an educational and humanistic perspective to the study of school architecture, as well as a unique approach to the burgeoning field of post-occupancy evaluation through the use of photography.

INHABITING

The ways in which we inhabit a place or an idea profoundly affect our thoughts, feelings and actions in the world. The word inhabit describes being present or situated within a particular place, environment, idea, mindset or professional discipline. As a verb, inhabiting describes an on-going, ever-changing process of adaptation between a person or a group of people and the world in which they live. The process of inhabiting occurs simultaneously on a multitude of levels. It can be conscious or unconscious, physical, social, emotional, cognitive and spiritual or any combination of these experiences.

METHODOLOGY

A qualitative, phenomenological, multiple case study design was developed to investigate the lived experience of educational design at two exemplary, publicly funded, comprehensive schools (Grades 1–9) in Helsinki, Finland. The study group consisted of 29 students, 10 teachers, 2 principals and 3 architects. The student group was comprised of 11 boys and 18 girls between 12 and 16 years of age; four students were in Grade 6, five in Grade 7, five in Grade 8 and 15 in Grade 9. Teachers in the study taught a range of subjects including Language Arts, Science, Math, Music and Textile/Visual Arts. All but one teacher was female. All but two participants spoke Finnish (others spoke Estonian and Arabic) as a first language and had good-to-excellent skills in conversational English.

Semi-structured interviews were conducted with the architects and school principals involved in the design and/or administration of each school to explore participants' roles, working relationships (how decisions were made and by whom), design intentions and post-occupancy observations. These interviews also helped to contextualize students' and teachers' experiences.

Photo-elicitation interviews provided an opportunity for students and teachers to articulate their daily interactions with each school's design. An image-based research methodology was chosen as it is more inclusive and effective than the rigid question-and-answer format of traditional interviews and beneficial when working with second-language English participants (Einarsdóttir, 2005). The freedom to take personally relevant photographs shifted the locus of power to participants and required the researcher to adapt to students' and teachers' photographs and experiences.

Digital cameras were used in the study because they were readily available, participants were knowledgeable about their use and a digital format facilitated the transfer of photographs between people and data analysis software.

Students and teachers were instructed to *take photographs of interior and exterior school spaces that reflected supportive and constraining elements of their experiences with the design of each school*. Photographs were to be respectful of the people and places involved. Participants had the freedom to identify aspects of school design important to them within a defined (one-week) but unhurried timeline before choosing ten photographs for discussion at individual photo-elicitation interviews, which were held within 1–2 weeks after completing the research task. No selection criteria were provided, as each participant had their own reasons for choosing which photographs to bring to the interview.

DATA ANALYSIS

In the absence of a theoretical framework widely accepted by education and architecture, data were analysed using Christopher Alexander's (1964) construct that "every design problem begins with an effort to achieve fitness between two entities; the form in question and its context" (p. 15). Context is understood to be more than a description of functional requirements; it also includes the relationship between requirements and the environment in which the design is to be used.

In design, "incongruities ... are the primary data of experience [used to measure fit in an attempt] to satisfy the mutual demands which [form and context] make on one another" (Alexander, 1964, p. 22). Data analysis consistent with Alexander's (1964; 2012) thinking led to the development of a conceptual model that explores the *lived experiences of tensions within selected participant-identified educational design intentions and their implications for educational design*. The Educational Design Intentions (EDI) Model explores the flow of educational design from explicit or implicitly determined design intentions, to a discussion of participants' experiences of tensions (instances of fit and misfit) created by design choices and, finally, to ways in which greater balance between school spaces and users experiences can be achieved. A graphic description of the model is presented in Figure 1.

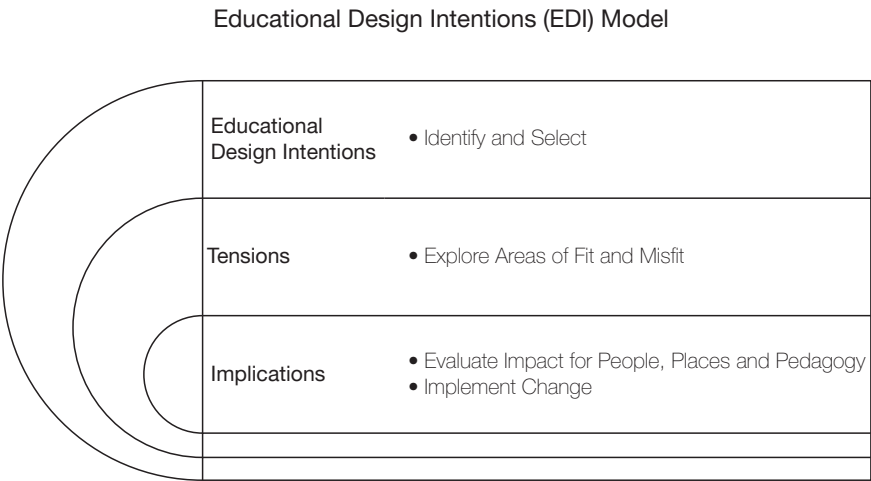


Figure 1. Educational Design Intentions (EDI) Model.

Data regarding student lockers affords a ready example of the model's utility. Lockers at both sites were identical, although they were distributed somewhat differently. As illustrated in Figure 2, the design of the locker included two L-shaped spaces configured one above the other with a wider horizontal space at the top or the bottom with a combination lock and a long narrow middle space.

In this instance, the *design intention* was to provide individual storage space for students in Grades 7–9. The data, however, demonstrated that students experienced their lockers as much more than storage space. They were experienced as a distinguishing feature of their *status as senior students*, as a *vibrant social space* and as their *only personal space* at school. Lockers located at a distance from peers were experienced as being of less value and disruptive of basic interactions.

Use of these lockers presented multiple *tensions*. It was difficult to use the top and bottom lockers simultaneously, as they occupied the same footprint. The placement of the lock further complicated the use of this shared space. The shape of the lockers was awkward at best and they were consistently described as too small. It was difficult, if not impossible, to accommodate larger items (art projects, sports gear) and backpacks excluded from dining halls for safety reasons. Lockers located at a distance from classroom added to travel time between activities and limited opportunities for organization.

Students' experiences yielded many *implications* for the design and use of lockers.

Comments include: "Lockers should be bigger." "If our school is so big, why don't we have a place to put our things." They also suggested that day-use lockers of different sizes be available and that safe storage options for backpacks be located outside dining hall areas. One student concluded, "You can do better." Imagine the ways in which student lockers could be designed, distributed and allocated if the meaningful ways in which students experienced their lockers were more fully integrated. Use of the model provides evidence of what is working and not working and can be used to guide holistic design decisions.



Figure 2. Design of student lockers at both schools.

INHABITING EDUCATIONAL DESIGN

Educational stakeholders are uniquely positioned to articulate their experiences regarding how their schools actually function. Students and teachers took over 1600 photographs, of which 400 were discussed at the interviews. Participants were proud of their work and eager to discuss why they had taken and chosen particular photographs and, most importantly, how their photographs led to the identification of many experiences with and feelings about design elements important to their everyday lives at schools.

The following section summarizes key insights regarding participants' experiences of inhabiting their schools:

- ***Need for professional teacher environments.*** Teachers felt they, as individuals, and their work were important when school environments communicated a valuing of their discipline and supported their personal and professional needs. This was further reflected in a desire for classrooms that were less architecturally neutral, more space and options regarding the location of teacher spaces and well-functioning staffrooms and workrooms.
- ***Sofas were important to everyone.*** The spaces created by soft-seating options were highly desired in both social and academic settings. The contributions of sofas at school were unparalleled even when they were falling apart or inconveniently located.
- ***Art contributes to the experience of being at school.*** All students photographed the art pieces commissioned for their schools and, even when they did not like a particular art feature, they appreciated the atmosphere they created. The contribution of school art far exceeded the one per cent budget allocation.
- ***Students feel recognized and valued when they see themselves reflected in school environments.*** Opportunities to display and share their work contributed to a sense of belonging by communicating that what students do matters. These experiences are formative and long lasting. As such, senior students traveling between rooms keenly felt the loss of personalized classroom environments.

- ***Drawn in and denied.*** When architecturally unique or purpose-built school spaces are inaccessible or underutilized, people feel cheated out of some or all of the intended experience. Over time, despite attempts to find alternate uses or ways around temporary rules, people can disengage with these spaces and their potential to contribute to pedagogy, learning and life at school are under realized.
- ***Overlapping use of space compromises functionality.*** When cost or efficiency is prioritized over utility, everyday experiences are unnecessarily complicated.
- ***Desire to be connected with the natural world.*** Participants enjoyed the extensive use of glass and large windows, which afforded long and short views of natural settings as they changed with the seasons. Opportunities to grow plants in classrooms were seen to be more valuable than plant rooms. Students at both schools sought out trees, water and animals even when these were off school property. Teachers were attracted to the learning opportunities offered by the nearby forest, pond and seashore but were torn by having to enforce rules precluding the use of these spaces. Both students and teachers wondered why these natural elements had been excluded from the schoolyards.
- ***Schoolyards matter.*** Schoolyards designed without a dedicated budget and with an eye to minimizing operating expenditures, lost student opportunities to engage in age-appropriate play and to connect with each other and their surroundings.
- ***Senior students need a place of their own.*** Repeatedly, senior students expressed a need for indoor and outdoor places to be with friends and opportunities to engage in developmentally appropriate activities unique to their cohort. Such places can support the development of interpersonal skills and help to balance the demands of academic life.
- ***Need for calm, quiet, restful places.*** Schools are hectic. When quiet spaces are lacking, students and teachers have few opportunities to recharge throughout the day. The provision of restful places and activities reduces stress and fosters an individual's ability to cope.
- ***Small things that annoy on a daily basis have a disproportionate impact on lived experience.*** Over time, participants felt annoyed and frustrated of small areas of misfit or design problems.
- ***Individual unisex bathrooms worked well.*** So well, in fact, they rarely appeared in the data. When they did, it was to show off aesthetically pleasing, functional spaces.
- ***Multipurpose spaces need to be responsive to the needs of each function.*** Too often, one function takes precedence and little is known about how these spaces function in situations of over or under enrolment.
- ***Need for adequate and appropriate storage.*** Not enough storage or storage that does not meet requirements creates many problems. It can lead to disorganization, absorption of alternate spaces to meet storage needs and poor use of teacher time. Storage needs vary widely and need to be understood on an individual basis.
- ***Schools that provide specialized teaching spaces and learning opportunities are valuable.*** Experiential and hands-on learning opportunities in music, the visual and fine arts, domestic arts and wood/metalworking were integral to students' experiences at school and complemented their academic endeavours. In this way, students were able to explore personal interests and abilities as part of discovering their own avenues for success. Students and teachers were proud when these spaces were well designed and equipped.

DISCUSSION

Inhabiting educational design is a complex process at the heart of the relationship between people and the natural and built environment. If schools of the future are to effectively meet the needs of their inhabitants, more research is needed to capture and communicate stakeholders' experiences of inhabiting school architecture.

The design, construction and use of educational facilities is supported when architects and educators inhabit this experience as equal participants, develop more effective ways of working and when strategies are implemented to enhance a greater understanding of each other's disciplines.

Educational stakeholders are best situated to work with architects to identify the component parts integral to the relationship between school design, education and life at school. Information at the level of the user clarifies and explains what is needed rather than what is envisioned by another person or group. By bringing component parts out into the open, it is possible for

architects and educators to jointly see them as they are, to discover how they interact and to develop a common language grounded in a shared understanding of areas of fit and misfit and their implications for the design of educational facilities. In this way, design decisions are free from assumptions and guesswork.

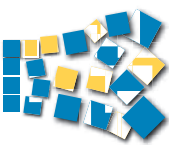
Input from educators regarding how the built and natural environment supports or constrains teaching, learning and life at school is critical throughout every step of the process of developing a school. Such participation also supports the development of curricula in concert with school design and construction.

Post-occupancy evaluations need to explore the full range of the dynamic relationship between education and architecture. Evaluations of school buildings from an educational and humanistic perspective are as important as evaluations of a facility's physical plant. Architects in the study were unaware of what design aspects worked well and were at risk of replicating areas of misfit. At the same time, teachers at both schools felt powerless to address areas of misfit. Their attempts were thwarted by rules of unclear origin governing the overall use and/or aesthetic of the school. An inability to effect change in their immediate environments was keenly felt, engendered feelings of helplessness and discouraged talented people.

Too often educators, architects and the public assume that school design is a chicken and egg problem and that simultaneous evolution of educational form and context is impossible. In fact, education and school architecture are, as they have always been, dependent on one another for definition and expression. Only by making the intangible aspects of this relationship tangible, will we discover and actualize the full potential of the relationship between education and architecture.

REFERENCES

- Alexander, C. (1964). *Notes on the synthesis of form*. Cambridge, MA: Harvard University Press.
- Alexander, C., Neis, H., & Moore Alexander, M. (2012). *The battle for the life and beauty of the earth: A struggle between two world-systems*. New York, NY: Oxford University Press.
- Burke, C., & Grosvenor, I. (2008). *School*. London, England: Reaktion Books.
- Darian-Smith, K. & Willis, J. (2017). *Designing schools: Space, place and pedagogy*. New York, NY: Routledge.
- Davis, B., Sumara, D., & Luce-Kapler, R. (2008). *Engaging minds: Changing teaching in complex times* (2nd ed.). New York, NY: Routledge.
- Einarsdóttir, J. (2005). *Playschool in pictures: Children's photographs as a research method*. *Early Child Development and Care*, 175(6), 523–541.
- Ellsworth, E. (2005). *Places of learning: Media, architecture, pedagogy*. New York, NY: Routledge.
- Imms, W., Cleveland, B. & Fisher K. (Eds.). (2016). *Learning environments evaluation*. Snapshots of emerging issues, methods and knowledge. Rotterdam, Netherlands: Sense Publishing.
- Noddings, N. (2003). *Happiness and education*. Cambridge, England: Cambridge University Press.
- Plummer, H. (2016). *The experience of architecture*. New York, NY: Thames & Hudson.
- Taylor, A. (2009). *Linking architecture and education: Sustainable design of learning environments*. Albuquerque, New Mexico: University of New Mexico Press.
- Tuan, Y. (1977). *Space and place: The perspective of experience*. Minneapolis, MN: University of Minnesota Press.
- Woolner, P. (Ed.). (2015). *School design together*. New York, NY: Routledge.
- Zumthor, P. (2005). *Atmospheres: Architectural environments · Surrounding objects*. Boston, MA: Birkhäuser.



The Gadfly: Doing data differently

Sarah Healy & Carol Morrison
University of Melbourne - Australia

ABSTRACT

The Gadfly first materialized as a provocative data performance at the Transitions Research Symposium, held at the University of Melbourne in June 2017. The figuration of Socrates-as-gadfly in the title shapes the figure of the researcher as (bothersome) questioner that provokes critical dialogue about the assumptions underpinning our own research practices and learning environments research more generally. This figuration provides us an entry point into working data through approaches offered by new materialist and post-qualitative research methods. The resulting data performance comes together as a collaborative experiment which inhabits the in-between spaces of researchers, participants, research contexts, and 'data' from an in/formal educative site – a taekwondo club. A by-product is the development of a collaborative method involving an intra-active process that seeks to do data differently, rather than to simply represent data. Informing our process of 'data talking, us talking data and data talking back' are concepts of assemblage, affect, and sticky data.

KEYWORDS: POST-QUALITATIVE; DATA PERFORMANCE; COLLABORATIVE METHOD; AFFECT

Sarah and Carol are both late-stage PhD candidates at the University of Melbourne's Graduate School of Education. Prior to embarking on her PhD, Carol was a primary teacher for 17 years and a primary school principal for 8 years. She is now researching policy practices of new generation learning environments in Melbourne Catholic schools. Meanwhile, Sarah's background is in the creative industries and visual art education. She is now researching affective pedagogies across in/formal learning environments. Sarah and Carol share an interest in poststructural theories related to new materialities. Their respective research projects intersect on an onto-methodological level. This collaborative presentation explores that intersection, inhabiting the in-between spaces of researchers, research contexts, and 'data' from an in/formal educative site – a taekwondo club.

ENTER THE GADFLY

Socrates referred to himself as a **gadfly** - a horsefly with a nasty bite that, while irritating, does not do serious harm. Socrates-as-gadfly continually provoked citizens of Athens to show that they did not know what they thought they knew. We draw on the figuration of Socrates-as-gadfly to ask provocative questions with 'bite' to draw different methodological approaches into the learning environments applied research conversation. We argue that without methodological diversity, learning environments research risks reproducing existing knowledge by limiting itself to the development of understandings about how learning environments as pre-existing objects work, and how teachers as individual subjects make them work (or resist their pedagogic potential). To expand our view of what learning environments research could achieve, we turn to studies of Science, Technology and Society (STS) which show, through empirical case studies, that knowledge and reality are not distinct from one another (Callon, 1986; Callon, Law, & Rip, 1986; Latour & Woolgar, 1986). Rather, these studies, alongside related works, show that reality and knowledge of reality assemble together – that is they are co-produced in entangled sociomaterial practices (Barad, 2003, 2007; Latour, 2005; Law, 2004; Law & Mol, 2002; Mol, 2002). The broad aim of this paper is to explore the possibilities that arise from accepting that the researcher, the researched, and the research approaches and tools co-constitute each other. We do this by bringing a performative sensibility to our data work, co-opting approaches offered by new materialist (Coole & Frost, 2010; Fox & Alldred, 2017) and post-qualitative research methods (Lather & St. Pierre, 2013).

What follows is a brief methodological backstory to the gadfly-performance-paper and an introduction to guiding concepts of assemblage, 'sticky data' and affect. We then demonstrate our data work via a performative script and, finally, discuss possibilities emerging from doing data differently.

METHODOLOGICAL BACKSTORY

Using Honan's (2014) 'Disrupting the habit of interviewing' as a model for how we might work empirical material differently, we present a data-performance from our own PhD research entailing a method of 'data talking, us talking data, and data talking back'. This paper maps our collaborative data intra-actions¹ with three, mini data 'vignettes' (Masny, 2014) configured from a Taekwondo training session involving a group of high performance athletes and their coach in the lead-up to two high profile national and international events. The data vignettes draw on material from various sources (field notes, sound bites, interviews, and photographs) including our researcher conversations, with no one source being privileged over another. Our collaborative method of 'doing data differently' resists temptations to 'close data in on themselves' thereby disrupting what Honan (2014) identifies as habitual approaches to working with data. In the process, data become agentic co-collaborators that bring into play concepts, affects, encounters and relations in (and out of) research.

Our data work draws on Deleuze and Guattari's (2013) closely linked concepts of assemblage and affect. An assemblage can be understood as consisting "of multiple, heterogeneous parts linked together to form a whole" (Muller & Schurr, 2016). The research assemblage in which we become entangled is a gathering of researcher, research tools, research site, participants, data vignettes and analysis. A research 'subject' such as the coach or the researcher in this data performance can be understood as an assembling of entities within the larger research assemblage, rather than a distinct and pre-existing human subject. For example, a researcher body assembles with living and inert others for a period of time (researcher-pencil-notebook-laptop-chair-desk-data), then disassembles and reassembles in different combinations of living and inert others (researcher-notebook-pencil-audiorecorder-sweat-smell) only to disassemble and reassemble again and again (Somerville, 2016). Agency within the assemblage "is not attributable to any one thing, but rather bound to [the] assemblage" ... [and] ... "human actions are only one force" (original emphasis, Jackson & Mazzei, 2016, p. 94). In the research assemblage, data and other living and non-living entities all exert force and have agency (Bennett, 2010).

Affect, understood as a transmission of intensity (Deleuze & Guattari, 2013), is one such force that we consciously attune to in this collaboration. Affect is an important part of any assemblage because it acts as a pulse, becoming the source of its

1 We work with Barad's (2003, 2007) concept of intra-action to convey the co-constitutive nature of data, researcher, and researched rather than interaction, which that assumes there are separate entities that interact.

power, “making the socio-material hold together or fall apart” (Muller & Schurr, 2016, p. 9). Foregrounding the work that affect does in the research assemblage moves us to deliberately seek out those moments of ‘disconcertion’ in the data (MacLure, 2013). It prompts us to engage with relations and entities that get ‘under the skin’ (MacLure, 2011, p. 999) and ‘stick’ to us. This ‘stickiness’ can be understood as an affective relation that functions variously to hold-together, block, or bind entities by accumulating affective value (Ahmed, 2014). The notion of ‘sticky learning’ has recently been deployed in educational research due to its capacity to generate “a different way of attending to the production and transfer of learning” (Mulcahy, 2016, p. 208). In our case, the notion of ‘sticky data’ becomes salient because it offers us a way of accounting for the complex and “dynamic process of discursive practices and the materiality of the body” (original emphasis, Zembylas, 2007, p. 29).

WORKING THE DATA

In the following section of the paper, we present a script of us, the author-researchers, doing data. It is comprised of three research/ers intra-actions with data, as performed at the Transitions Research Symposium, 2017. Intra-action acknowledges that the boundaries of entities are not fixed but are in a constant state of being made, unmade and remade differently from within relationships. Our researcher thinking-doing is interspersed with field notes, photos and interview transcripts to form data conversations around data that ‘stuck’ with us.

Data Intra-action 1.

[Sarah sits on stool holding journal - becoming researcher at Taekwondo. Carol moves to the researcher table and dons her researcher hat (literally a hat). A soundbite of athletes vocalizing while they spar plays. Photo of training room on screen.]

Sarah: *Taekwondo training session*
7.30am
17 high performance athletes, 12 – 28 years
1 coach
1 researcher

I sit in a rectangular shaped room with mirrors down each side. The floor has red and blue taekwondo mats. Training mitts, kicking bags, and protective gear hang in orderly rows. There are ceiling fans – not on. And air conditioning units – also not on. There is a particular smell.

[Sarah joins Carol sitting at the researcher table – hat on, notebook and pen in hand.]

Carol: *Air con and fans not on? What is it about the smell? Assaulting the senses?*

How does the smell affect researcher, athletes, and coach? The air-conditioning and fans are not on – the ‘not on’ fans attract – how? Smell and (not on) fans become part of this training assemblage along with trainees, coach, equipment and competition. How is our researcher attention called to what is (not) there?

Sarah: *We can understand data that attract attention and stay with the researcher as ‘sticky data’. The data vignettes are composed of data that stick (and stink). Data stick to the researcher and the researcher sticks to data. Not only do data have the capacity to stick but they can also have sticking points. The smell, the air con – not on, fans – not on, unwashed training gear releasing microscopic particles into the atmosphere can clot.*

Carol: *Our researcher expectations enter the assemblage. Something expected to be there that is not there, to be ‘on’ or working but not working, reveals a contingent reality – an expectation of the future but one that will vacillate – a future that is both fans on and fans off. This working of data that become part of assemblages brings to attention the constant contingency at work between human and nonhuman agencies which, according to Spinoza, involves the passions and patterning of fear and hope.*

Data Intra-action 2.

[Sarah puts on tracksuit top, becoming coach. Carol becomes researcher sitting on the stool taking notes. A soundbite of coach-voice plays. Photo shows athletes entangled in a sparring exchange.]

Carol: *The coach walks into the training room and the chatter that is accompanying the warm-up stops dead. Today the athletes are instructed to listen, NOT question. The first drill is explained; they break off into sparring pairs and begin. The coach has a stopwatch, whistle and stick. Every minute she shouts "CHANGE!" and the sparring pairs swap roles. The intensity in the four walls of the training room is palpable.*

Sarah-coach: *"As I call out your name, you'll be on the defensive
Keep going. No stopping. No talking!
Frustrate your partner. Close your gaps. Frustrate, frustrate, frustrate!
Change! The other line is frustrating now.
Work the other person's patience. Look for the gaps in the attack.
Change!"*

Carol: *One sparring pair at the end of the room stop what they are doing. They've lost focus.*

[Sarah removes Tracksuit top. Carol and Sarah move to research table and chairs – hats, notebooks, pens.]

Sarah: *The clotting of coach-stopwatch-stick-whistle-shouting-pacing in a traditional martial arts training space 'appears' coach-centred. However, this rendering of the coach as coach-centred is incomplete; it reflects the notion of coach (teacher) as individual, intentional human subject. It misses the highly responsive bodywork that the coach is doing.*

Carol: *It brings to mind the work that teachers do in classrooms. What we as researchers can see and hear is not all that is happening. We can also turn our attention to athlete (or student) bodies and their material-discursive practices. Moving with coach/ resisting coach – becoming Taekwondo athletes differently? Identities are enacted through multiple connections with other bodies, other assemblages.*

Data Intra-action 3.

[Sarah becomes coach in tracksuit top – standing, leaning against researcher chair. No soundbite. Photo of sweaty athlete bodies engaged in a group hug.]

Sarah-coach: *"You can't overthink it because it becomes a little forced... Sometimes I'll tap into the kids and I'll see that once they start fraying, that means they've lost control. So, I pull back a little. I stop counting the activities, I stop whistle blowing, I just keep it free. I'm conscious of not just yelling at them because then they'll become incredibly dependant on that. We don't want that. A class is designed around giving them a sense of empowerment over decision-making. The decision is ultimately theirs; I just give them lots of options. Then we practice, then I put them under pressure. Then I'll pull back and see how they're going making that decision. And so often, they're bugging it up. And then there's "BaaaH!" And that's fine. I'll come back in and reassert, reposition everybody. Changing partners is a big one because if they stay with the same partner they don't reboot."*

[Sarah and Carol move to chairs. Hats, notebooks and pens.]

Carol: *Fear and hope are intense in this vignette. Does the coach work to allay fear and build hope through her body? Giving a sense of empowerment – is that hope that athletes can make the right decisions on their own? She builds muscle memory – body workings, working bodies helping them to not overthink? She pulls back to give them a go but they keep 'buggering it up'. Is that her fear?*

Sarah: *She puts the pressure back on, practicing again. She is 'tapping' into the athletes, palpating their body-talk, responding in kind by modifying her own practice, modifying the intensity of the affective flows within the training assemblage, sometimes modifying the assemblage altogether.*

Sarah: *And then there is the assembling of sweat-bodies. Athlete-partner-frustrating-sweating-in control/buggering it up! Athlete and coach bodies produce sweat, smell, and feelings that fold into other assemblages. It is not clear where bodies begin and end. The smell of Taekwondo hugs you. It is a seeping of sweat between athlete bodies into protective gear, permeating the atmosphere and thickening the air. It inhabits the data but you can't see or smell it in this data performance.*

Carol: *Thank god!*

Sarah: *It is both flashback and premonition that palpates stink-bodies in ever shifting patterns of fear and hope.*

[Sarah and Carol move to lectern and conclude the performance. No hats.]

DISCUSSION

In this paper, we demonstrate how we might do data differently. We accomplish this by engaging a collaborative method of talking and questioning data, that disrupts conventional analytic approaches. We argue that uncritical use of analytic strategies like coding, classifying, reducing and weighting data do not represent reality, but help create the phenomena under investigation. Therefore, we wanted to make room for unexpected and surprising events to emerge by allowing data to speak with and through us. We deploy concepts of assemblage, 'sticky' data, and affect, and engage in a process of learning with each other (as researchers) to not steer away from affects that produce, and are produced by bodies and sweat and smells. Working in this collaborative way, we consciously open ourselves to the potential agency of living and non-living entities.

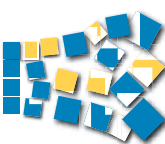
We present this methodological experiment to open a space for critical dialogue among the learning environments research community. For us, that critical dialogue aims to push back on commonly-held assumptions that there are naturally occurring divisions between the researcher and researched, what our participants tell us and what we ask them, what we think about and what we write in research texts, and participants' and researcher bodies (and minds). Therefore, the performance cum paper is provocative in its attempt to unsettle the assumption that there are pre-existing realities out there that can be represented in our research reports. Moreover, it demonstrates how we may understand material settings, texts and bodies (minds) as entangled assemblages – continually co-constituting each other in messy and often uncertain socio-material practices.

Adopting new material and post-qualitative research practices such as these can help us to think differently, and become researchers differently, by interrogating and disrupting what is emerging, assembling, and clotting in learning environments research. However, perhaps more importantly for us is the process of collaborating, the intra-active researcher practice that is emerging as the most powerful research tool. This is so much the case that we are currently developing the second phase of this project whereby we enact our collaborative method with data generated at another research site, a primary school. This will result in a second data performance, allowing us to look for patterns of understanding developed through the first data performance in relation to school-based practices. It is this collaborative practice that enables – and emboldens – us to put aside our "blind faith in the power of language to re-present the story [to show] a different way of re-presenting the [learning environments] research assemblage" (Honan, 2014, p. 14). And in the process, becoming learning environments research/ers differently.

REFERENCES

- Ahmed, S. (2014). *The cultural politics of emotion*. Retrieved from <http://unimelb.eblib.com.au/patron/FullRecord.aspx?p=1767554>
- Barad, K. (2003). Posthumanist performativity: Toward an understanding of how matter comes to matter. *Signs*, 28, 801-832.
- Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Durham: Duke University Press.
- Bennett, J. (2010). *Vibrant matter: A political ecology of things*. Durham and London: Duke University Press.
- Callon, M. (1986). Some elements of a sociology of translation: Domestication of the scallops and the fishermen of St Brieuc bay. *Sociological Review Monograph*, 32(2), 196-233.
- Callon, M., Law, J., & Rip, A. (Eds.). (1986). *Mapping the dynamics of science and technology: Sociology of science in the real world*. Basingstoke: Macmillan Press Ltd.
- Coole, D. H., & Frost, S. (Eds.). (2010). *New materialisms: Ontology, agency, and politics*. Durham [NC]; London: Duke University Press.
- Deleuze, G., & Guattari, F. (2013). *A thousand plateaus: Capitalism and schizophrenia* (B. Massumi, Trans.). London: Bloomsbury Academic.
- Fox, N. J., & Alldred, P. (2017). *Sociology and the new materialism: Theory, research, action*. London; Thousand Oaks, CA.: SAGE.

- Honan, E. (2014). Disrupting the habit of interviewing. *Reconceptualizing Educational Research Methodology*, 5(1). Retrieved from <http://journals.hioa.no/index.php/rerm>
- Jackson, A. Y., & Mazzei, L. A. (2016). Thinking with an agentic assemblage in posthuman inquiry. In C. A. Taylor & C. Hughes (Eds.), *Posthuman Research Practices in Education*. Houndmills, Basingstoke, Hampshire: Palgrave Macmillan.
- Lather, P., & St. Pierre, E. A. (2013). Post-qualitative research. *International Journal of Qualitative Studies in Education*, 26(6), 629-633. doi:10.1080/09518398.2013.788752
- Latour, B. (2005). *Reassembling the social: An introduction to Actor-Network-Theory*. Oxford: Oxford University Press.
- Latour, B., & Woolgar, S. (1986). *Laboratory life: The construction of scientific facts*. Princeton, NJ: Princeton University Press.
- Law, J. (2004). *After method: Mess in social science research International Library of Sociology* Retrieved from <http://unimelb.eblib.com.au/patron/FullRecord.aspx?p=200755>
- Law, J., & Mol, A. (2002). *Complexities: Social studies of knowledge practices*. Durham: Duke University Press.
- MacLure, M. (2011). Qualitative inquiry: Where are the ruins? *Qualitative Inquiry*, 17(10), 997-1005. doi:10.1177/1077800411423198
- MacLure, M. (2013). Classification or wonder? Coding as an analytic practice in qualitative research. In R. Coleman & J. Ringrose (Eds.), *Deleuze and research methodologies*. Edinburgh: Edinburgh University Press.
- Masny, D. (2014). Disrupting ethnography through rhizoanalysis. *Qualitative Research in Education*, 3(3), 345-363. doi:10.4471/qre.2014.51
- Mol, A. (2002). *The body multiple: Ontology in medical practice*. Durham and London: Duke University Press.
- Mulcahy, D. (2016). 'Sticky' learning: Assembling bodies, objects and affects at the museum and beyond. In J. Coffey, S. Budgeon, & H. Cahill (Eds.), *Learning bodies: The body in childhood and youth studies*. Singapore: Springer.
- Muller, M., & Schurr, C. (2016). Assemblage thinking and actor-network theory: Conjunctions, disjunctions, cross-fertilisations. *Transactions of the Institute of British Geographers*(3), 217. doi:10.1111/tran.12117
- Somerville, M. (2016). The post-human I: Encountering 'data' in new materialism. *International Journal of Qualitative Studies in Education*, 29(9), 1161-1172. doi:10.1080/09518398.2016.1201611
- Zembylas, M. (2007). The "specters" of bodies and affects in the classroom: A rhizo-ethological approach. *Pedagogy, Culture and Society*, 15(1), 19-35.



The pure and the polluted: A spatial study of one co-located special school

Peter Walker

Flinders University - Australia

ABSTRACT

This paper focuses on one of four 'case study' special schools researched within a doctoral thesis. The overall thesis explored the extent to which co-locating special schools might facilitate increased inclusive practices. Soja's Thirdspace was utilized as a conceptual framework to analyse both place and space. The credibility of the final analysis was increased through member checking of major themes during a subsequent interview of two school leaders. Results showed significant differences between 'planned for' and 'realized' schools. Spatial contestation and budgetary limitations prohibited connections between schools. An analysis of classrooms, playgrounds, and shared spaces, such as corridors, indicated a pedagogical desire to promote student learning and increase independence, over the spatial control of student behaviour. Connections are made with the literature on 'pollution' and schools utilizing spaces to define, restrict and protect against certain populations and behaviours. This paper provides a valuable contribution towards an emerging body of research on how inclusive education is affected by the spatial decisions of policy makers and educators.

KEYWORDS: THIRDSPEACE; INCLUSION; SPATIAL

Peter Walker has worked in both general education and special school settings for over 20 years, both in South Australia and New South Wales. Following 5 years as a school principal, Peter returned to Adelaide to teach in both undergraduate and postgraduate programs at the School of Education, Flinders University. His current research interests include the Australian Curriculum, inclusion, whole school approaches to challenging behaviour, and autism. In 2016 Peter presented a Ted Talk at Tedx Adelaide on the theme of 'inclusive education'.

FLINDERS SPECIAL SCHOOL =

In 2006 *Education Works* was announced by the South Australian Government. The new reform, resulting in the amalgamation of schools, was seen as an opportunity to address outdated school facilities and low enrolments. The creation of one-stop 'Super Schools' was positioned as a way to spatially provide benefits to teachers and students, including "greater school interaction through clusters" (Government of South Australia, 2006, p.1). Flinders Special School was one such special school co-located with a regular school through the Education Works initiative, and the subsequent *School Renewal Project*. Traditionally South Australian special schools have been "stand-alone specialized settings", different to special classes or units within mainstream schools (Government of South Australia, 2017, para. 1).

This study draws on previous research, highlighting the benefits of spatial analysis to explore how policy reforms can serve to replicate social inequalities (Gulson & Symes, 2007) or to reproduce educational segregation (Armstrong, 2007). Considerations of how space can include/exclude align strongly with Soja's thinking around 'spatial justice', a contesting of "unfair geographies" (Soja, 2010, p. 54). Article 24 of the United Nations Convention on the Rights of Persons with Disabilities proclaims inclusive education as a right, and a social justice issue. For this reason Soja's socially mindful Thirdspace method of inquiry was considered to be a fitting conceptual lens through which to view the co-location of Flinders Special School with its mainstream neighbour. Indebted to the work of Lefebvre (1991), Soja developed his own trialectic approach (Soja, 1996) towards spatial analysis (Figure 1). This consisted of Firstspace (the physical, e.g. walls and gates), Secondspace (planned space, e.g. architectural design), and Thirdspace (considering explanations beyond previous, limiting, binary thoughts, to create an 'other'). This 'othering' of space is considered to be critical in breaking the analysis free from narrow interpretations, creating a choice "that speaks and critiques through its otherness" (Soja, 1996, p.61).

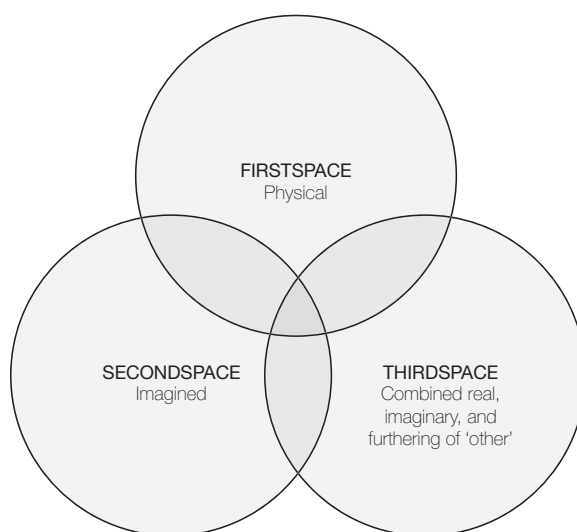


Figure 1. Soja's Thirdspace Trialectic.

DATA COLLECTION

Data for this study consisted of field notes, maps, and 70 individual photographs. Flinders Special School was in a pre-occupation stage when data collection occurred, with students still being taught at their previous, segregated location. In many ways the new school resembled a construction site. A tour was provided by a school leader, who voluntarily contributed narrative and context throughout. This narrative, along with the researcher's own thoughts, resulted in the construction of the field notes. Photographs were taken by the researcher during the tour, at key locations of interest. An architectural map was supplied by the school.

FIRSTSPACE

Flinders Special School was purpose-built, located alongside a large and recently opened Birth to Year 12 'Super School'. An expansive footprint existed, with ample space set aside for parking and student transportation. Vacant space resided to the south where an Autism Training Facility was to have been, if initial funding had been provided. Two large classroom blocks resided to the west. A playground space was further to the west, towards exterior fencing, and was due to be subdivided into play areas according to the age of the children. These subdivided spaces, the researcher was informed, would be designed to connect, enabling students to ride bikes or walk from one play space to the next.

No gate or connecting path existed between the schools, despite the close proximity enabling student populations to directly observe each other. A small 'buffer zone', recommended by the architect and designed to prevent students from climbing and absconding over the fence, was situated between Flinders Special School and the neighbour's play space.

Classrooms in both the junior and primary blocks were annexed, with secure outside spaces, serving as 'withdrawal' areas. Smaller class spaces were described as ILAs (Individual Learning Areas) whilst larger ones were GLAs (General Learning Areas). Two additional classroom blocks, one for middle/senior and another for severely and multiply disabled students (SMD) resided to the east.

At the rear of the administration block a library was located where students would be encouraged to borrow books independently. Large cavities existed in some library walls, made to shelve equipment such as toys. A decision was made, however, to not use these spaces as storage receptacles, due to the likelihood that items would be thrown to the floor by the students. Instead, comfortable pillows would be placed in these nooks, enabling students, particularly those on the autism spectrum, to use them as places of withdrawal and relaxation. One window in the resource room had been lowered to enable its use by students using wheelchairs.

A deliberate reduction in corridor space existed throughout, reflecting a desire to not only gain space through their omission, but to also reduce their adoption as an impromptu location for student withdrawal.

SECONDSPACE

Flinders planned for their student cohort through the installation of lowered windows, withdrawal nooks in the library, and the securing of external fences. Budgetary restrictions, however, limited the scope of the initial build. The architectural plan suggested that school leaders and planners believed expansion would ultimately occur, with spaces labelled and set aside for a hydrotherapy pool, additional classrooms, and an Autism Training Facility, enabling the sharing of expertise with mainstream teachers. This new facility now appeared unlikely to be constructed, however, due to the neighbouring school's car park being extended where the two schools were to have been spatially connected. Motor vehicles now formed a physical barrier where a connecting gateway was intended. Flinders and their mainstream neighbours had previously received joint funding to work together on an autism project, yet the space to conduct such training now appeared unrealized.

Flinders Special School's own car park was a site of possible contestation; with the neighbouring principal suggesting Flinders should be aware and vigilant should parents from the mainstream try and 'claim' their car park spaces (Flinders Special School Leader, Personal Communication, 2013). This provided an example of difficulties arising from the rapid growth of the mainstream site. If initial experiences between parents across schools involved the contestation of car park space, then this could impact the initial relationship between schools.

The western fence spanned 150 metres, with play space planned along its length. The space was raw and bush-like, a Froebelian garden of sorts, evoking Rousseau's maxim, "The best school is the shade of a tree" (cited in Benito, 2010, p.58). Eventual division and demarcation of student space could, however, be identified through the labelling of spaces on the architectural plan as 'individual learning areas', 'secure play' spaces and junior/primary/senior play spaces. Armitage saw children's play as "influenced largely by the environment in which it takes place and the material available that can be included" (2006, p.539). In designating separate play spaces to meet the needs of different aged students, then directing students to those spaces, according to their age, there appeared an assumption that student needs were more chronologically than

developmentally based, a view at odds with educators who have considered placement of students into 'aged-groupings' as a rigid practice (Shepherd, 2009). If students are 'positioned' into spaces by age rather than interest, then their choice is at best, restricted, and at worst, removed. If planned interconnectivity eventuated, however, then this could be lessened, although the danger of teachers then presenting as 'gatekeepers' appeared possible.

An exception to the sorting of students by age was witnessed by the labelling of one building as 'SMD' on the architectural plan, an acronym for 'Students with Multiple Disabilities'. Flinders foregrounded the disability identifier 'SMD', perhaps reproducing negative labelling and stigmatization of their students in the process (Holt, 2007). The terminology 'SMD' appeared as a justification for the need to socially exclude, removing students from the playgrounds they might have accessed if not for the severity of their disabilities. They had become 'othered' in an already 'othered' environment – the special school.

'Secure play' individual learning areas (n=17) were provided as possible places for withdrawal of students to occur, whether to access therapeutic services, for independent study, or as a place to calm when anxious. The secure and lockable play spaces surrounded the classrooms in a moat-like fashion to provide a buffer from the larger playgrounds. One scenario put forward during the site tour was the school's ability to now move students from the playground to a secure play lockable area, should they be agitated or violent during play times (Flinders Special School Leader, Personal Communication, 2013). The aggressor would be segregated, reducing the likelihood of harm to others whilst maintaining a line of sight and required duty of care. Although this response would be considered seclusion and possibly a 'punishment' (Children with Disability Australia, 2012), within some positive whole school approaches, such as Positive Behaviour Interventions and Supports (PBIS), it could be an acceptable safety response within a comprehensive behaviour plan (Horner & Sugai, 2009). How human bodies are spatially positioned can be productive in determining how power is both produced and reproduced (Soja, 1996). Hooper considered bodies as social spaces to be controlled if identified as dangerous pollutants (cited in Soja, 1996).

THIRDSPEACE

The Pure and the Polluted

Flinders Special School appeared to spatially support special education more so than inclusive education. It was physically separated from its neighbouring school, with the co-location revealing no short-term intention to forge a relationship spatially. Nothing appeared to be transparently shared, despite the newfound proximity. This was perhaps a predictable result given that proximity is a vastly different proposition to meaningful interaction (Kauffman & Badar, 2013). Visibility between schools was always mediated by fencing, a standard practice of separation and division.

A dialectical opposition, with no middle ground, appeared created, with Flinders positioning itself as an opposing educational environment, a counter-point to that provided by their mainstream neighbour. Some new spaces, such as car parking, were not to be shared, but 'protected' against incursions from the other school. Protecting students from 'otherness' was also witnessed within the ubiquitous 'secure play' spaces, microcosms enabling teachers to take control of liminal (Douglas, 1966) bodies of difference. The construction of borders were seen by Thomson (2007) as a way to both protect 'self', by keeping the polluted 'other' away. Sibley identifies such spatial protection as the creation of a "moral landscape", used to encourage conformity across a cohort (cited in Thomson, 2007, p. 117). Such landscapes may also serve to normalize specific students and abilities, which is antithetical to inclusion (Graham & Slee, 2008).

Determining an appropriate Least Restrictive Environment (LRE) for students with disabilities remains a bone of contention (Rueda, Gallego, & Moll, 2000), and complications arise when sites internally increase or decrease restrictions. This was illustrated by the mainstream school's decision to protect their students from harmful aspects within their local community by locking their external gates during school hours, creating a 'gated school' which "shields itself from the populations it regards as polluting ones" (Gulson & Symes, 2007, p.99). A limitation of shielding students from unstable community elements may be the marginalization of the school from within its community. Inclusive education is fundamentally about transforming

society through schooling experience. This may be less likely to occur if a distinct schism exists between the school and the community in which it resides. Similarly, the positioning of internal fencing within Flinders Special School to demarcate space and control student bodies, shows a gated approach to protect from and remove certain differences.

Flinders Special School resisted the assertion of power through a planned panopticon (Symes & Preston, 1992). Although teachers can often observe students through glass and between fences, multiple classroom blocks and the deliberate reduction of corridors has prevented ubiquitous observation. Students have an environment which presents challenges, but also offers considerable opportunities for independent navigation. The spatial design reflects a trust that such navigation can occur without the required gaze of teachers or paraprofessionals. The need to acquire independence appears foregrounded, with the need for spatial control, in this instance, moved to the back of the room.

OPENINGS AND CONCLUSIONS

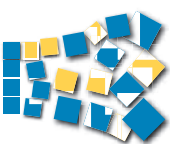
Flinders Special School made spatial choices which appeared not primarily driven by a philosophy of social inclusion. Special education and developing student independence were instead prioritised. The creation of spaces to afford student privacy could prove useful in enabling students to become increasingly confident and independent without feeling monitored. The creation of 'dark spaces', outside of surveillance, permit and advocate for the trusting of students, and the expectation that they will learn to orient and travel independently around the school.

During member checking two leaders from Flinders Special School were asked to respond to elements of analysis, including their labelling of the 'SMD' building, the creation of increased spaces for student withdrawal, and emerging tensions due to the ever-increasing size of the neighbouring school, particularly in regard to car parking demands. They acknowledged that the SMD building had not been well labelled, and had since renamed it after a specific school program, rather than severity of disability. Although the Autism Training Facility had not eventuated, this was not considered to hamper the beginning relationship between schools. The leaders conceded that increased traffic, however, had become a major issue, resulting in a ministerial complaint. The increased building of spaces to withdraw students was identified as resulting in lower workplace injuries. These spaces were considered to primarily be alternative teaching areas, with educators encouraged to break free from previous habits of teaching within four walls. The leaders felt that the requirement to remove students, who'd been exhibiting aggressive or self-injurious behaviour, existed regardless of spatial provision, citing examples where teachers had previously removed students to makeshift spaces, such as corridors outside of rooms. The difference now, was that the spatial provision for withdrawal had afforded the benefits of easier removal of distressed students, reducing the likelihood of injury to all.

REFERENCES

- Armitage, M. (2006). The Influence of School Architecture and Design on the Outdoor Play Experience within the Primary School. *Paedagogica Historica: International Journal of the History of Education*, 41, 4-5, p.535-553. doi: 10.1080/00309230500165734
- Armstrong, F. (2007). Disability, education, and space. In K. N. Gulson & D. C. Symes (Eds.), *Spatial Theories in Education: Policy & Geography Matters* (1st ed., pp. 96-110). Routledge: New York.
- Benito, A. E. (2010). The School in the City: School Architecture as Discourse and as Text. *Paedagogica Historica: International Journal of the History of Education*, 39, 53-64. doi:10.1080/00309230307462
- Children with Disability Australia. (2012). *Enabling and Protecting – Issues Paper*. Retrieved from <http://www.cda.org.au/enabling-and-protecting>
- Douglas, M. (1966). *Purity and Danger: An analysis of concepts of pollution and taboo*. London: Routledge and Kegan Paul.
- Government of South Australia. (2006). *Chief Executive's Circular*. Retrieved from http://www.educationworks.sa.edu.au/files/links/Circ_06_031_Education_Wor_1.pdf

- Graham, L., & Slee, R. (2008). An Illusory Interiority: Interrogating the discourse/s of inclusion. *Educational Philosophy and Theory: Incorporating ACCESS*, 40, 2, 277-293. Doi:10.1111/j.1469-5812.2007.00331.x
- Gulson, K.N., & Symes, C. (2007). Knowing one's place: Educational theory, policy, and the spatial turn. In K. N. Gulson & D. C. Symes (Eds.), *Spatial Theories in Education: Policy & Geography Matters* (1st ed., pp. 1-16). New York :Routledge.
- Holt, L. (2007). Children's sociospatial (re)production of disability within primary school playgrounds. *Environment and Planning D: Society and Space*, 25, 783-802. doi: 10.1068/d73j
- Horner, R., & Sugai, G. (2009). *Considerations for Seclusion and Restraint Use in School-wide Positive Behavior Supports*. Retrieved from http://www.pbis.org/common/cms/files/pbisresources/Seclusion_Restraint_inBehaviorSupport.pdf
- Kauffman, J.M., & Badar, J. (2013). Instruction, Not Inclusion, Should Be the Central Issue in Special Education: An Alternative View from the USA. *Journal of International Special Needs Education*, 17, 1, 13-20. doi: 10.9782/2159-4341-17.1.13
- Lefebvre, H. (1991). *The production of space*. Oxford: Blackwell.
- Rueda, R., Gallego, M.A., & Moll, L.C. (2000). The Least Restrictive Environment – A Place or a Context? *Remedial and Special Education*, 21, 2, p.70-78. doi: <https://doi.org/10.1177/074193250002100202>
- Shepherd, J. (2009, February 10). Fertile minds need feeding. *The Guardian*. Retrieved from <http://www.theguardian.com/education/2009/feb/10/teaching-sats>
- Soja, E. W. (1996) *Thirdspace: journeys to Los Angeles and other real-and-imagined places*. Cambridge, MA: Blackwell.
- Soja, E. W. (2010). *Seeking Spatial Justice*. Minneapolis: University of Minneapolis Press.
- Symes, C., & Preston, N. (1992). *Schools and Classrooms: A cultural studies analysis of education*. Australia: Longman.
- Thomson, P. (2007). Working the in/visible geographies of school exclusion. In K. N. Gulson & D. C. Symes (Eds.), *Spatial Theories in Education: Policy & Geography Matters* (1st ed., pp. 11-130). New York : Routledge.



Session two: Teacher practices

Interlocutor

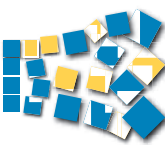
Associate Professor Craig Deed

La Trobe University - Australia



Craig Deed (PhD) is an Associate Professor in Education, School of Education in the College of Arts, Social Science and Commerce at La Trobe University, Australia. His research interests include the interaction between space, teaching and learning at all levels of education. This includes investigation into educator adaptation and student participation in flexible, open and virtual space; innovative and future pedagogical approaches in higher education, and the changing identity and role of academics in higher education.

Recent research has focused on the relationship between pedagogy and use of flexible learning space in secondary schools in low socioeconomic contexts; as well as student use of informal learning spaces in contemporary higher education. Craig has been involved in several Australian Research Council grants in the area of increasing educational opportunity for students living in low socioeconomic areas of regional Australia. He has published over thirty academic papers and book chapters that have had productive impacts on school and higher education pedagogy, workplace innovation, and reform.



Addressing the challenges of Innovative Learning Environments for practicum: Socio-spatial entanglements

Emily Nelson & Leigh Johnson

Eastern Institute of Technology - New Zealand

ABSTRACT

A shift to Innovative Learning Environments (ILEs) in New Zealand schools is a current Ministry of Education strategic direction that creates implications for how we as teacher educators prepare preservice teachers to teach in these emerging environments. Candidate Teachers (CTs) (preservice teachers) in our Bachelor of Teaching (Primary) programme increasingly are placed in ILEs on practicum as these develop in our partner schools. CTs report anecdotally that teaching in ILEs pose them steep and novel challenges around how they plan, teach, assess, and manage students and learning as well as work increasingly collaboratively with Associate Teachers and other colleagues. With our programme designed around a more conventional image of classrooms, and teaching and learning, we wondered how our CTs navigated the novel pedagogical and physical configurations they encountered in ILEs on practicum. We adopt a socio-spatial view (Lefebvre, 1991) to explore the 'embodied material conditions' (Monahan, 2008) and particular pedagogical challenges preservice teachers face learning to teach in ILEs on practicum. We conducted focus group interviews with current third year CTs and recent graduates of our programme who had completed one or more practicum in an identified modern or innovative learning environment (identified by the practicum school). Focus group questions explored CT's perceptions of the particular demands of ILEs in relation to planning, pedagogy, integrating technology, managing student learning and collaborating with colleagues. Utilizing Lefebvre's construct of space as layered, perceived, conceived and lived spaces as an analytic frame we identified key interrelationships that emerged for our preservice teachers between the campus space, the theoretical and ideological space, the practicum space and increasingly, the virtual spaces of ILEs.

KEYWORDS: PRACTICUM, INNOVATIVE LEARNING ENVIRONMENT, COLLABORATION, SOCIO-SPATIAL

Dr Emily Nelson is a teacher educator at the Eastern Institute of Technology, Taradale, New Zealand. She is Programme Coordinator for a new innovative practice-based teacher education degree and a teacher on an inter-disciplinary Master of Professional Practice degree. She is motivated by student voice as socially just action. Emily's research interests include enacting student voice within pedagogy in classrooms, post-structural theorizing of power, and increasingly, investigating how preservice teachers respond to new configurations of schooling generated by new generation learning spaces.

Leigh Johnson is a teacher educator at the Eastern Institute of Technology, Taradale, New Zealand. She is a passionate advocate for e-learning in the implementation of learning and teaching from primary years through to tertiary. She has extensive experience with the implementation of e-learning in the primary sector as a classroom teacher, a School Advisor in e-learning and as a Facilitator for Ministry of Education contracts.

INTRODUCTION AND BACKGROUND

The education sector is currently undergoing profound change in how teaching and learning and learning environments are conceptualized. Innovative learning environments (ILEs) have emerged, a response to 'changing perspectives on what constitutes important and appropriate education [...] in contemporary society' (Cleveland & Fisher, 2014, p. 7). In this research how to support preservice teachers to learn to teach in ILEs on practicum is the focus.

We practice as teacher educators within a relatively new practice-based primary teaching degree. The degree was collaboratively conceptualized, designed and enacted between a group of local Principals and the ITE provider. As a result of this unique school and tertiary collaboration, a strong partnership between the ITE provider and the partnership schools emerged and is foundational to the programme. Candidate Teachers (as we term our preservice teachers) spend two days per week in campus classes and two days per week engaged in 'school-based learning' tasks within one partner school. In addition to the school-based learning programme Candidate Teachers participate in block practica. In Year 1 they participate in one, three week practicum. In Year 2 they participate in two, four-week practica and in Year 3 they participate in two, five-week practica. In 2015 our Candidate Teachers began to experience MLEs (Modern Learning Environments) on practicum and within their school-based learning contexts. In 2016 these numbers increased with Candidate Teachers experiencing ILEs (Innovative Learning Environments) as the change in nomenclature and emphasis shifted (Ministry of Education, n.d.). We wondered: With more Candidate Teachers experiencing ILEs on practicum, how were they grappling with these new environments and the pedagogical challenges these posed?

THEORETICAL FRAMING

Two theoretical ideas frame our work: Lefebvre's (1991) socio-spatial trialectic and Monahan's (2008) notion of embodied material conditions. Lefebvre views space as socially produced, alive and layered with perceptions, experiences, conceptualizations and ever-present possibilities of disruption and transformation. From a socio-spatial perspective space is imbued with discourses and ideologies, always political (Lefebvre, 1991; Monahan, 2008). As Mulcahy, Cleveland and Aberton (2015) argue, 'learning spaces and the uses made of these spaces are created and sustained together; they are in a mutually constitutive relationship' (p. 6). Considering the materiality of space, Monahan (2008) emphasizes the "messy materialities" that are generated in the production and experience of space. The intersection or entanglement of physical and social spaces generates "embodied material conditions". He argues an investigation of materiality is needed to explore the ways in which the material, 'shape[s] lives and establish[es] social orders' (p. 99).

We adopt Ryan's (2011) definition of Lefebvre's three spaces: perceived space, conceived space and lived space. She defines perceived space as 'course content and assessment, field placements, school and university pedagogies and practices, and relationships between all involved in these 'first space' practices' (p. 887). Conceived space is the "ideal", the conceptualizations of how 'society should be' (Ryan, 2011, p. 887). In the context of preservice education she defines conceived space as 'professional standards, course accreditation and the structure of university and school procedures to produce 'ideal' future teachers' (p. 887) including within the practicum space.

The third, lived space, represents the coming together of the perceived and conceived through the choices inhabitants make in-action. It is a space of imaginings and possibilities. Ryan defines this as 'the space where pre-service teachers can make choices about which [...] practices/ideologies they might interrupt or resist and how they might do so in their own time and space' (p. 888).

Ryan argues that the perceived, conceived and lived spaces are entangled, in that harmonics of all three are continuously enacted and exert influence on each other producing interrelationships.

Monahan (2000) contributes the notion of "built pedagogy" to considerations of spatialized practice arguing that, 'Built environments enable and constrain certain modes of social action and interaction, educational structures embody curricula

and values by design' (p. 1). Environments are not benign rather, 'arrangements of space critically influence patterns of learning and teaching in education' (Mulcahy, Cleveland & Aberton, 2015, p. 1). How physical spaces and their degree of flexibility influence "built pedagogies" depend on different spatial configurations and social interactions (Monahan, 2000).

In practicum experiences, 'pre-service teachers are expected to make the connections between often-contradictory spaces with little or no guidance on how to negotiate such complex relationships' (Ryan, 2011, p. 881). Ryan (2011) poses a question essential to this research:

'Do we teach [preservice teachers] how to inhabit and negotiate the difficult inter-spaces of ideological contradictions, of homespun or media-fuelled philosophy, of teacher accountability and its spawns, of deeply entrenched practices, and of the immediacy of passing the course?' (Ryan, 2011, p. 882).

Mulcahy, Cleveland and Aberton (2015) argue 'Much of the existing empirical research on learning spaces is limiting when it comes to an appreciation of the complexity of relations between learning space design and use, and between learning spaces and pedagogy' (p. 16). Preservice teachers learn to teach in ILEs whilst simultaneously negotiating the high-stakes requirements of passing the practicum as an assessment experience, how they achieve this, drawing on preservice campus experiences that remain largely suited to conventional practicum contexts is the key focus of our research.

METHODOLOGY

Our qualitative, small-scale exploratory research explored the meaning Candidate Teachers assigned to their experiences of learning to teach in innovative learning environments on practicum. Three recent graduates and six currently enrolled Candidate Teachers consented to participate in the study. Candidate teachers had to have experienced at least one practicum in an ILE or a variant (MLE, digital class) to participate in the research. Our sample size is small. This is indicative of the emergent nature of ILEs in our geographical area and the small class sizes of our programme. We typically begin the year with a cohort of 34 Candidate Teachers and graduate around 20.

We utilized focus group interviews (Morgan, 2004) as our data generation strategy. Due to an ongoing teaching relationship with the currently enrolled participants, an academic staff member not in a teaching relationship with the participants conducted this focus group interview. We conducted the focus group interviews with the recent graduates. The 45-minute focus group interviews were audio-recorded and transcribed.

One main research question framed our research: 'How do Candidate Teachers learn to teach in Innovative Learning Environments (ILEs) on practicum?'. We developed our focus group interview protocol around areas central to practicum and to the theoretical framing of our research: characteristics of ILEs experienced, approaches to planning, pedagogy, support and guidance, necessary skills and dispositions, technological capability, student ownership. We utilized a constant comparative approach (Silverman, 2005) to analyse the focus group interview transcripts, coding for the areas that underpinned each interview questions, Monahan's dimensions of fluidity and Lefebvre's three spaces.

FINDINGS

In this section we highlight four interconnections that emerged from thinking with our data through a socio-spatial lens:

1. Messy materialities of teaching in the virtual spaces of ILEs
2. Planning for the feel of the class - Responding to rhythmical practices of ILEs
3. Effects of Collaboration
4. Mediating Practice through the 'Shoulds' of the Conceived Space

The nine participants drew on 11 ILE practica. The contexts are presented in Table 1 below in relation to Dovey and Fisher's (2014) spatial typology.

Table 1: Spatial Typology.

Cluster Type	Characteristics	Number
A	Traditional classroom	4
B	Traditional classrooms + street space	
C	Convertible Classrooms	5
D	Convertible street space	1
E	Dedicated Commons	
Unsure		1

MESSY MATERIALITIES OF TEACHING IN THE VIRTUAL SPACES OF ILES

Current dominant discourses of IT promise “democratic access” and “friction-free” exchanges of capital’ (Monahan, 2008). However, “messy materialities” of technology use in reality disrupt this utopian vision. Proprietary barriers meant that Candidate Teachers’ capacity to enact teaching in the virtual space was limited. One CT described

I only had access to Teacher Dashboard through my teacher’s laptop so I only used it in the morning to send my stuff out, ‘cos it was a programme on her laptop. I didn’t actually have access to it while I was teaching so I couldn’t look at the children’s screens unless you’re actively there and it’s hard. What do you do when you’re teaching a group to make sure that you can still monitor those children?

Even for those with limited access, CTs were often not able to take full advantage of the affordances of these platforms because they did not have full teacher access. This messy materiality created a tension with the entangled expectations from the preservice programme that CTs demonstrate pedagogy responsive to learners’ needs (Ministry of Education, 2007) and what was possible in the lived spaces of practicum where virtual spaces, although in many cases ubiquitous, were not fully available to them.

PLANNING FOR THE FEEL OF THE CLASS - RESPONDING TO RHYTHMICAL PRACTICES OF ILES

Within “built pedagogy” ‘the design of learning spaces must take into account how the space-time compression engendered by information technology affects learning rhythms ... built pedagogies ... emerge relationally through rhythmical practices that occur within these spaces’ (Monahan, 2000, n.p). With participants placed in social spaces with responsibility for learners from up to three “classes”, they noted their ability to get to know the needs of learners in the short time of practicum became more difficult,

At [School] we had a three week rotation on PE where one teacher took the same thing just three times in a row and the three home classes rotated round each teacher. So it was, yeah you just plan for the general feel of the class.

The particular space-time compression of ILEs is also a new challenge for CTs in a way that seldom shows up in a conventional practicum.

Managing lots of students. I think being able to think on the spot and just, well, reflect on action isn’t it, yeah how to make those quick changes to make improvements.

CTs need a sound and solid understanding of curriculum and learning progressions to make quick collaborative decisions about next learning steps as a key part of the teaching role.

EFFECTS OF COLLABORATION

Teaching on practicum in ILEs upscales practicum supervision relationships. The dynamic spatiality of the ILE context required CTs to plan collaboratively with multiple colleagues, taking responsibility for different groups of learners across curriculum areas and year levels.

The way I planned is that I planned in conjunction with both teachers that were in the classroom. So it was after school we would talk about which parts I'd be taking and which parts they'd be taking. So I had responsibility for the year fours for maths, so I'll plan just strictly for the year fours and the other teacher would have responsibility for the year threes.

One outcome surprising to us was that CTs described this enhanced collaborative responsibility positively, emphasizing the support and feelings of competence they gained.

I felt that my AT supported me a hundred percent. The other teacher let me take over her job. It was great, it had its downfalls but, yeah.

These feelings of value and competence seemed to be reinforced by the fact that often the Associate Teachers themselves were new to teaching in ILEs creating space for CTs to contribute to how the material disruptions (Monahan, 2008), of teaching in new ways in ILEs, were negotiated. Working in ILEs also provided increased and collaborative support for CTs with their planning and teaching.

In the sense that if you've got an idea and you're not entirely sure you can clarify it with someone [...] in my case there was a really experienced teacher and then a teacher that had only just come out of her practice. [...] So that helped me develop and also I felt confident approaching a lesson knowing that I was well prepared.

Collegial discussion around lesson planning seemed to increase confidence and open up teaching as a more collaborative activity.

MEDIATING PRACTICE THROUGH THE 'SHOULD'S' OF THE CONCEIVED SPACE

The ways in which participants expected to use technologies in their ILE practicums were influenced by messages from campus learning around the importance of purposeful integration,

[Teacher educator] touched on it when we did one of the courses. The technology [...] should enhance or morph the task into something deeper than what could be done without the device.

Participants also brought a number of 'shoulds' to the ILE practicum that they appear to use to evaluate ILEs.

The one I was in, it was in a hall, so the hall had been taken out but it was just an open plan setting. It had a couple of different level tables, bean bags, but nothing really that stood out to be what is an ILE for me. It was just this bunch of furniture put into a room, basically.

Many participants struggled with messy materialities of ILEs including informal furniture arrangements such as bean bags and acoustic challenges. These realities contributed to ambiguous evaluations of ILEs as spaces where CTs would want to start their first teaching job.

DISCUSSION

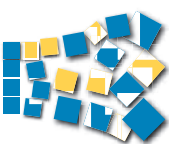
Our findings suggest that the material disruption ILEs pose practising teachers opens up opportunities for preservice teachers to experience significant collaboration, and pedagogical responsibility from multiple colleagues. The disparity of access to the virtual spaces of ILEs pose challenges for preservice teachers, especially given the ubiquity of technology integration as a key aspect of ILE pedagogies as well as the high stakes nature of practicum as an assessment.

Framing our work with a socio-spatial theory has enabled us to focus on “elements of inter-connection” (Mulcahy, Cleveland & Aberton, 2015) between campus learning and ILE learning. The participants’ perspectives challenged our existing thinking. Where our participants talk about their campus experiences as supports for engaging with the challenges of ILEs as social spaces new to them, we initially viewed campus and practicum as separate spaces. We now think of these spaces as entangled like a mobius strip, with our preservice teachers taking experiences from campus classes, arranged primarily for conventional practicum, and putting these under torsion for enactment, in ways that address the lived expectations of ILE configurations.

Already from this initial exploratory research we are thinking differently about our practice, in a more entangled way. The uses made of technologies by CTs on practicum and their call for attention to emphasizing “purposeful use”, are influencing what, when, how and why we introduce certain technological platforms in our programme. We are emphasizing the importance of working collaboratively as an essential of teaching in ILEs, in our programme from Year One. Changes to collaborative decision-making and shifts in the pace of decision-making (Alterator & Deed, 2013) suggest we need to expand opportunities for our preservice teachers to engage with learning progressions and develop depth of curriculum knowledge. More generally, we need to prioritize “material disruption” and “messy materialities” as ubiquitous expectations for negotiating ILEs on practicum, and enhancing preservice teachers’ capacities to generate adaptive practice in these spaces.

REFERENCES

- Alterator, S., & Deed, C. (2013). Teacher adaptation to open learning spaces. *Issues in Educational Research*, 23(3), 315-330.
- Cleveland, B., & Fisher, K. (2014). The evaluation of physical learning environments: A critical review of the literature. *Learning Environments Research*, 17, 1-28.
- Dovey, K., & Fisher, K. (2014). Designing for adaptation: The school as socio-spatial assemblage. *The Journal of Architecture*, 19(1), 43-63.
- Lefebvre, H. (1991). *The production of space*. Trans. Cambridge, MA: Blackwell.
- Ministry of Education. (n.d.). *Innovative learning environments*. Retrieved from: <http://ile.education.govt.nz/#home>
- Ministry of Education. (2007). *The New Zealand curriculum: For English medium teaching and learning in years 1-13*. Wellington, New Zealand: Learning Media Limited.
- Monahan, T. (2000). Built pedagogies & technology practices: Designing for participatory learning. In T. Cherkasky, J. Greenbaum, P. Mambrey, and J. Pors (Eds.), *Proceedings of the Participatory Design Conference*. Palo Alto, CA: CPSR.
- Monahan, T. (2008). Picturing technological change: The materiality of information infrastructures in public education. *Technology, Pedagogy and Education*, 17(2), 89-101.
- Morgan, D. (2004). Focus groups. In S. Hesse-Biber & P. Leavy (Eds.), *Approaches to qualitative research* (pp. 263-285). New York, NY: Oxford University Press.
- Mulcahy, D., Cleveland, B., & Aberton, H. (2015). Learning spaces and pedagogic change: Envisioned, enacted and experienced. *Pedagogy, Culture & Society*, Advanced Online Publication, DOI: 10.1080/14681366.2015.1055128.
- Ryan, M. (2011). Spaces of possibility in pre-service teacher education. *British Journal of Sociology of Education*, 32(6), 8810900, doi: 10.1080/01425692.2011.614745
- Silverman, D. (2005). *Doing qualitative research* (2nd ed.), London, United Kingdom: Sage.



Learning without boundaries: Reconceptualising the curriculum in Innovative Learning Environments

Janet Buchan

Lourdes Hill College - Australia

ABSTRACT

In order to maximize the effective use of innovative learning environments teachers need to understand how to effectively integrate their pedagogy into learning spaces, and space into the curriculum. This paper puts forward the Dimensions Model of the Learning Environment, which can be used to provide the foundation for reconceptualizing how the curriculum can be re-designed and taught in innovative learning environments. Grounded in Ph.D. research the Dimensions Model complements existing research into learning space design and associated pedagogical frameworks.

The paper reports on a research study in a traditional Catholic girls' high school that applied the model to inform the school's new Learning Futures Framework that will underpin curriculum design and the student learning experience into the future. The Learning without Boundaries Unit Planner is introduced that affords educators a holistic view of the learning environment and an understanding of its explicit connection to curriculum and appropriate pedagogy.

KEYWORDS: INNOVATIVE LEARNING ENVIRONMENTS, LEARNING SPACES, PEDAGOGICAL FRAMEWORKS, LEARNING WITHOUT BOUNDARIES

Dr Janet Buchan, has over 25 years' experience as an educator in secondary schools, TAFE and including over 13 years' experience in universities in the various roles of manager, educational technologist, educational designer, researcher and more recently as a Senior Lecturer and Academic Developer (Learning Spaces). Her current position is the Director of CiTEL (Centre for innovation, Teaching Excellence and Leadership) at Lourdes Hill College in Brisbane where she oversees the operational aspects and development of the College's new state-of-the-art Centre. This includes developing programs and research that underpin the College's commitment to advancing teaching and academic excellence. Janet is a regular presenter at conferences and symposiums and has researched and published widely in a number of fields.

INTRODUCTION

A question posed to researchers at the 2017 ILETC Symposium (ILETC, 2017) was; 'Do teachers know how to integrate space into their pedagogy?' Or should that be; 'Do teachers know how to integrate pedagogy into their space?' Finding the answers to these questions would be akin to finding the 'holy grail' for innovative learning environments' (ILEs) research and practice.

Despite their diversity, design and technology-rich interiors, innovative learning environments (ILEs) might remain simply learning spaces that are essentially four walls (albeit glass, movable or even non-existent) enclosing teachers and students. That is, until educators adopt a more holistic view of the learning environment and understand its explicit connection to curriculum and appropriate pedagogy. In order to maximize the use of ILEs, practitioners need tools to be able to reimagine the curriculum and learn how to actively integrate the space into their curriculum.

This paper recognizes the potential of the pedagogical application of learning environment research and puts forward the Dimensions Model of the Learning Environment (Buchan, 2014). It is proposed that this model can be used to provide the framework or base for reconceptualizing how the curriculum can be re-designed to ensure that innovative learning environments can reach their potential to achieve impact on student learning.

BACKGROUND

The Dimensions Model of the Learning Environment is an original output of Ph.D. research (Buchan, 2014). One of the research questions in that study sought to describe the contemporary learning environment in a regional Australian university, with a focus on the management of the technology-enhanced learning environment. Extensive data collection and analysis of interview data, university documents and journals was conducted during the five-year ethnographic case study.

The research findings demonstrated that people were aware of their learning environment and its value. Part of the intrinsic value of the learning environment emerged as the place or space where learning happens. It was noted that the learning environment does not occur naturally but needs to be co-created. However, the real value that emerged from the focus on the learning environment in the research was in establishing that the learning environment is a complex system. This complex system has components, variables, feedback loops, interactions, inputs and outputs. Five dimensions of the system were identified: temporal, spatial, social, technological and connectedness (see Figure 1). These dimensions were used to develop the Dimensions Model of the Learning Environment (see Figure 2). This model complements and builds on existing frameworks and theories such as learning ecology, Siemens' connectivism and perspectives for a blended learning experience (Flexible Learning Institute, 2009; Siemens, 2005).

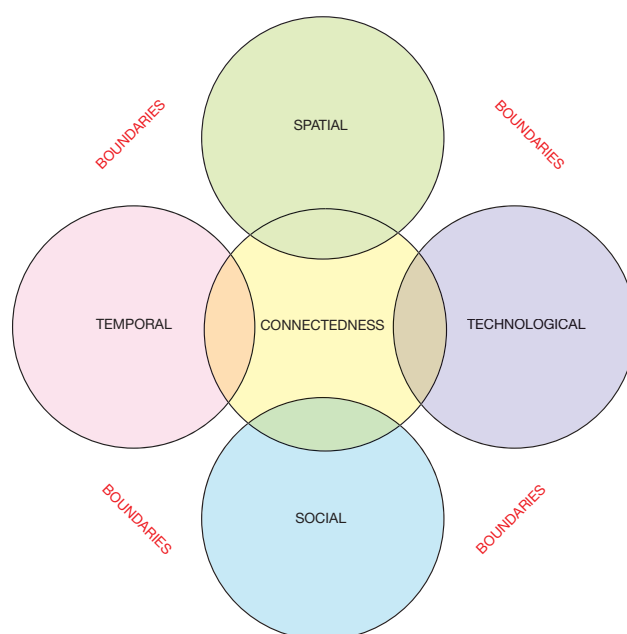


Figure 1: Representation of the five dimensions of the learning environment

What is unique about the Dimensions Model that is not found in other pedagogical models representing the learning environment, is the *temporal perspective*. What emerged from the data over a five-year immersion in the distributed learning environment of a large, multi-campus university was the importance to curriculum design of considering the timing of study. This involves thinking outside the boundaries of traditional temporal organizational elements such as terms, semesters, class timetables and even degree programs. To fully understand the learning environment requires one to take a systemic, holistic, systematic and long-term view of the learning environment. This can be particularly applicable to the effective use of innovative learning spaces.

Another important conceptual finding was that of *boundaries* in the technology-enhanced learning environment. This is captured in the choice of the term *Dimensions* for the model, whereby Dimensions promotes an awareness of creating or conceptualizing a boundary-less space.

The term *learning environment* is liberally used throughout the educational literature from school (K-12) to higher education levels (Brown & Adler, 2008; Henning & Van der Westhuizen, 2004). References to the learning environment are numerous, loose and inconsistent in recent publications on learning spaces (Jones, 2012). Perhaps the only commonality in its definition being that everyone has their own understanding and perception of the learning environment - within their own context.

The term learning environment is often separated from the learning space (Rafferty, 2012). However, within the context of ILE research, ILEs are effectively innovative learning spaces. The Dimensions Model has the potential to extend the *boundaries* of our conceptualization of the use of ILEs by providing a bridge or connector between pedagogical theory and application in designing curriculum for the effective use of such learning spaces.

It is proposed that, by applying the Dimensions Model of the Learning Environment to curriculum design, educators will be able to adopt a more holistic view of the learning environment and to understand its explicit connection to curriculum and appropriate pedagogy. The features of the Dimensions Model are summarized in Figure 2. The context of ILEs has been used to demonstrate the application of the features of each of the Dimensions.

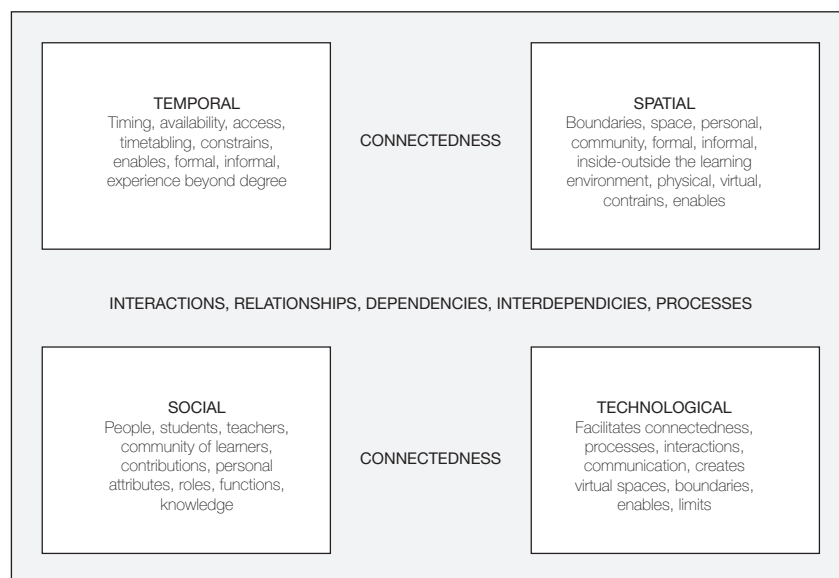


Figure 2: The Dimensions Model of the Technology-Enhanced Learning Environment (Buchan, 2014, p. 123)

DESCRIPTION OF THE DIMENSIONS

Spatial: Features to be considered in the spatial dimension include the physical and virtual learning spaces; personal learning spaces, connections to community, formal and informal learning spaces and what falls inside and outside of the learning environment. The boundaries of the space can constrain or enable learning and the affordances or design of the space can enable (or limit) particular pedagogies.

Temporal: The temporal dimension includes time considerations that impact on the learning environment. This includes the availability of the learning space or environment; when classes are over, how can students still access resources? Suitability of timetabling for ILE space use; the formal in-class learning during the school day/term, informal learning i.e. in the workplace, out of school or in social justice programs are all temporal considerations. The virtual (online) spaces can extend the accessibility of resources and thus the learning process. Learning at high school (or university) is only part of a continuum of lifelong learning that begins before entering school and continues after school with distinct pedagogy and support for each transition stage. ILEs can prepare students for independent study.

Social: The social component of the learning environment concerns the people and relationship building. This extends beyond the classroom and school boundaries to the people who need to contribute to a learning experience; these include the roles of teachers, students, parents and family, workplace colleagues, mentors and sporting teams. Other aspects of the social dimension include developing the personal attributes of students and staff.

Technological: The technological dimension (the virtual learning environment) can be a space in itself. Technology extends the boundaries of the traditional classroom learning environment. In an ILE, it can facilitate connectedness, extend the timing of the availability of the learning experience through the virtual environment and provide alternatives for learner interaction both in and outside of the physical spaces.

Connectedness: The previous four dimensions of the learning environment are linked by a fifth dimension - connectedness. Connectedness draws on the origins of the learning environment model as a complex system. It encompasses relationships, the dependencies and interdependencies between components in the system. Connectedness links the components together and, in turn, the association of components can create connectedness and make boundaries more permeable.

CASE STUDY

In order to guide their pedagogical approach to learning and teaching into the 21st century, a large traditional Catholic girls' high school (1200 students), posed themselves the question: 'What should learning and teaching look like in our classrooms of the future?' To investigate this a research study, the *Learning Futures Project*, was conducted by the school in 2016.

Methodology. The methodology involved an extensive consultation process with the school community: staff, students and parents as well as with external learning experts. Data collection methodology included online surveys, targeted focus groups and in-depth interviews (see Table 1).

Table 1: Summary of data collection methodology and respondent numbers.

Group	Survey respondent numbers	Focus Group participant numbers
Students	1010	---
Parents	285	8
Staff	62	27
External learning leaders	Six in-depth interviews were conducted with external learning leaders	

To try to move the collective thinking beyond the traditional classroom, in addition to drawing on an extensive literature review the Dimensions Model of the Learning Environment was applied to the research problem. A set of 17 survey questions was developed and tailored to the target audience. Similar questions were asked during the in-depth interviews with external learning leaders. The questions attempted to be future thinking and to encourage participants to (literally) think outside the square. The data collection covered three thematic areas.

- I: Respondents' demographics.
- II: What will be taught and learned at our school of the future and how will it be taught.
- III: Preparing for life outside of and after school.

The data collected was synthesized into an extensive internal report (Buchan, 2016) which has been used to inform the development of the school's new Learning Futures Framework. The Framework (to be implemented from 2018 onwards) will be a pedagogical blueprint and will underpin curriculum design and the student learning experience into the future. A snapshot of some of the data from the study is presented here to illustrate perspectives relevant to the body of knowledge on ILEs. The data presented focuses on two questions. These probed aspects of what will be taught and learned at the school of the future and how it will be taught. The first of these is; where and when good learning takes place (learning without boundaries), and the second involves respondents' views on effective learning and teaching strategies.

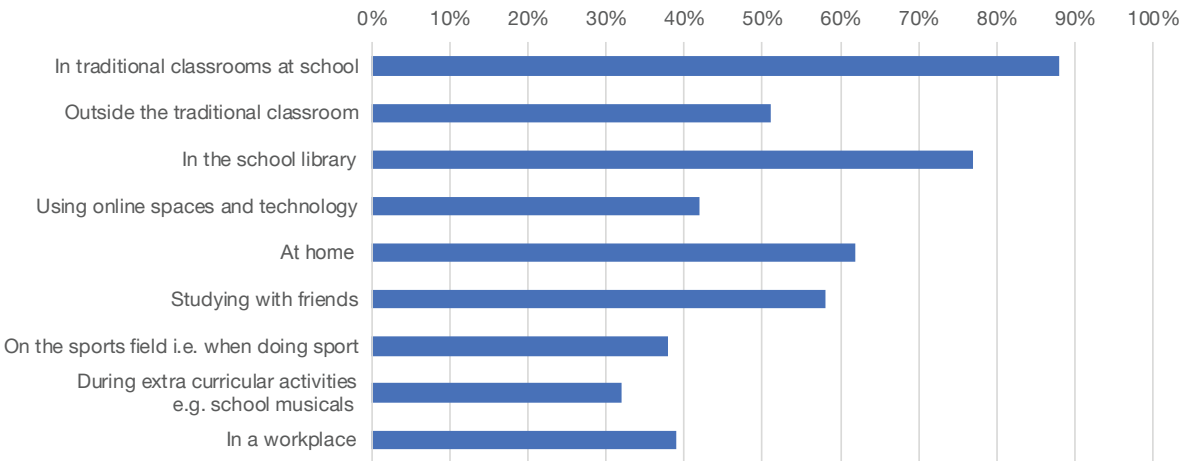


Figure 3: Student survey responses to the question: Learning without boundaries: Where and when does good learning take place?

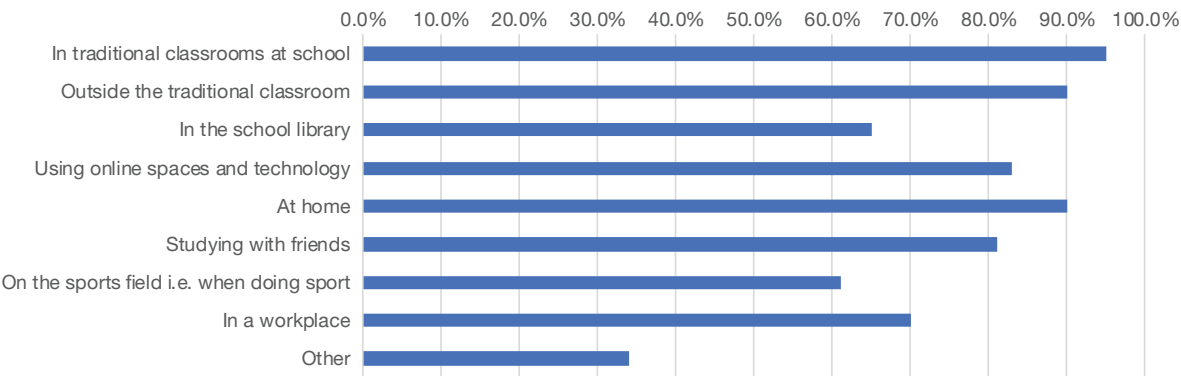


Figure 4: Staff survey responses to the question: Learning without boundaries: Where and when does good learning take place?

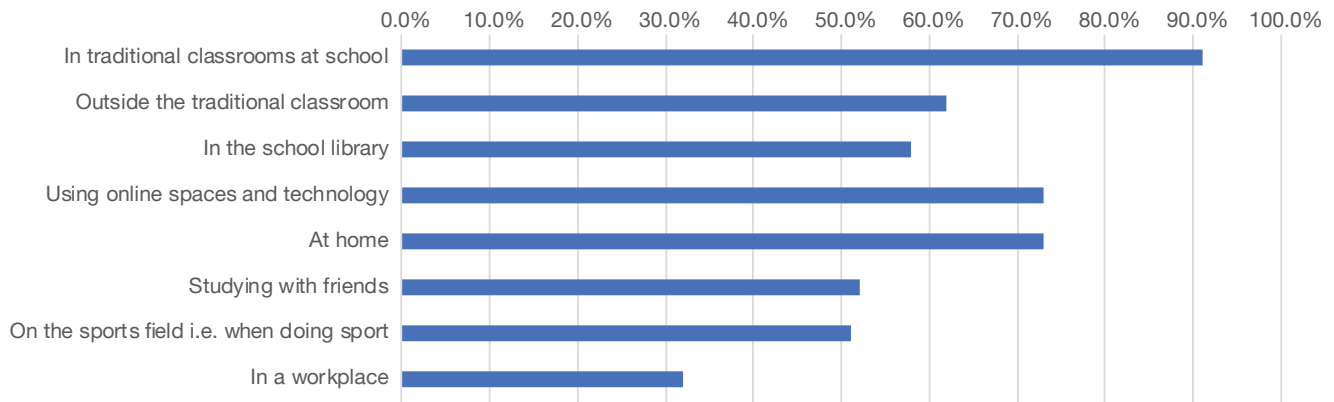


Figure 5: Parent survey responses to the question Learning without boundaries: where and when does good learning take place?

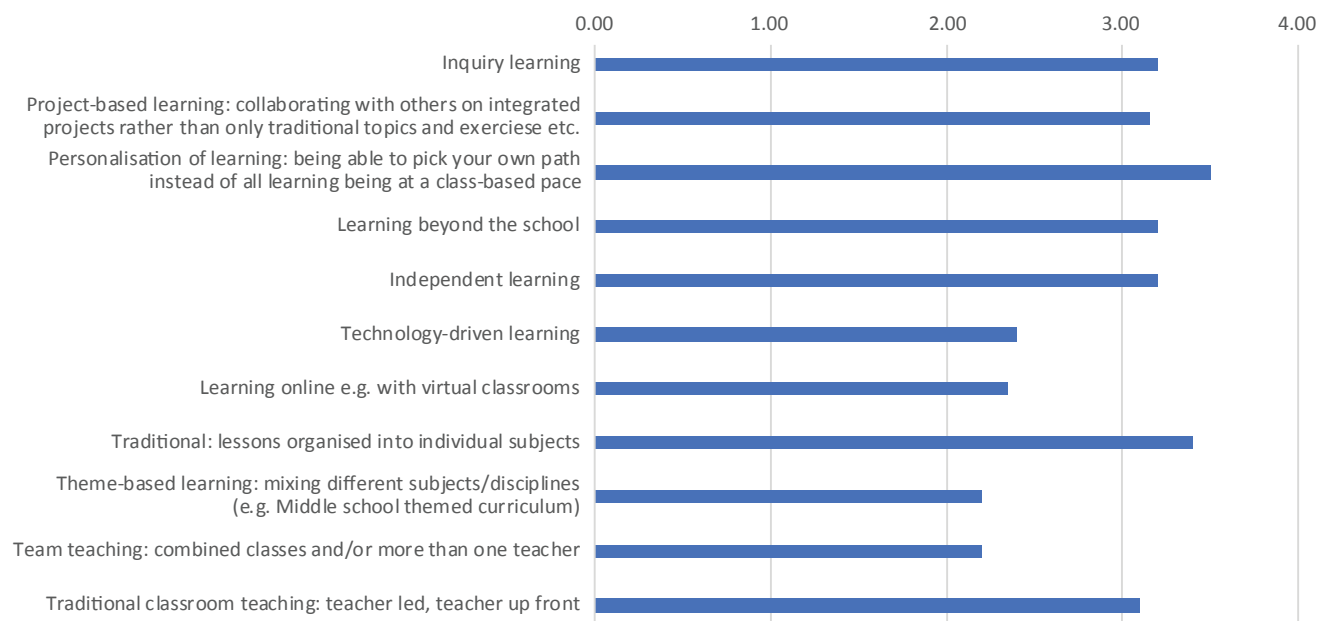


Figure 6: Student survey ratings of selected learning and teaching strategies as to how important they are to students for improving their learning in the classrooms of the future.

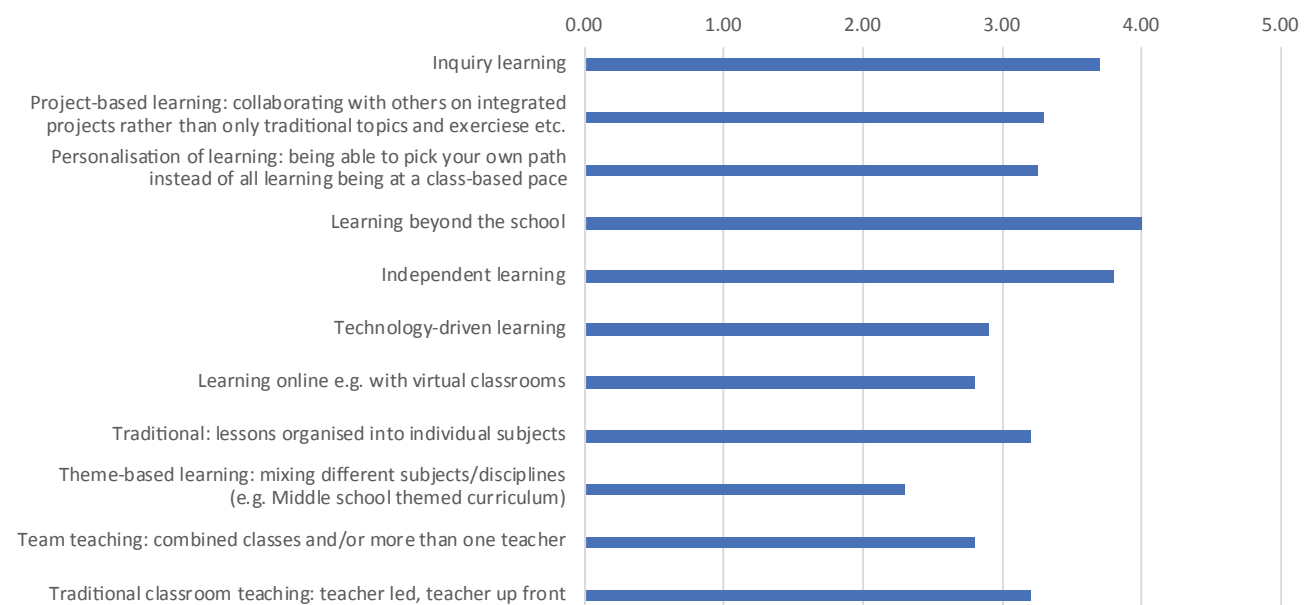


Figure 7: Staff survey ratings of learning and teaching strategies as to how important they are to students for improving their learning in the classrooms of the future.

FINDINGS

The data showed that in the case study school environment students, staff and parents still valued the traditional 'classroom' experience (see Figures 3, 4 and 5). Some of the elements of the experience that were valued were the active teaching, the relationship building between students and staff and engaging with cultural and social experiences outside the classroom.

While less than 45% of students considered good learning to take place in online spaces and with technology, over 70% of parents and close to 90% of staff valued the importance of the online learning environment (see Figures 6 and 7). However, other feedback also illustrated the importance of having a cohesive and well-designed online learning environment to support the student in-class learning experience.

REIMAGINING THE CURRICULUM

This case study has shown how a secondary school with a predominance of traditional classrooms, is attempting to reimagine the learning environment in order to look to the future of learning. Seeing the fruits of those 'imaginings' come to life, however, will be an ongoing project for some years to come.

Curriculum design in schools traditionally focuses on learning outcomes, assessment and the content that needs to be taught. The constraints of prescriptive national and state curricular requirements mean that freedom in curriculum design *per se* may be somewhat restricted. There is little scope for independence and innovation, or even addressing the needs of one's own localized students. Teachers' control over their classroom teaching can be limited to the learning activities used to engage students in the learning process and the teaching strategies used.

ILEs in schools have a lot in common with the tertiary sector where blended and flexible learning principles and practices were developed and introduced (Conole, 2013; Rafferty, Munday, & Buchan, 2013). There are many different levels of curriculum planning ranging from whole programs to units and individual lessons. In such planning processes, there is generally limited reference to integrating where and when learning happens. Curriculum design can tend to be limited to the content and pedagogy. By applying the lens of the Dimensions Model, active teaching and learning strategies can be explicitly designed into the curriculum within the physical and temporal context. It is suggested that the Dimensions be embedded into the learning design process through the use of a curriculum planning template to ensure more effective use of ILEs, for example.

Table 2 illustrates one example of a Unit Planner template used to organize a typical course, unit or program schedule. It can be applied to a whole program, a subject or a single lesson. This planner focuses on the content, teaching strategies and a linear timeline of traditional terms/weeks. Yes, there is usually more to a unit than this, but how well will this help teachers innovate their teaching towards effective use of new ILEs?

Table 2: Example of a traditional unit planner template.

Study Schedule	Learning outcomes/goals	Topic	Teaching strategies & resources	Assessment
Week 1				
Week 2				

The Learning without Boundaries Unit Planner is illustrated in Table 3. The columns 'Learning Timeline', 'Learning Space Use', 'Technology Integration' and 'Connectedness' have been added to the unit planner. The unit planner learning design questions ask teachers to consider *when* the learning happens (Learning Timeline) and *where* the learning will take place (the Learning Space use). The learning experience design also needs to include technology integration into the unit or program.

Table 3: Example of a 'Learning without Boundaries' unit planner.

Module/Unit name		Semester Planner Schedule
Purpose/rationale: Curriculum skills	Subject content/topics	Learning Timeline When does the learning happen?
Assessment	Teaching strategies	Learning Space Use Where does the learning happen? What are the affordances of the space?
Learning Activities	Learning Resources	Technology Integration In-class, online resources, LMS (virtual).
Connectedness Links multiple aspects of the learning experience: pedagogical, assessment, social, spatial, temporal.		

HOW PERMEABLE IS YOUR CURRICULUM?

When considering the design questions from the unit planner, applying the concept of 'permeability' of the dimensions can be helpful in the process of reimagining the curriculum. This is illustrated in Figure 8 and will be briefly discussed in relation to the case study.

When does the learning happen? – Learning at school or post-school and tertiary levels is only part of a continuum of lifelong learning that begins before entering school and continues after school with distinct pedagogy and support for each transition stage. Figure 8 illustrates how taking a longitudinal view to the temporal dimension can be used to integrate the student experience across their formal schooling and to post-school. The temporal dimension includes the availability of the learning space or environment. Within school planning, how suitable is timetabling for ILE space use? When classes are over, how can students still access resources? Does the curriculum cater for both formal (in-class learning during the school day/term) and informal learning i.e. in the workplace, out of school. Are ILEs being used effectively to prepare students for independent study?

Where does the learning happen? Are ILEs being effectively integrated into the curriculum? How are physical and virtual learning spaces being integrated into the curriculum design? Where are the personal learning spaces (physical and virtual)? Do the boundaries of the space constrain or enable learning? How can the affordances of a learning space be used to enable particular pedagogies to be included in the curriculum? Do the facilities support pedagogies for the future?

The *Technological dimension* links and enables the temporal and spatial dimensions. The virtual learning environment in its broadest sense is an important planning element of the curriculum. The online learning environment can be used to extend the accessibility of resources beyond the school day and thus extend where and when the learning takes place. Effective use of technology in ILEs can enhance interactivity and collaborative learning.

This case study has shown how a traditional secondary school is preparing to reimagine the curriculum. The input from the school community during the Learning Futures Research Project has been invaluable as the school develops and prepares to introduce a new learning and teaching pedagogical framework - *The Learning Futures Framework*. Data gathered about how and where students want/need to learn, the pedagogical affordances of spaces and teaching strategies for the future will enable the school to assess how its current facilities can meet the learning needs of students into the future and inform the design of innovative learning environments.

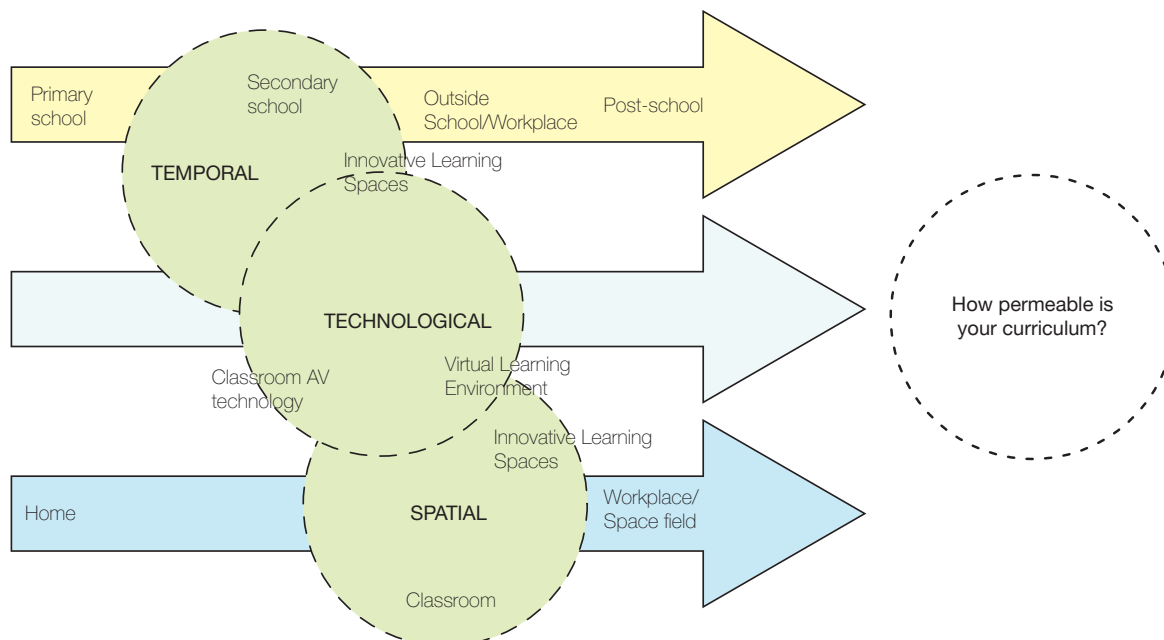
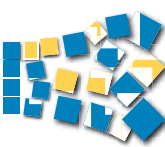


Figure 8: How permeable is your curriculum? Representation of the application of the metaphor of 'permeability' of the Dimensions of the Learning Environment.

REFERENCES

- Brown, J. S., & Adler, R. P. (2008, January/February). Minds on fire: Open education, the long tail, and Learning 2.0. *Educause Review*, 43, 16-32.
- Buchan, J. (2014). *Developing resilience and managing change in technology-enhanced learning environments*. (Doctor of Philosophy), University of Southern Queensland, Toowoomba. Retrieved from <http://eprints.usq.edu.au/25684/U35T>
- Buchan, J. (2016). *Framework for Learning Futures Project Report [Research version]*. Internal report. Lourdes Hill College, Brisbane.
- Conole, G. (2013). *Designing for learning in an open world*. London: Springer Science+Business Media.
- Flexible Learning Institute. (2009). *Perspective. Designing your course from different perspectives*. Retrieved 8 March, 2013, from <http://blendedandflexiblelearning.wikispaces.com/perspectives35T>
- Henning, E., & Van der Westhuizen, D. (2004). Crossing the digital divide safely and trustingly: how ecologies of learning scaffold the journey. *Computers & Education*, 42(4), 333-352.
- ILETC. (2017). Transitions Australasia. Transitions Research Symposium Melbourne. Retrieved 15 June, 2017, from <http://www.iletc.com.au/events/transitions/transitions-australasia/35T>
- Jones, C. (2012). Networked learning environments. In M. Keppell, K. Souter & M. Riddle (Eds.), *Physical and virtual learning spaces in higher education* (pp. 102-118). Hershey PA: IGI Global.
- Rafferty, J. (2012). Design of outdoor and environmentally integrated learning spaces. In M. Keppell, K. Souter & M. Riddle (Eds.), *Physical and virtual learning spaces in higher education: Concepts for the modern learning environment* (pp. 51-70). Hershey PA: IGI Global.
- Rafferty, J., Munday, J., & Buchan, J. (2013). Ten rules of thumb in blended and flexible learning: a study on pedagogies, challenges and changing perspectives. In J. Willems, B. Tynan & R. James (Eds.), *Outlooks and opportunities in blended and distance learning* (pp. 35-49). Hershey PA: Information Science Reference, an imprint of IGI Global.
- Siemens, G. (2005). Connectivism: a learning theory for the digital age. *international Journal of Instructional Technology and Distance Learning*, 2(1), 3-10.



Teaching Space: Does a teacher's spatial competency affect their teaching and effect the different types of learning that takes place in a classroom?

Vicky Leighton

University of Melbourne/Anglican Church Grammar School - Australia

ABSTRACT

Teachers do not generally plan space for pedagogical advantage. Equally, a designed educational space is not an incidental component of the teaching and learning cycle. The relationship is complex and not always articulated or understood. Environmental factors such as school and individual cultures, contextual symbolism, issues of identity and the influence of teachers' environmental capabilities and their spatial awareness, are all component parts that influence those who occupy learning spaces.

Learning environments research has evolved rapidly to the stage we can now be critical of the knowledge teachers bring to the space. The aim of this project will be to determine and measure the effect of teachers' environmental capabilities - their spatial literacy, thinking and competency, - on their teaching, and subsequent impact on different types of learning.

KEYWORDS: ENVIRONMENTAL COMPETENCY; SPATIAL LITERACY; SPATIAL THINKING; SPATIAL COMPETENCY, ECOLOGICAL PSYCHOLOGY; INNOVATIVE LEARNING ENVIRONMENTS

Vicky gained a first class honours degree in Art History and Visual Art from the University of Wales, Aberystwyth. She was subsequently awarded a scholarship to complete her Master's degree in Art Theory and Fine Art, and continued to a custodial career in the heritage industry in the UK. Vicky has lived and worked in a range of nationally-significant historic buildings including Chartwell, the home of Winston Churchill, and Monks House, Virginia Woolf's home. Vicky completed a postgraduate certificate in education at Oxford Brookes University in 2008 and she is currently the Head of Art at the ILETC partnership school, Anglican Church Grammar School in Brisbane, and vice-chair for The Churchie National Emerging Art Prize in Australia.

INTRODUCTION

Thirteen years ago, Kenn Fisher asked the question, "Why is the physical learning environment in schools largely ignored by teachers within pedagogical practice?" (Fisher, 2004, p. 36). Why indeed? Fisher argues that it is in the school campus that we all begin to learn how architecture is lived and experienced. It is here where we develop our "architectural vocabularies and spatial literacies" (2004, p. 37). If this is an accepted notion, it is unsurprising that teachers, adults who have grown from student learners, have an underdeveloped architectural and spatial vocabulary. Many come from the failed open plan movement of the '70s or the industrialized model of classroom prevalent to this day. Even younger teachers, who may have experienced innovative learning spaces within their own schooling, were likely taught by an educator who had not been trained to use the space or understand its affordances. As Fisher points out "my research has found that architecture seems to be perceived primarily in the sub-conscious" (2004, p. 37). The purpose of this research is to explore how to bring the lived architectural space within a school into the consciousness of its occupants, users and communities, and beyond that, facilitate active control over the environment as an agent for teaching and conduit for learning.

The study is premised upon the idea that space shapes social relations and practices (Lefebvre, 1991; Massey, 1994), and acts as a connection between designed ideological and educational contexts and inhabitants. Hattie challenged the 2015 LEARN Terrains symposium by saying: "So the plea that I challenge you with today is...how do you change the teaching to optimize the power of architectural difference?" (Hattie et al., 2015, p. 12). This call to arms poses a number of divergent questions, perhaps most obviously; what, and why, do teachers need to change? What imbues a building with power in an educational setting? Are teachers and learners influenced, or do they influence, the buildings they inhabit? Can and do teachers utilize or take advantage of their built environment? How does a three-dimensional mass assume and convey meaning, identity, ideology and ambition (De Botton, 2006), and how can a teacher harness these as a teaching tool?

Anecdotally teachers are observed to react to their environment, and it is therefore argued that they should be taught how to manage this interaction (Byers & Imms, 2014). Blackmore, Bateman, Loughlin, O'Mara, & Aranda (2011) points out the connection between learning outcomes and learning spaces is mediated by 'tangibles' (for example spatial density or light) and 'intangibles', (school culture, sense of belonging), suggesting there is a complex balance between a teacher's underpinning beliefs and principles (Hattie & Yates, 2014), and their understanding of context and space. These confounding variable factors have complicated research concerning the effectiveness of innovative learning environments, some of which lack rigorous experimental methodology (Brooks, 2011; Painter et al., 2013).

A constructivist approach recognizes school social interactions are in a constant state of revision (Sala-Oviedo & Imms, 2016) and provides a position on learning and place that is well understood by classroom teachers. New pedagogies taught in classrooms today, seen in this constructivist context, are typified by student centred, self-directed learning. "The school environment...can be seen as 'scaffolding': a temporary framework that enables the social construction of knowledge to take place and then be removed as students become autonomous learners" (Dovey & Fisher, 2014, p. 45). This suggests the possibility that teachers can manipulate their environment to connect skills and knowledge with what is to be learned next. This study examines if teachers really think of their environment as a scaffold for teaching and learning. It looks at how the scaffolding is constructed and deconstructed, who the decision makers in that process are, and asks the question 'how aware are teachers and learners of the potentialities of the framework?'

TEACHER SPATIAL CAPABILITIES

It is argued that empirical evidence of teacher spatial capabilities needs to be established if tools for environmental competency (Lackney, 2008) are to be devised. Ambitious open plan designs, created to imbue teachers with the ability to deliver new, innovative and collaborative learning programs, and enable learners to become curious and critically minded, have often been observed to be ineffective. Far from anointing occupants with new capabilities of behaviour and learning, their ability to bring old habits into the new environment has proved to be more powerful. Drawing on Sanoff (2001), Lackney comments; "Regardless of improvements in classroom size, spatial configuration, physical features, furnishings or equipment, traditional patterns of direct instruction persist" (2008, p. 134).

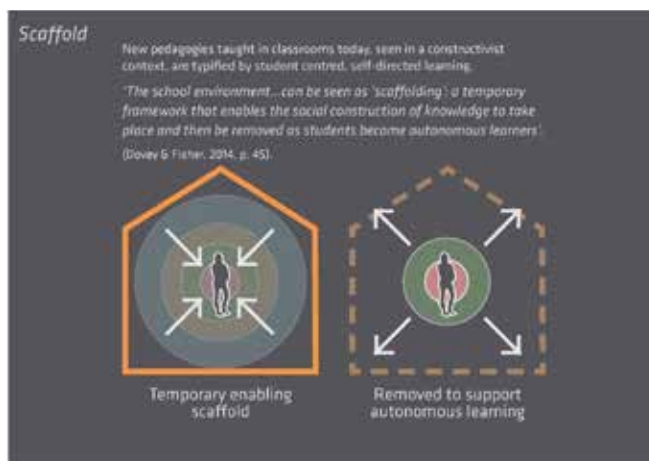


Figure 1: The school environment seen as a scaffold that can be constructed and deconstructed.

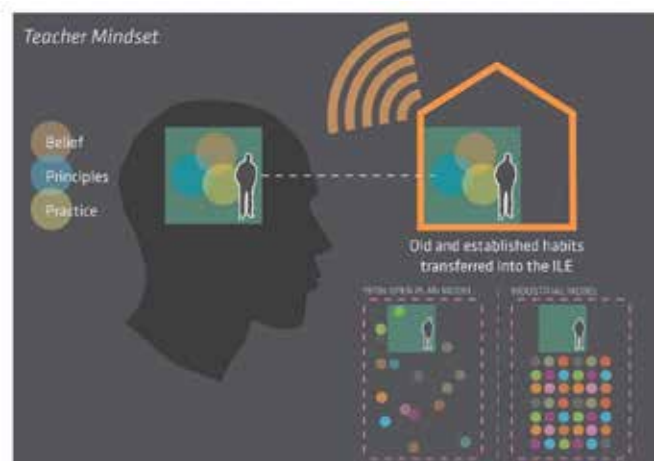


Figure 2: Established habits potentially transferred into ILEs.

Lackney (2008) argues that observed unchanging patterns of instruction exist because educators "lack the environmental competence to effectively use the school environment to support their teaching practice" (p. 134). Teachers, for example, may cite problems of student behaviour, but are unlikely to associate environmental factors as a contributing factor. He calls for a common language to be developed for teachers to articulate their experiences of space.

It is argued here that further action is required to first define, and then develop, teacher's environmental and spatial literacy, in order that competence and expression can follow. Furthermore, an understanding of the characteristics of practice in a spatially literate teacher needs to be established in order to evaluate the possible relationship between teacher spatial competency, pedagogy, and classroom type.

TEACHER SPATIAL THINKING

There is, as yet, no clear consensus about what an educator's spatial thinking is. Often related interdisciplinary concepts are described in its place, such as spatial ability, spatial reasoning, spatial intelligence, or environmental cognition. These descriptors are useful, but are specific in their approach. Lackney's 'environmental competency' is a well-documented example. It is argued that spatial thinking is broader in its scope and links concepts of space, ways to represent space and critical evaluation of space into one cognitive process. This is closer to a teacher's more holistic, varied, temporal and accidental experience of spaces and classrooms. "There is no single way to think spatially. Instead, the process of spatial thinking comprises broad sets of interconnected competencies that can be taught and learned" (National Research Council, 2005, p. 26).

Spatial literacy, using principles derived from the National Research Council's report 'Learning to Think Spatially' (2005), encompasses the exploration of spatial thinking itself. The committee asserts that spatial thinking is a universal mode of thinking, a collection of cognitive skills, accessible to everyone over a range of domains and contexts. Spatial thinking distinguishes itself from spatial ability by providing the link between space, representation and reasoning thereby giving it currency, adaptability and versatility. Key to the theory put forward is the notion that spatial thinking is "based on a constructive amalgam of three elements: concept of space, tools of representation, and processes of reasoning" (2005, p. 3).

The concept of space is associated with spatial knowledge. It incorporates the key elements that are the building blocks for spatial thinking. These concepts are expressed and applied within learning environments as spatial affordances, cultural and school contexts, and classroom design.

The tools of representation are demonstrated as a teacher's spatial skills—their ability to understand and express the properties of, and relationships between, spatial affordances, spatial contexts and classroom design to enhance pedagogy and learning outcomes. "By expressing relationships within spatial structures..., we can perceive, remember, and analyse the static and, via transformations, the dynamic properties of objects and the relationships between objects" (National Research Council, 2005, p. 12).

The processes of reasoning are associated with spatial extrapolation and interpretation. This requires a critical approach or stance, evaluation skills and ability to extrapolate and put forward a course of action. It demands a command over spatial reasoning and the capacity for using supporting tools. This is manifest in a teacher's ability to effectively evaluate their own spatial competency as a measure of impact (Hattie, 2012) on their students.

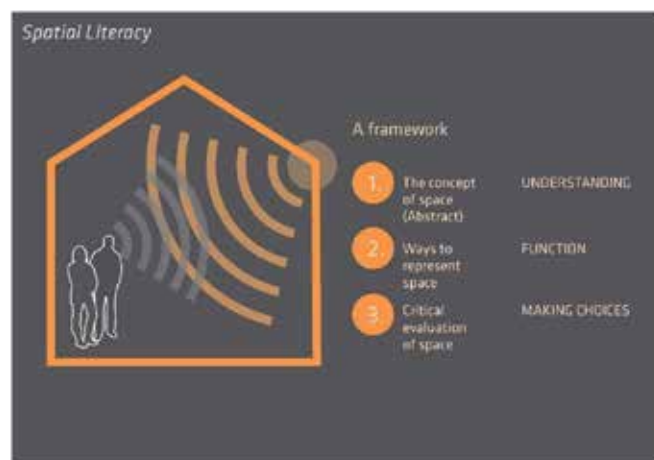


Figure 3: Spatial literacy using principles derived from the National Research Council's report 'Learning to Think Spatially' (2005).

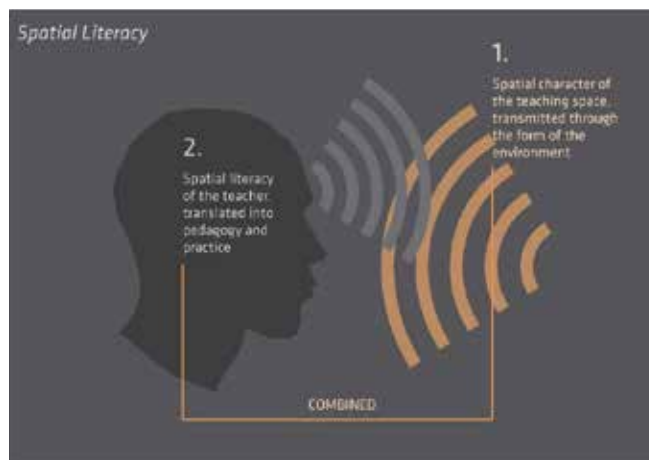


Figure 4: Teacher spatial literacy.

TEACHER SPATIAL LITERACY

When applied together, these spatial concepts suggest a working definition for teacher spatial literacy as knowledge and skills related to learning environments that incorporate spatial ways of thinking, expressed and evident within a classroom through the use of specialized pedagogical and environmental capabilities. In this context, teacher spatial literacy is explained as the ability of a teacher to react, respond and use space to enhance and optimize teaching and learning experiences whilst recognizing a range of identified contextual overlays. Through the lens of spatial thinking, it implies an awareness of pedagogical/typographical teaching approaches that are appropriate to school contexts, and the awareness of different types of learning related to learner profiles and cultural contexts.

Key ideas associated with this approach are recognized. Spatial literacy can be cultivated. "The process of spatial thinking comprises broad sets of interconnected competencies that can be taught and learned" (National Research Council, 2005, p. 26). This implies that teachers can be taught spatial literacy, thinking and capability skills. To apply spatial literacy to the concept of environmental competency opens the door to an approach that feeds on the strengths of a variety of disciplines. It is recognized that spatial thinking develops uniquely in individuals, depending on their experience, education and inclination. This complicates data collection for the researcher, but opens up the potential for new knowledge to be acquired. Drawing a similar approach to Dane's effective teaching and learning spatial framework it is proposed that a spatial literacy framework (see Figure 4) can be developed with the ability to understand the meaning of space so that we can use its properties to critically, in this context, structure teaching to enhance learning (Dane, 2016).

DEVELOPING A FRAMEWORK FOR RESEARCH

The initial study will be exploratory by nature because there is no established method for conducting teacher spatial competency research. Systematic studies examining how school architecture informs teaching and learning are rare (Byers, Hartnell-Young, & Imms, In review; Higgins, Hall, Wall, Woolner, & McCaughey, 2005). There are, however, environmental psychology research approaches that potentially provide some footing in this regard. In a summary of the literature that provides the foundation for research into possible spatial evaluative approaches, Cleveland puts forward the value of critical human geography and environmental psychology as a possible lens in which to devise a research strategy (Cleveland, 2015).

Psychologists and other behavioural scientists began to investigate the interaction between the built environment and human behaviour in the 1950s. This represented a new field respectively known as architectural psychology, environmental psychology, or ecological psychology (Altinbasak, 2016). Weinstein (1981) used an environmental psychological approach to person-environment relations, and suggested that the environment communicates 'direct' and 'symbolic' effects to students.

Sala-Oviedo and Imms blend compound educational and architectural theories to develop an evaluation theory that encompasses three key concepts: people; place and space; and practice, curriculum and assessment, to provide a methodological framework for examining the role of evaluation in an ESP (educational space planner).

Soja (1989) asserted that the discipline of 'critical human geography', a branch of critical social theory, allows for new interpretations of social history seen through the lens of spatial critiques. "Just as space, time, and matter delineate and encompass the essential qualities of the physical world, spatiality, temporality, and the social being can be seen as the abstract dimensions which together comprise all facets of human existence" (1989, p. 25). It is well known that Lefebvre (1991), argued that space is not 'innocent', and that users 'felt' space more that they thought about it. The abstract dimensions associated with temporality and space explains the complexity of the variables involved.

Gislason (2010) used behaviour setting theory that assumes 'behaviour is a function of the person and the environment, and the unit of the study is the natural environment' (Swartz & Martin, 1997, p. 6). He based his theory on Owens and Valesky's (2006), and by deduction after Barker and Gump (1964), conceptual school climate model, as a tool that "accounts for the relationship between school design, teaching and learning" (Gislason, 2010, p. 128). The model recognizes the role of social, organizational and physical aspects of school settings as "formative factors in the educational process" (2010, p. 128).

Most recently, Altinbasak (2016) utilized a correlational research design positioned to explore the relationship between identified complex variables in a conceptual framework. This was developed from an ecological psychology approach that assumes a correlation and interdependence between environments and behaviour. Drawing on Kurt Lewin's (1936) equation, $B = f(P, E)$ whilst accepting Stokols (1977) assertion that ecological psychology "focuses on the whole process shared by groups, which adjust to their both physical and social conditions in their environment" (2016, p. 59), Altinbasak (2016) provides the formulation of behaviour with an interactionist perspective as listed in Figure 5.

Altinbasak (2016) further explores the theory of behaviour settings (focussing on its ability to conceptualize the relationships between behaviour and milieu), and the theory of affordances (which mainly focuses on the act of perceiving) to develop a conceptual framework for her study.

In order to clarify and propose relationships among the concepts and provide a context for interpretation, assertions such as Gislason's (2010) theoretical framework for school design research and Altinbasak's (2016) conceptual framework will provide antecedents to define the specific characteristics of practice and understanding represented by teacher spatial literacy, thinking and competency.

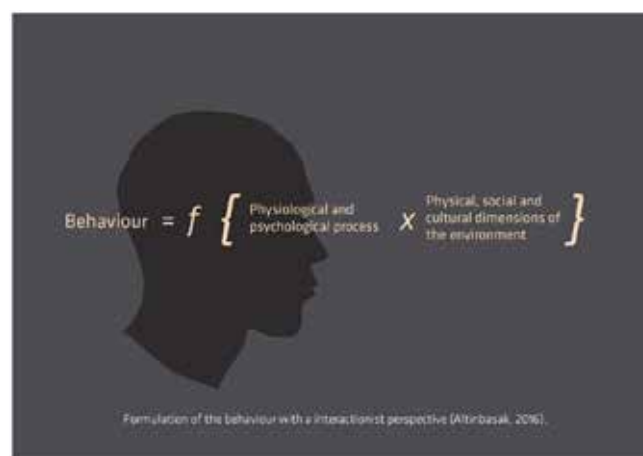


Figure 5: Formulation of the behaviour with an interactionist perspective (Altinbasak, 2016).

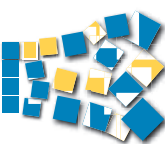
CONCLUSION

There is a tantalizing possibility that a spatially capable teacher could potentially harness the interaction between learning environment, teaching and types of learning to maximize their impact in the classroom and enhance learner outcomes. This paper has provided an outline of the research currently being undertaken to establish a framework for defining teacher spatial capabilities that incorporates the interconnected skills of spatial literacy, spatial thinking and spatial competency. This framework introduces theoretical connections and relationships between these elements with school contexts and cultures, pedagogies, types of learning and classroom type. The research is currently investigating and testing tools for empirical measurement to evaluate and advance the theories put forward, with subsequent papers to report findings.

REFERENCES

- Altinbasak, E. (2016). *Designing Schools for Future: Comparison of Teacher Attitudes and Preferences toward Classroom Environment*. North Carolina State University.
- Blackmore, J., Bateman, D., Loughlin, J., O'Mara, J., & Aranda, G. (2011). *Research into the connection between built learning spaces and student outcomes*: Department of Education and Early Childhood Development.
- Brooks, D. C. (2011). Space matters: The impact of formal learning environments on student learning. *British Journal of Educational Technology*, 42(5), 719-726. doi:10.1111/j.1467-8535.2010.01098.x
- Byers, T., Hartnell-Young, E., & Imms, W. (In review). Empirical evaluation of different classroom spaces on student perceptions of the use and effectiveness of 1 to 1 technology.
- Byers, T., & Imms, W. (2014). *Making the space for space: The effect of the classroom layout on teacher and student usage and perception of one-to-one technology*. Paper presented at the 26th Australian Computers in Education Conference, Adelaide.
- Cleveland, B. W. (2015). *Developing new approaches to the evaluation of physical learning environments: A return to the origins of post-occupancy evaluation in environmental psychology*. Paper presented at the Australasian Association for Educational Research, Perth, WA.
- Dane, J. (2016). The Effective Teaching and Learning Spatial Framework. In W. Imms, B. Cleveland, & K. Fisher (Eds.), *Evaluating Learning Environments: Snapshots of Emerging Issues, Methods and Knowledge* (pp. 211-228). Rotterdam: SensePublishers.
- De Botton, A. (2006). *The architecture of happiness*: Camberwell, Vic. : Hamish Hamilton an imprint of Penguin Books, 2006.
- Dovey, K., & Fisher, K. (2014). Designing for adaptation: The school as socio-spatial assemblage. *The Journal of Architecture*, 1-21. doi:10.1080/13602365.2014.882376
- Fisher, K. D. (2004). Revoicing classrooms: A spatial manifesto. *Forum*, 46(1), 36-38. doi:10.2304/forum.2004.46.1.8
- Gislason, N. (2010). Architectural design and the learning environment: A framework for school design research. *Learning Environments Research*, 13(2), 127-145. doi:10.1007/s10984-010-9071-x
- Barker, R. G., & Gump, P. V. (1964). *Big school, small school: High school size and student behavior*. Stanford, California: Stanford University Press.
- Hattie, J. (2012). *Visible learning for teachers: Maximizing impact on learning*. New York: Routledge.
- Hattie, J., Healy, S., Grant, G., Villafranca, E., Yang, P., Frith, K., . . . Imms, W. (2015). *Terrains 2015 Mapping learning environment evaluation across the design and education landscape: Towards the evidence-based design of education facilities*: LEARN.
- Hattie, J., & Yates, C. (2014). *Visible learning and the science of how we learn*. London: Routledge.
- Higgins, S., Hall, E., Wall, K., Woolner, P., & McCaughey, C. (2005). *The impact of school environments: A literature review*. Retrieved from Newcastle, United Kingdom: <http://www.ncl.ac.uk/cflat/news/DCReport.pdf>

- Lackney, J. A. (2008). Teacher environmental competence in elementary school environments. *Children, Youth and Environments*, 18(2), 133-159.
- Lefebvre, H. (1991). *The production of space*. Oxford: Blackwell
- Lewin, K. (1936). Principles of topological psychology. London : McGraw-Hill.
- Massey, D. (1994). Place, space and gender. *Minneapolis: University of Minnesota Press*.
- National Research Council. (2005). *Learning to think spatially: GIS as a support system in the K-12 curriculum*: National Academies Press.
- Owens, R., & Valesky, T. (2006). *Organizational Behavior in Education: Adaptive Leadership and School Reform*. Boston : Pearson/Allyn & Bacon.
- Painter, S., Fournier, J., Grape, C., Grummon, P., Morelli, J., Whitmer, S., & Cevetello, J. (2013). *Research on learning space design: Present state, future directions*. Retrieved from <http://www.scup.org/page/pubs/books/rolsd>
- Sala-Oviedo, A., & Imms, W. (2016). The Role of Evaluation as an Educational Space Planning Tool. In W. Imms, B. Cleveland, & K. Fisher (Eds.), *Evaluating Learning Environments: Snapshots of Emerging Issues, Methods and Knowledge* (pp. 145-161). Rotterdam: SensePublishers.
- Sanoff, H. (2001). *School building assessment methods*. Washington, DC: National Clearinghouse for Educational Facilities.
- Soja, E. W. (1989). *Post modern geographies: The reassertion of space in critical social theory*. London: Verso.
- Stokols, D. (1977). Origins and directions of environment-behavioral research *Perspectives on environment and behavior* (pp. 5-36): Springer.
- Swartz, J. L., & Martin, W. E. (1997). Ecological psychology theory: Historical overview and application to educational ecosystems. In J. L. Swartz & W. E. Martin (Eds.), *Applied ecological psychology for schools within communities: Assessment and intervention* (pp. 3-27). Mahwah, NJ: Erlbaum
- Weinstein, C. S. (1981). Classroom design as an external condition for learning. *Educational Technology*, 21, 12-19.



Session three: Change and risk

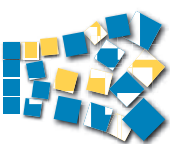
Interlocutor

Steve Cook

Principal, Albert Park College - Australia



Steve Cook has led the development of two inner city secondary schools in Melbourne, Victoria. The Bayview Street Campus of Williamstown High School was the first 5 star green school built in Victoria and featured innovative environmental design including a 1.8 hectare wetland and a Marine Education Centre. Currently, he is the Foundation Principal of Albert Park College. Twenty six million dollars has been invested in creating an open plan 21st century learning environment in which the use of technology is king!



Into the great wide open: Navigating teacher opportunity, agency and structure in a collaborative ILE

Chris Bradbeer

University of Melbourne - Australia

ABSTRACT

Implicit within the design of many Innovative Learning Environments (ILEs) in New Zealand primary schools is the intention for a group of co-located teachers to work together with an 'up-scaled' community of students. To some these socio-spatial settings are suggestive of pedagogical and spatial freedom, of high levels of professional and student agency, and a transformation from routines established in previous traditional classroom environments. The shift into ILE may therefore encourage possibilities for novel approaches, the utilization of individual strengths, and opportunities for teachers to determine together how facets of learning, time and space are organized. However, the level of structure required by teams to successfully and collaboratively achieve this presents as a complex, and time-consuming task, with teachers often finding themselves in a space between practicality and potential. This paper draws on observational and interview data from a wider study of teacher collaboration in six New Zealand primary schools case study sites. It considers the role of pedagogical and organizational structures alongside levels of autonomy experienced by teachers on adapting to new spaces. The findings indicate that while the occupation and ongoing inhabitation of Innovative Learning Environments may well present opportunities for teachers, tensions may be felt between predominating or created structures, and aspired or idealized practice.

Data utilized in this research was obtained adhering to the ethical protocol current at the time of data collection. The research forms part of a PhD thesis and has been approved by the Human Research Ethics Committee (1442559.1).

KEYWORDS: INNOVATIVE LEARNING ENVIRONMENTS, TEACHER COLLABORATION, NEW ZEALAND, STRUCTURE, AUTONOMY, ADAPTATION

Chris Bradbeer is an Associate Principal at Stonefields School in Auckland, where he has been involved in establishing and developing a vision for teaching and learning, building teacher capacity and having the opportunity to consider 'what might be possible' in a new school setting. He is a Research Fellow (part time) on the ILETC project. Chris' interest is particularly focused on the opportunities engendered by the provision of new learning spaces. He is currently completing a PhD investigating the nature of collaborative teacher practices in Innovative Learning Environments in New Zealand.

INTRODUCTION

Conceptualised as new and potentially improved socio-spatial contexts for learning, the introduction of Innovative Learning Environments (ILE) (OECD, 2013) and Flexible Learning Spaces (Ministry of Education, 2011) in New Zealand primary schools represents a significant shift in educational discourse. Designed to support the requirements of '21st Century learners' more readily than traditional classrooms (Ministry of Education, 2011) the intention is that they will contribute towards the raising of student performance and learning outcomes (Ministry of Education, 2016). Accordingly, these changes to socio-spatial settings have been demonstrated to demand new competencies of teachers, whether in navigating new spaces or in adopting new pedagogical approaches (see for example Alterator & Deed, 2013; Cleveland, 2011; Cox & Edwards, 2014; Deed & Lesko, 2015; Deed, Lesko, & Lovejoy, 2014; Saltmarsh, Chapman, Campbell, & Drew, 2015; Woolner, Clark, Laing, Thomas, & Tiplady, 2012). Furthermore ILEs are considered to provide a setting where teachers are able to work more collaboratively, work in a strength-based manner, adopt a higher degree of pedagogical variation and as a result, to better meet the needs of learners (OECD, 2013). This requirement may represent a wholesale shift in workplace environment and teachers' relationships with colleagues (Alterator & Deed, 2013).

COLLABORATION

Entering into collaborative arrangements often brings with it a proportional level of risk to reputation and individual autonomy. Collaboration represent a level of formal commitment towards a commonly held mission (Mattessich & Monsey, 1992). Considered to be a step above situations of cooperation and coordination, collaborative arrangements are therefore often definitionally concerned with giving something up for the greater good, in order to achieve something that is not possible individually (Thomson & Perry, 2006). Inherently though this requires the relinquishment of some individual autonomy (Peterson, 1991).

STRUCTURE AND AUTONOMY WITHIN THE COLLABORATIVE PROCESS

The process of collaboration identified by Wood and Gray (1991), outlined a need for shared rules, norms and structures, a clear intention towards action, and a shared orientation towards the purpose that brought people together in the first place. Thomson and Perry (2006) concluded that the collaborative process required structures in order to make decisions and manage ways of working. However, parallel attention was needed to address participants' autonomy so that individual identity could be retained, strengths utilized and mutual benefits recognized.

TEACHER COLLABORATION AND SPACE

For teachers, fostering deeper levels of multi-level collaboration has been considered instrumental in leveraging large-scale shifts in student outcomes (Fullan & Langworthy, 2014; Goddard, Goddard, & Tschannen-Moran, 2007; Hattie, 2015; Stoll, Bolam, McMahon, Wallace, & Thomas, 2006). Notably however the vast majority of collaborative scenarios have taken place outside the classroom, resulting in collaboration constituting a 'visited activity' (Forte & Flores, 2013; McGregor, 2003). Within the classroom, establishment of organizational structures such as daily routines, student grouping, time allocation and spatial practices have largely remained the domain of fairly autonomous individual professionals (Clandinin & Connelly, 1996). Here, autonomy is viewed as control over one's own environment (Hoekstra, Korthagen, Brekelmans, Beijard, & Imants, 2009).

The implication of a move into ILEs is that team-teaching, sharing of resources and distribution of roles will occur (Saltmarsh et al., 2015). Additionally adaption to new spaces often involves the management of larger than previously encountered numbers of students Campbell, Saltmarsh, Chapman, and Drew (2013). In their case-studies of ILEs, Saltmarsh et al. (2015) identified a tension between a supposed need for innovation and flexibility in these spaces, alongside the creation of an environment that was ordered enough for learning, as well as providing a "demonstration of professional competence" (, p. 324) for teachers. They concluded that structural components of space and pedagogy were central to the successfulness and responsiveness of the adoption of new collaborative spaces.

THE STUDY

RESEARCH DESIGN

This was part of a three-phase PhD study aimed to understand more deeply the intersection between teacher collaboration and ILE. The research used a qualitative collective instrumental case-study design (Stake, 1995), so that the issue became the focus rather than the group being studied. Data in this phase was collected through observations, semi-structured interviews with principals, and focus groups of teachers and students. It was analysed using thematic narrative analysis (Riessman, 2008), and interrogated through the lens of the theorization of collaborative process (Thomson & Perry, 2006). The data presented in this paper was gathered from one of the Phase 2 sites.

CASE STUDY

'Treeside Intermediate' is a suburban Year 7-8 school built originally in 1976 with a student roll of 290. They were divided into three 'communities', each occupying a building (recently refurbished on a tight budget), containing a set of rooms aside a central 'corridor'. The move into communities had been a relatively recent change prompted by a desire to create a more collaborative teacher culture, and a consideration of how space across the school might be better utilized. Within their communities, teams had been given a high level of autonomy to decide how they would operate. Pivotal to the school's vision however was the idea of building agency and self-management skills in students, something regularly reinforced through a school-wide set of values.

PEDAGOGICAL PRACTICES

'Whio' community was home to 94 students. It was staffed by three teachers, (one a 'beginning teacher'), and a teacher aide who worked predominantly with students requiring additional support. At the beginning of the year, the teachers had predominantly worked individually but over the first term had identified ways in which they could work more closely as a team, play to their strengths, and better build levels of self-management with students. They had divided curriculum responsibilities so that two teachers were responsible for teaching literacy to ability groups across the whole cohort, with the third teaching all the mathematics. Only two teachers taught these groups at any one time and were generally based in the *Teaching Space*. This was considered by the team to be pedagogically advantageous as well as means of creating organizational efficiency. It also shifted some management emphasis onto the students so they had to ensure they were in the right place at the right time.

The opportunity for one or two teachers to remain in a particular room for any duration was enabled through a set of team co-constructed protocols. Students were assigned activities following maths and literacy sessions that they were expected to complete either individually or with a partner. In addition a weekly activity sheet contained a number of 'must do and can-do' tasks. For some students these tasks were differentiated, and support made available from the teacher aide.

An established norm within the community was that students knew not to disturb teachers who were engaged working with a group. Instead, the expectation was that they would talk to the third teacher, the roaming 'Learning Coach' for assistance. The Learning Coach's role was to respond to queries from individual students, monitor levels of self-management and independence, as well as to 'sign-off' completed activities on the weekly sheet. The practice provided immediacy and timeliness of support that students felt would be lacking if they were all teachers were working with groups simultaneously. Observations distinguished that the Learning Coach's mobility (and that of the teacher aide) was in strong contrast to those teaching in the *Teaching Space*.

SPATIAL PRACTICES

Each of the four rooms adjacent to the central passageway had been named, assigned specific usage and furnished accordingly (see Figure 1). An individual student's opportunity to use these different spaces was determined through a measure of their self-management. This was mediated through the 'Independence Wall' and applied the language of SOLO (Structure of observed learning outcomes) taxonomy of learning to levels of individual independence. Used primarily across the school as a meta-cognitive framework to describe levels of understanding, teachers in the community had adapted it to this context. Students' positioning on the display board contributed directly to their levels of permissible spatial access. Decided by the teachers, the further to the right their photograph was placed on the display, the greater the range of spaces accessible to them. Consequently some students were limited to staying in a room with their 'home-room' teacher, while others were able to work away from direct supervision from any teachers, and ultimately to have freedom to work anywhere through school. Teachers acknowledged that spatial independence opportunities provided a level of incentivization for many students.

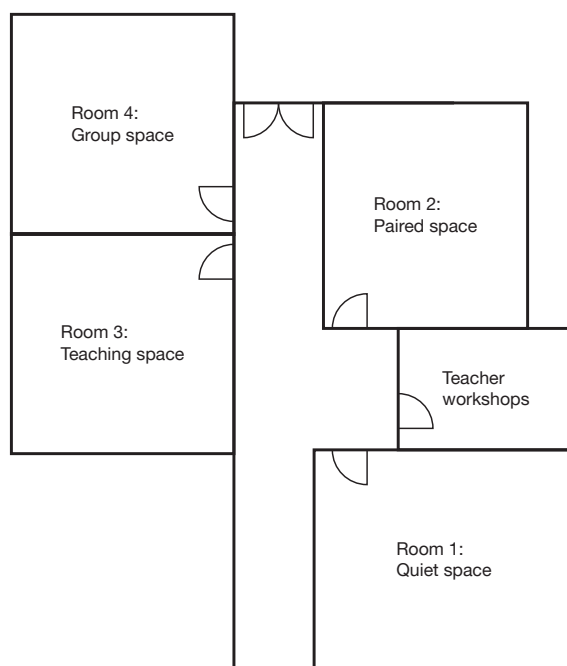


Figure 1: Spatial layout and designation in 'Whio' community.

Additionally a centrally located workspace provided a meeting and storage space for staff. Internal glazing meant there was visibility into Rooms 1 and 2, and out to central the passageway. Previously set up as a small science room, teachers and school leaders noted that removing teacher's desks from classrooms and collocating into a shared space had been a deliberate move towards decreasing ownership of space, and the creation of a more collaborative workplace. Teachers viewed it as a key assemblage.

COLLABORATIVE PRACTICES

The development of collaborative forms of working had formed a significant investment for the team of teachers in 'Whio' community, including the scaling-up of a number of routines that were required over and above those required by teachers working on their own. Much like (Saltmarsh et al., 2015) had identified, the need to spend time together placed some constraints on teachers. Planning, and consideration of how the community was going to function on a day-to-day basis had occupied much of their time. The use of synchronous and asynchronous online documentation formed a key component in supporting administrative aspects of teacher collaboration and was regularly observed in use within the teacher workspace.

DISCUSSION

For the experienced teachers in the study colocation with colleagues in shared spaces represented a significant departure from their previous spatial experiences within schools. Similarly, for the teacher new to the profession it was appreciably different to the spaces she had trained in and had prepared for. For both, individual classrooms had represented jurisdictional domain, where teachers were relatively free to set structural frameworks (Clandinin & Connelly, 1996). To develop a more collaborative approach the team of teachers had assembled a set of structures and practices as a means to enact the collaborative intentions underpinning their spatial shift. As (Saltmarsh et al., 2015) had concluded, it was evidential that there was a high level of structural sophistication in such a shared learning environment that, had teachers been working on their own, would have been unrequired.

Taken as a whole the practises and structures teachers had employed ensured that they maintained a level of control over a larger cohort of students while at the same time theoretically providing room to develop more self-managing skills among them. Put simply, structures that were evident in the teachers' joint work fell into three broad categories: structures that existed beforehand, structures that did not, and those that existed beforehand but required modification.

The former could perhaps be termed *Heritage structures* in that they had been carried across over time (and space). In this category, they were seen to include a language of educational values and vision common across the school, the practice of timetabling subjects, the allocation of students to a specific 'home-room' teacher. *Modified structures* included the use of ability groups (now shared between more than one teacher), the utilization of SOLO taxonomy (used in an alternate context), and the removal of individual teacher desks (into a shared space). *Novel structures* were seen to include the practice of the 'roaming' Learning Coach, the relationship between self-management levels and individual spatial determination, and the use of synchronous and asynchronous collaborative teacher documentation.

Critically it is important to note that in the majority of cases it was the team of teachers themselves who had instigated particular ways of working rather than being externally imposed. The development of structures seen as constraining therefore could be described as self-constraining. However, the same structures could also be seen as enabling as they created opportunities that would be less achievable in a traditional setting. Reflecting on Giddens (1984) theory of structuration, agency and structure need to be viewed as a duality. His assertion that "...the structural properties of social systems are both the medium and outcome of the practices they recursively organize" (, p. 25) portrays a social system that is equally reliant on both. In the community under investigation, the structures developed enabled a pedagogical approach that teachers noted met students' needs. Together they helped to enable teachers' idealized practice, but at the same time created constraints.

CONCLUSION

The idea that teachers are to work in Innovative Learning Environments together is underemphasized, and presents a significant terrain for teachers to navigate and negotiate their way through. Taking a community of practice that has been used to working relatively autonomously and spatially privately, into one that is by default collaborative and proximal illuminates multiple hitherto professional normalities. Many of these concern the pedagogical and organizational structures teachers have previously created within their classrooms. In the case illustrated here the resultant structures, designed to promote self-management and agency, seen in sum were considered by teachers to meet the needs of students and the vision of the school. However, the self-same structures could also be observed to create tensions in the way they limited use of both time and space for teachers and students alike.

REFERENCES

- Alterator, S., & Deed, C. (2013). Teacher adaptation to open learning spaces. *Issues in Educational Research*, 23(3), 315-330.
- Campbell, M., Saltmarsh, S., Chapman, A., & Drew, C. (2013). Issues of teacher professional learning within 'non-traditional' classroom environments. *Improving schools*, 16(3), 209-222. doi:10.1177/1365480213501057

- Clandinin, D. J., & Connelly, F. M. (1996). Teachers' Professional Knowledge Landscapes: Teacher Stories—Stories of Teachers—School Stories—Stories of Schools. *Educational Researcher*, 25(3), 24-30. doi:10.3102/0013189X025003024
- Cleveland, B. (2011). *Engaging spaces: Innovative learning environments, pedagogies and student engagement in the middle years of school*. (PhD Unpublished), Melbourne University, Melbourne.
- Cox, P., & Edwards, D. (2014). Restructuring teaching and learning in open-plan schools. In V. Prain, P. Cox, C. Deed, D. Edwards, C. Farrelly, M. Keefe, V. Lovejoy, L. Mow, P. Sellings, B. Waldrup, & Z. Yager (Eds.), *Adapting to teaching and learning in open-plan schools* (pp. 61-78). Rotterdam: Sense.
- Deed, C., & Lesko, T. (2015). 'Unwalling' the classroom: teacher reaction and adaptation. *Learning Environments Research*(18), 217-231. doi:10.1007/s10984-015-9181-6
- Deed, C., Lesko, T., & Lovejoy, V. (2014). Teacher adaptation to personalized learning spaces. *Teacher development*, 1-15. doi:<http://dx.doi.org/10.1080/13664530.2014.919345>
- Forte, A. M., & Flores, M. A. (2013). Teacher collaboration and professional development in the workplace: a study of Portuguese teachers. *European Journal of Teacher Education*, 1-15. doi:10.1080/02619768.2013.763791
- Fullan, M., & Langworthy, M. (2014). *A rich seam: How new pedagogies find deep learning*. Retrieved from London: http://www.michaelfullan.ca/wp-content/uploads/2014/01/3897.Rich_Seam_web.pdf
- Giddens, A. (1984). *The constitution of society*. Cambridge: Polity.
- Goddard, Y., L., Goddard, R., D., & Tschannen-Moran, M. (2007). A theoretical and empirical investigation of teacher collaboration for school improvement and student achievement in public elementary schools. *Teachers College Record*, 109(4), 877.
- Hattie, J. (2015). *What works best in education: The politics of collaborative expertise*. Retrieved from London: <https://www.pearson.com/hattie/solutions.html>
- Hoekstra, A., Korthagen, F., Brekelmans, M., Beijaard, D., & Imants, J. (2009). Experienced Teachers' Informal Workplace Learning and Perceptions of Workplace Conditions. *Journal of workplace learning*, 21(4), 276-298. doi:10.1108/13665620910954193
- Mattessich, P. W., & Monsey, B. R. (1992). *Collaboration: What makes it work. A review of research literature on factors influencing successful collaboration*. St. Paul, MN: Amherst H. Wilder Foundation.
- McGregor, J. (2003). Making Spaces: Teacher workplace topologies. *Pedagogy, culture & society*, 11(3), 353-377. doi:10.1080/14681360300200179
- Ministry of Education. (2011). *The New Zealand School Property Strategy 2011-2021*. Retrieved from Wellington: http://www.minedu.govt.nz/NZEducation/EducationPolicies/Schools/SchoolOperations/~/_media/MinEdu/Files/EducationSectors/PrimarySecondary/PropertyToolbox/StateSchools/SchoolPropertyStrategy201121.pdf
- Ministry of Education. (2016). *The impact of physical design on student outcomes*. Retrieved from Wellington: <http://www.education.govt.nz/assets/Documents/Primary-Secondary/Property/School-property-design/Flexible-learning-spaces/FLS-The-impact-of-physical-design-on-student-outcomes.pdf>
- OECD. (2013). *Innovative Learning Environments, Educational Research and Innovation*. Retrieved from <http://dx.doi.org/10.1787/9789264203488-en>
- Peterson, N. L. (1991). Interagency collaboration under Part H The Key to Comprehensive, Multidisciplinary, Coordinated Infant/Toddler Intervention Services. *Journal of Early Intervention*, 15(1), 89.
- Riessman, C. K. (2008). *Narrative methods for the human sciences*. Thousand Oaks, CA: Sage.
- Saltmarsh, S., Chapman, A., Campbell, M., & Drew, C. (2015). Putting "structure within the space": spatially un/responsive pedagogic practices in open-plan learning environments. *Educational Review*, 67(3), 315-327.
- Stake, R. E. (1995). *The art of case study*. Thousand Oaks: Sage.
- Stoll, L., Bolam, R., McMahon, A., Wallace, M., & Thomas, S. (2006). Professional learning communities: A review of the literature. *Journal of Educational Change*, 7(4), 221-258.
- Thomson, A. M., & Perry, J. L. (2006). Collaboration Processes: Inside the Black Box. *Public Administration Review*, 20.
- Wood, D. J., & Gray, B. (1991). Toward a comprehensive theory of collaboration. *The Journal of applied behavioral science*, 27(2), 139.
- Woolner, P., Clark, J., Laing, K., Thomas, U., & Tiplady, L. (2012). Changing spaces: Preparing students and teachers for a new learning environment. *Children Youth and Environments*, 22(1), 52-74.



Mitigating perceptions of risk and improving impact in ILE

Tamara Jones

University of Auckland - New Zealand

ABSTRACT

Expectations of teachers to work in Innovative Learning Environments (ILE) is likely to generate many reactions from teachers. Findings from this doctoral research suggests teachers' perceptions of risk are a key reaction, and a fundamental barrier to engagement in ILE. The perceptions and experiences of 73 teachers employed in schools making the transition from 'traditional' classrooms to ILE suggests that perceptions of risk and perceptions of support influence teachers' willingness to engage in ILE. Implications of this research may inform researchers, policy makers, educational leaders and teacher educators of the importance of being aware of and responsive to teachers' cognitive and emotional reactions to change. Implementing actions that mitigate teachers' perceptions of risk may improve the impact in ILE.

KEYWORDS: RISK PERCEPTION; RISK-TAKING; ILE; CHANGE

Tamara Jones is an educator with over twenty years' experience in New Zealand and abroad. During this time, she has held various primary teaching and school leadership roles, written contracts for the New Zealand Ministry of Education and developed school-wide programmes with international education agencies in Asia. Tamara completed her Masters in Educational Leadership (Hons) in 2014. Currently, with the support of a University of Auckland doctoral scholarship, Tamara is completing her doctoral thesis. Her research explores teachers' perceptions of risk associated with making the transition to ILE, and forms of support, which increase teacher engagement in innovative practices.

INTRODUCTION

The New Zealand Ministry of Education (2014) has suggested flexible quality learning spaces enable teachers to employ creative and innovative teaching practices, which can lead to more robust, continuously improving communities of practice. There is however, limited research validating a significant relationship between the physical environment and student learning. Furthermore, attempts to change the traditional learning environments have been unsuccessful.

Engaging in ILE will necessitate a shift away from 'traditional' single cell classrooms, organization and teaching approaches. This will likely generate many reactions from teachers with one being perceptions of risk, which can be a fundamental barrier to change (Le Fevre, 2014; Twyford, 2016). This paper highlights the importance of understanding and addressing perceptions of risk.

WHY AN UNDERSTANDING OF PERCEPTIONS OF RISK MATTERS

Teachers are commonly expected to be "doing something that others are suggesting they do" (Richardson, 1990, p. 11). Some teachers willingly trial or implement these suggestions for change, whilst many others avoid engagement, or are accused of being resistant to change. Forms of resistance such as refusal or withdrawal are commonly reported, which places the blame for the failure of educational initiatives on the classroom teacher.

More recent studies have recognized that accusing teachers of being resistant to change may be counterproductive to developing a culture of collaborative and sustainable improvement; "No one should be blamed in the process of building better schools" (Timperley & Parr, 2010, p. 17). Instead, research by Le Fevre (2014) and Twyford (2016) suggests that teachers' perceptions of risk may be a fundamental barrier that influences engagement in educational change.

Education is, by nature, a risky venture. "It is a dialogic process and, by implication, involves the teacher not knowing precisely what might happen next" (Barrow, 2014, p. 308). Additional expectations for teachers to work collaboratively and integrate learner-centric pedagogies and digital technologies in de-privatized environments will likely exacerbate teachers' perceptions of risk, which may impact on a teacher's willingness to engage in ILE.

THE CONCEPT OF RISK

The term risk has been used numerous ways and in various contexts for many years. In the corporate world, the term 'risk' is commonplace; risk management, capital risk and systematic risk all focus on the identification, assessment and prioritization of commercial risk (Stulz, 1996). In the education sector, the concept of risk is only beginning to be acknowledged in the context of working to understand processes of innovation and change.

A broad definition of risk includes loss, significance of loss and uncertainties (Aven & Renn, 2009; Ponticell, 2003; Trimpop, 1994). Loss, which can be performance related, social, psychological or status related is considered foundational to risk-taking (Ponticell, 2003) and is often discussed in relation to the significance or severity of potential loss to a person (Aven & Renn, 2009). If a teacher perceives certain actions may lead to a greater severity of loss, then he or she will correspondingly react with higher levels of caution. The third element associated with risk is the nature of the uncertainty of an outcome. Uncertainty is inherent to perceptions of risk (Trimpop, 1994).

INDIVIDUAL AND ORGANIZATIONAL THEORIES OF RISK-TAKING IN EDUCATION

Empirical research conducted by Jones (2014) explored theories of risk-taking and primary teachers' engagement in professional learning for change. As the researcher (author) I conducted a qualitative case study in a large Auckland school to investigate the perceptions of teachers as they participated in professional learning initiatives. The analysis focused on psychological, social and contextual theories of risk-taking.

The extent to which teachers take risks may be reflective of their age and career stage. Studies by Hargreaves (2005) and Maskit (2011) found teachers in the early stages of their career viewed learning and change as an inseparable part of the teaching

profession. In contrast, the older and more experienced a teacher was, the less willing they were to take risks and change their practice. Teachers in this late stage learnt to treat initiatives like “kidney stones: it causes considerable pain but it will pass, and so innovation that is imposed by management is resisted until it passes” (Stoll & Fink, 1996, p. 79).

Another risk-taking theory is based on personal practical theories (Maaranen, Pitkaniemi, Stenberg, & Karlsson, 2016). Personal practical theories are formed through experience and reflection; they include images of teaching and learning, and the roles of teachers and students. Hammerness et al., (2005) claim personal practical theories forge a teacher's identity and with more teaching experience become ingrained. However, the unquestioning acceptance of ingrained personal practical theories of teaching may result in teachers closing themselves off to new learning and adopting risk-adverse attitudes to avoid exposing their inadequacies.

It may be that an individual teacher's risk attitude determines risk-taking behaviour (Baylor & Ritchie, 2002; Le Fevre, 2014). The degree of teacher willingness to engage in change initiative, whether the change is imposed by school leaders or self-directed, may be a personal trait, which Baylor and Ritchie (2002) claim is difficult to influence.

An alternate theory of risk-taking in education is that groups and cultures, which have diverse social principles, guide risk behaviour and judgement of what is deemed a risk and who should be allowed to take risks. Rosa (1998) suggests that, “since identification of risks is entirely a social process, risks do not exist in objective reality, but in the collective consciousness of cultures; risk is thus a cultural phenomenon, not a physical one” (Rosa, 1998, p. 21). What one school culture perceives as a risk may not be deemed a risk for another.

The divergent theories highlight the complexities of risk-taking in education. The interrelatedness of elements in the theories suggests there is no singular theory that underpins risk-seeking or risk-adverse teacher behaviour. However, a commonality identified in all the theories is that risk-taking can influence or deter innovative opportunities for change.

RESEARCH METHODOLOGY

A case study approach was selected as the best fit for gaining an in-depth understanding of teachers' perceptions of risk when there were expectations for them to engage in ILE. To ensure purposeful sampling, schools that were espousing a shift from traditional practices and environments to ILE were sought. The criteria included teaching staff who were trialling flexible use of learning spaces, involved in ILE-related professional learning and/or exploring ILE teaching or professional approaches.

Three Auckland primary schools were selected, and 84 teachers consented to participate in the first phase of the research. All these teachers completed a three-part questionnaire, which provided data on teachers' perceptions of how ILE differs from traditional learning and environments, risks of engaging in ILE, and support that had encouraged them to engage in innovative practices. During data preparation eleven questionnaires that were incomplete or not accompanied with consent were removed from the data set.

The multiple responses that were obtained in the questionnaire were coded. The responses were read numerous times, and the coding frame reworked to ensure the responses were categorized accurately. Variable sets for multiple responses were then defined and frequencies were generated for each of the questions. Interview questions were generated from this data.

The third section of the questionnaire contained a Likert scale with ten items based on elements of the ILE pedagogical core (OECD, 2013). For each item, participants were asked to identify the extent to which they felt using the ILE teaching or professional approach to be of high risk, and the extent to which they felt confident to engage in the teaching or professional approach. The correlation between teachers' perceptions of risk and their confidence to use ILE teaching or professional approaches was $\rho = -0.468$ ($P\text{-value} < 0.00001$, $p < 0.05$) suggesting there was a statistically significant correlation between teachers' perceptions of risk and their confidence to engage in ILE teaching and professional approaches.

Exploratory factor analysis was also performed to examine the overall dimensionality of the questionnaire items, and to reduce data to smaller sets of summary variables. The subsequent statistical procedure applied was two-step clustering of the items to ensure a maximum variation sampling scheme for phase two of the research. Using a two-step cluster analysis, participants who

perceived varying levels of risk and who had varying levels of confidence to engage in ILE were selected to maximize the range of perspectives investigated in this research. In total eighteen teachers and four school leaders participated in the qualitative phase of this research.

The qualitative methods used included semi-structured interviews, online journaling, observations, and document analysis. The teachers were interviewed in May and again in November 2016. They shared their understandings of ILE, understandings of expectations to engage in ILE, changes made to their practices, and perceptions of risk working in ILE. Participants were also asked what support had encouraged them to engage in ILE. Observations of these teachers were conducted during class time and meetings throughout the year.

PERCEPTIONS OF RISK AND PERCEPTIONS OF SUPPORT

Expectations to engage in ILE resulted in polar reactions from teachers in each of the three schools. Teachers who felt they were supported to make the transition to ILE relished the freedom to adapt their proven 'traditional classroom' pedagogies to maximize the learning opportunities provided by the space. In contrast, teachers who perceived they were not supported, but still expected to 'change' felt frustrated. Not knowing what to change or how to change generated the teachers' perceptions of risk and resulted in many retreating to familiar 'traditional' practices.

The freedom to explore ways of working in an ILE was perceived by other teachers as a form of trust. Many of these teachers had taught in 'traditional' schools where the organizational systems were prescribed, and felt this had stifled their individuality and creativity. Not having to adhere to fixed ILE models and guidelines resulted in the teachers perceiving they were respected as professionals. This perception encouraged them to explore innovative practices that enhanced student learning. As one teacher explained, "We are actually thinking what benefits the kids, and can be innovative with the kids and change what we are doing to benefit our learners".

In contrast, other teachers who perceived risk and felt they had not been supported to make the transition to ILE expressed feelings of frustration. These teachers found efforts to work collaboratively in an ILE without a clear understanding why or how to change resulted in negative outcomes. The teachers perceived the practices they had trialled under the guise of ILE had resulted in weaker relationships with their students and their students' families, strained collegial relationships and been detrimental to students' learning. Consequently, many new practices were abandoned and the teachers retreated to the familiarity of their own space and traditional practices.

Although many professional learning opportunities were provided in the three schools, the teachers who felt frustrated by expectations to engage in ILE did not perceive the support had deepened their understanding of ILE, or enlightened them on how to adapt their pedagogies to maximize the learning opportunities provided by ILE. Consequently, these teachers did not have a deep understanding of why they should change, or how they should change. The teachers' frustration was created by what Schön (1983) refers to as the enactment gap, the disparity between knowing why and knowing how to do something. Feelings of frustration were further exacerbated if the teachers perceived they were effective practitioners who did not need to change their practice.

ACTIONS THAT MAY SUPPORT TEACHERS TO ENGAGE IN ILE

Providing clarity of purpose, focus and expectations for the shift to ILE is likely to mitigate teachers' perceptions of risk and increase engagement in ILE. Teachers who understand why they are being expected to work collaboratively and integrate learner-centric pedagogies and digital technologies in flexible environments are more likely to trial innovative practices with success. Furthermore, having a theoretical awareness of the principles of ILE, and why traditional practices may no longer meet the learning needs of students is likely to promote dialogue about ways the learning environment could be utilized to maximize student learning.

Providing teachers with targeted professional learning opportunities that specifically focuses on ILE may assist teachers to develop a shared language and shared understanding of ILE. Communal knowledge created may enable teachers to test each other's beliefs and assumptions that underpin their collective practice. In contrast, expectations for teachers to participate in extraneous

whole school professional learning whilst undertaking individual professional inquiries is likely to result in disjointed diffusion of effort and confusion of what is the core purpose and focus for the change. This issue highlights how critical it is for school leaders to identify what professional learning initiatives should be prioritized and which ones should cease, not only so deeper learning can be promoted but for humanistic reasons (Dumont, Istance & Benavides, 2010).

Furthermore, teachers who can articulate what is expected from them, and what the expectations look like in practice may be more likely to explore innovative practices. These teachers may not necessarily perceive less risk, but having an awareness of what and how they are expected to change is likely to result in teachers working towards achieving the expectations.

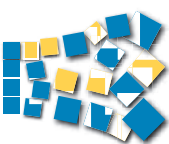
IMPLICATIONS

Suggestions that some teachers are resisting the need to adapt 'traditional' pedagogies to maximize the learning opportunities provided by ILE rules out other possible explanations for their non-engagement. Furthermore, it places blame on teachers, implying they are actively refusing to accept or engage in the change process. This research suggests teachers may have the desire to implement innovative practices in highly flexible spaces, but do not enact these changes due to their perceptions of risks. Reframing teachers' cognitive and emotional responses to change using a risk lens may be a more positive way to understand teachers' reactions. Being aware of and responding to teachers' perceptions of risk will likely result in targeted support that fosters teacher risk-taking.

REFERENCES

- Aven, T., & Renn, O. (2009). On risk defined as an event where the outcome is uncertain. *Journal of Risk Research*, 12(1), 1-11. doi: 10.1080/13669870802488883
- Barrow, G. (2014). The beautiful risk of education. *Pastoral Care in Education*, 32(4), 308-310. doi: 10.1080/02643944.2014.972619
- Baylor, A. L., & Ritchie, D. (2002). What factors facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms? *Computers & Education*, 39(4), 395-414. doi: 10.1016/S0360-1315(02)00075-1
- Dumont, H., Istance, D., & Benavides, F. (Eds.)(2010). *The nature of learning. Using research to inspire practice*. Paris: OECD Publishing. doi:10.1787/9789264086487-en
- Hammerness, K., Darling-Hammond, L., Bransford, J., Berliner, D., Cochran-Smith, M., McDonald, M., & Zeichner, K. (2005). How teachers learn and develop. *Preparing Teachers for a Changing World: What Teachers Should Learn and be Able to do*, 1.
- Hargreaves, A. (2005). Educational change takes ages: Life, career and generational factors in teachers' emotional responses to educational change. *Teaching and Teacher Education*, 21(8), 967-983. doi: 10.1016/j.tate.2005.06.007
- Jones, T. K. (2014). Theories of risk-taking and primary teachers' engagement in professional learning for change. (Unpublished Masters dissertation). University of Auckland, New Zealand.
- Le Fevre, D. M. (2014). Barriers to implementing pedagogical change: The role of teachers' perceptions of risk. *Teaching and Teacher Education*, 38, 56-64. doi: 10.1016/j.tate.2013.11.007
- Maaranen, K., Pitkaniemi, H., Stenberg, K., & Karlsson, L. (2016). An idealistic view of teaching: teacher students' personal practical theories. *Journal of Education for Teaching*, 42(1), 80-92. doi:10.1080/02607476.2015.1135278
- Maskit, D. (2011). Teachers' attitudes toward pedagogical changes during various stages of professional development. *Teaching and Teacher Education*, 27(5), 851-860. doi: 10.1016/j.tate.2011.01.009
- Ministry of Education. (2014). *Modern learning environments*. Retrieved from www.minedu.govt.nz/NZEducation/EducationPolicies/Schools/PropertyToolBox/StateSchools/Design/ModernLearningEnvironment/MLEDQLSStandards.aspx
- OECD. (2013). *Innovative learning environments*. Paris: OECD Publishing.
- Ponticell, J. A. (2003). Enhancers and inhibitors of teacher risk taking: A case study. *Peabody Journal of Education*, 78(3), 5-24. doi: 10.1207/S15327930PJE7803_02
- Richardson, V. (1990). Significant and worthwhile change in teaching practice. *Educational Researcher*, 19(7), 10-18. doi:10.3102/0013189X019007010
- Rosa, E. A. (1998). Metatheoretical foundations for post-normal risk. *Journal of Risk Research*, 1(1), 15-44. doi: 10.1080/136698798377303
- Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. Basic books.
- Stoll, L., & Fink, D. (1996). *Changing our schools: Linking school effectiveness and school improvement*. Open University Press.

- Stulz, R. M. (1996). Rethinking risk management. *Journal of Applied Corporate Finance*, 9(3), 8-25. doi: 10.1111/j.1745-6622.1996.tb00295.x
- Timperley, H., & Parr, J. (2010). *Weaving Evidence, Inquiry and Standards to Build Better Schools*. Wellington: New Zealand Council for Educational Research Press.
- Trimpop, R. M. (1994). *The psychology of risk taking behavior*. Elsevier.
- Twyford, K. (2016). *Risk or resistance: understanding teachers' perceptions of risk in professional learning*. (Unpublished doctoral thesis). University of Auckland, Auckland, New Zealand.



Reconstructing senior science education in flexible learning spaces

Suzanne Trask

University of Waikato - New Zealand

ABSTRACT

Significant pedagogical and social adaptations are required when schools transition to flexible learning spaces. Complex institutional variables powerfully impact on what teachers can do or aspire to do in their classrooms. This paper reports on a qualitative study of science teachers who were in the process of repositioning their teaching from cellular laboratories to a new reality of open learning spaces. Science is often perceived as a knowledge-based subject and the added complexity of high stakes assessment demands can result in tensions between 21st century learning ideals and what is implicitly required in assessment policies. Findings indicate that some time-honoured assumptions about 'effective' approaches for teaching science are being troubled. For example, the charismatic entertainer who in his own lab engaged in spontaneous chemistry demonstrations finds this now less achievable. These findings have implications for the design of science spaces, curriculum and assessment decisions, and teacher professional development.

KEYWORDS: SCIENCE; FLEXIBLE LEARNING SPACES; TEACHER TRANSITIONS; ASSESSMENT

Suzanne is a full time doctoral student with the Wilf Malcolm Institute of Educational Research, University of Waikato, supervised by Professor Bronwen Cowie and Associate Professor Wendy Drewery. The research enquires into issues and opportunities surrounding senior science assessment for New Zealand teachers and learners working in flexible learning spaces. The focus for the study originates from an interest in 21st century teaching and learning ideals and in personalized learning. Other research interests include classroom interactions and classroom management in secondary schools. Before beginning her PhD study Suzanne was a secondary teacher educator at Bethlehem Tertiary Institute. Previous roles in education include Science/Chemistry/Mathematics teacher and ESOL teacher.

This paper presents findings from phase one of a PhD project exploring senior science learning in flexible learning spaces (FLS). Flexible learning spaces are intended to facilitate responsive, student-centred pedagogies including both personalized and collaborative learning rather than transmission-style approaches (Dovey & Fisher, 2014; OECD, 2013). Previous research has documented the affordances of these spaces and discussed impacts on teacher practice (Alterator & Deed, 2013; Saltmarsh, Chapman, Campbell, & Drew, 2015). For teachers, redesigned spaces demand pedagogical and social adjustment and adaptation with attendant issues and challenges (Cleveland, 2016; Osborne, 2016). Imms and Byers (2017) argue that while “the reconceptualizing and inhabiting of new spaces ha(s) moved at an unprecedented pace, teachers’ abilities to utilize them efficiently ha(ve) not always matched this growth” (p. 141). Teachers’ abilities to adapt can be impacted by personal factors as well as by the wider system, and in senior school, complex variables such as assessment environments or issues to do with subject identity powerfully affect or constrain what teachers can do or aspire to do in practice. For example, in the New Zealand context, Science involves learning both *about* science (knowledge of the world around us) as well as how to *do* science (learning to ask questions, conduct investigations, find, use, or evaluate evidence) (Ministry of Education, 2007). This curriculum view highlights two areas that have implications for teaching and learning in FLS. Firstly, the notion of learning *about* science means it is often seen as a knowledge based subject (Ajaja, 2012). Some literature suggests science attracts traditionalist ‘teacher-authority’, ‘student-recipient’ (Carlone, Haun-Frank, & Kimmel, 2010) approaches, with the demands of senior assessment playing a part in maintaining this status quo (Hipkins 2013; Moeed, 2010). 21st century ideals of open-ended, personalized, or collaborative learning are not easily superimposed upon structured, individualistic, level-progressive assessments (Jones & Bunting, 2013). Secondly, fundamental to learning how to *do* science is the practical component. Whereas FLS are open, integrated spaces, designed for fluidity of movement and use, science as a practical subject typically requires dedicated laboratory areas furnished with specialist apparatus.

This focus of this article is a single case-study school where single cell laboratory classrooms were transformed following problems with leaky building syndrome. The school was one of the first in New Zealand to undergo a re-build to flexible spaces as opposed to a new build on a new site. The New Zealand Ministry of Education’s FLS policy requires school boards to adopt the FLS standard as they use property funds for new-builds, re-builds or upgrades of teaching spaces (Ministry of Education, 2017) meaning an increasing number of schools will undergo this transition. Leiringer and Cardellino (2011) contend that teacher transitions for re-builds are different to new builds. In a new school, teachers ‘opt in’ by applying for a position and as such could be more likely to possess both the inclination and ability to adapt. As their learning environment transformed beneath them, the science teachers in the case study school had no choice; they were required to make a transition. The paper will first introduce the school context and staff involved in the study. It will then illustrate ways in which the dynamics of redesigned spaces, accountability regimes in high stakes assessment environments, and conceptions of ‘subject’ impacted and concomitantly repositioned teachers.

RESEARCH DESIGN

In phase one, a multi-case study design was employed across three schools seeking to explore what science learning looked like in FLS. This involved participant observation and audio/visual recording of teaching sessions, supported by the researcher’s field-notes and collection of assessment documentation. Observation sessions also furnished time and opportunity to interview students informally about the teaching and learning taking place. Science teachers and curriculum leaders participated in two interviews each. The first was a semi-structured exploratory interview seeking to hear experiences and perceptions of being teachers in FLS spaces. A second interview was intended as a data validation process, conducted to ensure both observations and analyses reflected participants’ experiences (Kornbluh, 2015). NVivo software was used to structure and cross-check data from all sources as themes and categories were generated.

SCHOOL CONTEXT

The case study school selected for discussion involves the science curriculum leader and two teachers of Year 11 mixed-ability classes of science learners in a mid decile, mid-size, co-educational, secondary school. The teachers are sharing

a space for the first time in the case study year (2016). Prior to the re-build classes happened in traditional laboratories with tables in the middle of the room, practical benches, gas taps and equipment storage around the outside. Whereas in the old school there were six laboratories with each teacher taking responsibility for one, in the new science pod there are four dedicated practical laboratories attached to larger learning commons. There is no seating in the labs. All equipment is stored centrally and must be requested and collected prior. Teachers and students book the lab ahead of time and sometimes only move in for a 20-minute exercise before moving back to the commons.

The L-shaped commons space is just large enough for two classes. A fish bowl (glass walled) classroom space intrudes into one corner and is usually occupied by a Year 12 class. A smaller breakout room (maximum 10 students) is beside the fishbowl. In the main space, two sets of data projectors and smart boards are fixed to opposite walls. Smaller portable whiteboards stand to the side. Tables are mostly round, seating about four students, distributed throughout the space. Semi-visible through small windows along one wall is a locked laboratory space.

CURRICULUM LEADER (CL)

The curriculum leader (CL) has 15 years teaching experience, arriving at the transition school two years prior to the re-build. He provided leadership through the change process, which he described as challenging but necessary.

For me there's an acceptance that the answers aren't there, and it's the journey; a moral purpose to change for the students. The old system might well serve the teachers, but does it serve these kids who are growing up in a society that's changing and it's so dynamic and it's moving forward quickly? When you sit down and ask yourself that question, it's quite easy to come to the conclusion that, yes, schools need to adapt and schools need to change.

EXPERIENCED TEACHER (TT1)

The experienced teacher (TT1) has 18 years of experience, 11 of them in the case study school. TT1 found the loss of his own laboratory space where he was surrounded with his apparatus and equipment to be a stressful adjustment. TT1 takes pride in the execution of a well-structured lesson and in engaging his students with discussion and demonstrations. In the old space he saw himself as "quite a good teacher", able to use skills honed over many years. Conversely, he feels he cannot practice as he would like to in the new space, and therefore is not as effective as a teacher.

I find these innovative learning environments less flexible than a cellular classroom or a laboratory.

BEGINNING TEACHER (TT2)

The beginning teacher (TT2) is in her first year of teaching, having moved directly from high school to complete her degree and teacher training. TT2's practicum experiences were in single-cell laboratory spaces and she perceived her pre-service teacher training as not offering any specific preparation for flexible, open spaces. Nevertheless, she described herself as prepared to be eager and enthusiastic and as such, she found it relatively easy to adapt.

I'm a first year teacher, I've been chucked into each school and it's all been different, and I thought, it's just something new again.

IMPACT OF SPACES ON TEACHERS' PRACTICE-IDENTITY

CL noted the new walk-in, walk-out labs challenged teachers' ideas about what labs should be like and how they should operate, especially considering staff were happy and comfortable in their old labs.

CL: There was quite a significant grieving period for teachers as they realize a lot of skills that they developed are no longer viable with the new setup.

In the flexible learning spaces some time-honoured assumptions about 'good' or 'effective' science teaching are being troubled. Teachers are not so readily able to take up 'traditional' science teacher practice-identities. These include teaching science as a knowledge-based subject and the value placed on spontaneous demonstrations or practical work.

SCIENCE AS A KNOWLEDGE-BASED SUBJECT

In New Zealand, Year 11 is the first year of high stakes assessment under a flexible, standards-based system. Science credits are gained via teacher-assessed, moderated internal assessment tasks or external examination-style assessments (New Zealand Qualifications Authority, n.d.-a). Teachers often see transmission-based pedagogies as most efficient in executing a duty to 'get students through' the external knowledge-based assessments, however, transmission-based pedagogies are less feasible in the new spaces where awareness of others and noise levels impact.

TT1: I would like it to be more teacher-led but I found with the new learning environment I have to do less of that, cause you just can't talk all the time, because there's another class next to you or, it's just too noisy for them to hear. I prefer to give them notes. I know that's traditional; write it on the board....

With TT1 and TT2 continuing at first to teach their classes separately, they were trying to maintain a sense of ownership of students and space that the new reality would not allow.

TT2: I had to get my class quiet to listen, and his class was doing their work and talking, and then it was the same for him, I noticed that he would try to get his classes' attention and then my class is talking, but then it was like who's actually in my class? Where's that defined line? Have I got everybody's attention? (laughing)

Both teachers feel repetition is important for science learning as a content-based subject. TT1's identity as an effective teacher is built in part from being able to motivate students by revisiting content learning using games and quizzes, but he finds in the new spaces the 'quiz-master' position is now less achievable. Fun often makes noise and issues of 'distractibility' are a key concern. TT1 is also conscious of judgement from peers.

TT1: I used to play games with my kids, have fun, but that makes noise on the other side and disrupts the other ones, and another adult in the room and you don't want to look like an idiot in front of your peers.

SPONTANEITY

Science teachers place importance on practical work and demonstrations not only for reinforcing concepts but for engaging students and igniting interest (Toplis, 2012). Part of the grief for what was lost was the position of charismatic magician or entertainer.

CL: Often a practical, you'd set up or you'd figure out just before you do it, but you've lost that ability, and same with just randomly blowing just stuff up. You can't just do things off the fly.

TT1: I've got a lot of demonstrations and experiments in my head that won't come out until some student says something and I think, oh yeah, I could show you that, but I can't do that anymore because I have to get the lab technician. It might be something simple, just static electricity on a plastic rod and how it bends water. Well, I'm not going to do that.

Separating laboratories from the main learning spaces has removed practical work and demonstrations from incidental or impromptu learning. The effect has been fewer practicals.

CL: Over the first 6 months, there was a huge drop in the amount of practicals that teachers were doing. Various reasons, not being able to set up before the lessons or tidy up afterwards, the logistics of not being in the same space as you're doing a practical while you're working made it for a lot of teachers into the too-hard basket.

A REPOSITIONING: FINDING ALTERNATIVE WAYS

Both TT1 and TT2 are taking steps to adapt to the new environment. Their desire to be good teachers and their sense of professional responsibility means they are working to find new ways within the confines of space, subject, and assessment environment.

There has been a shift from teacher-led learning to more personalized, student-directed learning. TT2 explains:

The traditional way with your own room, you can teach more at the front....but then (students) get more reliant on you giving them the information. In the pods, they're actually forced into doing more for themselves.

The following are some steps taken by teachers in the case-study school in this repositioning:

(1) MAKING USE OF AFFORDANCES OF DIGITAL TECHNOLOGIES:

TT1 is innovative in his exploration of digital pedagogies. He has begun 'flipping the classroom' - making online videos explaining science content and questions. As students access the videos to learn in their own time, at home or at school, and at their own pace, TT1 is able to support individuals during class time.

(2) KEEPING TRACK

Printed workbooks are used as important resources, which structure content learning for external assessments and enable students to work independently through notes and questions. As teachers visit individual students they make a record of the learning conversation—where the student is at and any next steps discussed. This new initiative is necessary as students progress at markedly different rates.

TT2: Each of them are pretty much just working at their own pace but we've given them timelines of 'you need to be up to this page by this day', but some of them are 20 pages ahead.

(3) TEAM TEACHING

In spite of CL's deliberate manoeuvres in timetabling the Year 11 science classes together to facilitate team teaching, this did not happen at first. There were multiple factors affecting teachers' ability to co-teach, such as the question of ownership of students ("my class") and of the decision making process.

TT1: I don't know what it is. We just never collaborated (laughing). At first, I thought I would like collaboration, but in some ways it's nice to do your own thing. It sounds very...what do I say? Against what they're trying to do.

There were also practical considerations, for example, the time required for focussed and intentional co-planning. Co-teaching across junior and senior classes means multiple collaborative relationships leading to sometimes unworkable time demands.

TT1: That's the problem with collaboration, you have to meet, and then the only time you can meet is if you've got a non-contact at the same time, which is rare, so you've got to meet after school, or before school, and we find we've got so many meetings at school.

However, there were advantages to team teaching once they tried it, half way through the year such as sharing the workload.

TT2: We were exhausting ourselves, when we were both trying to get to the same goal.

Team teaching also provided opportunity for students to further personalize their science programme, as teachers were able to offer choice in assessment standards.

(4) CHOICE FOR STUDENTS

While some students will sit examinations for all three external standards at the end of the school year (a measure of the more 'academic' students), some prefer to gain credits by working towards internal standards. Team teaching in a shared space with shared ownership of the two classes allowed students to choose to work towards an external Genetics standard or a task-based internal Earth Science option.

TT2: We're actually bouncing ideas off each other. (TT1)'s working with the people doing the internal, and I'm working with everybody doing the external, and so it's made it easier that way.

GOING FORWARD

The discussion illustrated challenges of transitioning to new learning spaces within a complex network of institutional demands. Simultaneously it has demonstrated ways in which the shift has catalysed innovative thinking and practice as teachers repositioned themselves, finding new strengths as collaborators and learning facilitators and allowing the emergence of more student-centred, personalized approaches. Teachers in many schools are working in different ways to exploit the potential of new learning spaces and whilst findings from a single case study are not generalizable (Yin, 2003), the representation here highlights issues that others might encounter.

How can we ease teachers' sense of loss of efficacy or enjoyment in their position? Are their strengths and expertise still relevant in the new environment? Science as a knowledge-based subject attempts to enlist teacher-centred approaches in order to efficiently accomplish the goal of assisting students to 'demonstrate understanding' of concepts in external achievement standards (New Zealand Qualifications Authority, n.d.-b). A key question for school science is if changes are needed in response to a 21st century reconstruction of education and if so, what types of knowledge and skills should be valued and assessed. Meanwhile there is still scope within the new environments to preserve traditional teacher practice-identities, but with a more personalized, student-centred flavour. One example from this study is flipped learning, which permits TT1 to keep his teacher-expert position, albeit in a revitalized, digital, space. Teachers need to be appropriately supported in this with understandings of the possibilities and options within a FLS, beginning with initial teacher education. For example, it is possible to also present the teacher-expert at opt-in workshops while reviewing specific concepts, or for the quiz-master to appear in an online form.

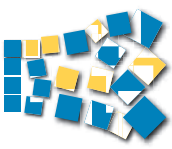
A central question for science as a practical subject is around the design of specialist areas that are agile enough (Dovey & Fisher, 2014). Agility would enable staff and students to work safely and allow equipment to be locked away, yet maintain connection to the main teaching and learning spaces in order to allow the charismatic entertainer or demonstrator to spontaneously emerge and ignite students' interest or promote understanding.

High stakes assessment in senior school means teachers are duty-bound to help students learn in ways that will allow them to gain credits. At the moment in the case study school, even within a flexible, standards-based system, student choice as to *what* and *how* they learn is limited to and directed by, fixed assessment options. Perhaps it is not only teachers' abilities to adapt to new learning spaces but also the wider system's ability to adapt or to 'learn' rapidly enough to keep up with 21st century changes (Absolum, Flockton, Hattie, Hipkins, & Reid, 2009, p. 23). The challenge the study will take up in phase 2 is to test the limits of what the present institutional ecosystem (OECD, 2013) will and will not allow in response to 21st century education demands.

REFERENCES

- Absolum, M., Flockton, L., Hattie, J., Hipkins, R., & Reid, I. (2009). *Directions for assessment in New Zealand: Developing students' assessment capabilities*. Retrieved from <http://assessment.tki.org.nz/Assessment-in-the-classroom/Directions-for-assessment-in-New-Zealand-DANZ-report>
- Ajaja, P. O. (2012). Senior secondary school science teachers in delta and edo states conceptualization about the nature of science. *International Education Studies*, 5(3), 67. doi:10.5539/ies.v5n3p67
- Alterator, S., & Deed, C. (2013). Teacher adaptation to open learning spaces. *Issues in Educational Research*, 23(3), 315-330.
- Carlone, H., Haun-Frank, J., & Kimmel, S. (2010). Tempered radicals: elementary teachers' narratives of teaching science within and against prevailing meanings of schooling. *Cultural Studies of Science Education*, 5(4), 941-965. doi:10.1007/s11422-010-9282-6
- Cleveland, B. (2016). Addressing the spatial to catalyse socio-pedagogical reform in middle years education. In K. Fisher (Ed.), *The translational design of schools: An evidence-based approach to aligning pedagogy and learning environments* (pp. 27-49). doi:10.1007/978-94-6300-364-3_2
- Dovey, K., & Fisher, K. (2014). Designing for adaptation: The school as socio-spatial assemblage. *The Journal of Architecture*, 19, 43-63. doi:10.1080/13602365.2014.882376
- Hipkins, R. (2013). *NCEA one decade on: Views and experiences from the 2012 NZCER national survey of secondary schools*. Wellington, New Zealand: New Zealand Council for Educational Research. Retrieved from http://www.nzcer.org.nz/system/files/NCEA%20Decade%20On%20Final_web%20%281%29.pdf
- Imms, W., & Byers, T. (2017). Impact of classroom design on teacher pedagogy and student engagement and performance in mathematics. *Learning Environments Research*, 20, 139-152. doi:10.1007/s10984-016-9210-0
- Jones, A., & Buntting, C. (2013). International, national and classroom assessment: Potent factors in shaping what counts in school science. In D. Corrigan, R. Gunstone, & A. Jones (Eds.), *Valuing assessment in science education: Pedagogy, curriculum, policy* (pp. 33-54). New York, NY: Springer. doi:10.1007/978-94-007-6668-6

- Kornbluh, M. (2015). Combatting challenges to establishing trustworthiness in qualitative research. *Qualitative Research in Psychology*, 12(4), 397-414. doi:10.1080/14780887.2015.1021941
- Leiringer, R., & Cardellino, P. (2011). Schools for the twenty-first century: School design and educational transformation. *British Educational Research Journal*, 37(6), 915-934. doi:10.1080/01411926.2010.508512
- Ministry of Education. (2007). *The New Zealand curriculum*. Wellington: Learning Media.
- Ministry of Education. (2017). *Flexible learning spaces in schools*. Retrieved from <https://education.govt.nz/school/property/state-schools/design-standards/flexible-learning-spaces/>
- Moeed, A. (2010). Teaching to investigate in year 11 science, constrained by assessment. *New Zealand Annual Review of Education*, 20, 74.
- New Zealand Qualifications Authority. (n.d.-a). *How NCEA works*. Retrieved 4 May, 2017, from <http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/understanding-ncea/>
- New Zealand Qualifications Authority. (n.d.-b). *Science subject resources*. Retrieved 4 May, 2017, from <http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/subjects/science/levels/>
- Organisation for Economic Co-operation and Development. (2013). *Innovative learning environments: Educational research and innovation*. Author. doi:10.1787/9789264203488-en
- Osborne, M. (2016). What works: Changing practice when spaces change. In W. Imms, B. Cleveland, & K. Fisher (Eds.), *Evaluating learning environments: Snapshots of emerging issues* (pp. 35-44). Retrieved from ebookcentral.proquest.com.
- Saltmarsh, S., Chapman, A., Campbell, M., & Drew, C. (2015). Putting "structure within the space": Spatially un/responsive pedagogic practices in open-plan learning environments. *Educational Review*, 67(3), 315-327. doi:10.1080/00131911.2014.924482
- Toplis, R. (2012). Students' views about secondary school science lessons: The role of practical work. *Research in Science Education*, 42(3), 531-549. doi:10.1007/s11165-011-9209-6
- Yin, R. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage Publications.



Session four: Measuring impact

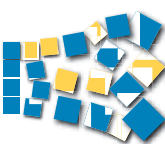
Interlocutor

Laureate Professor John Hattie

University of Melbourne - Australia



John Hattie is Laureate Professor and Director of the Melbourne Education Research Institute at the University of Melbourne and a Chief Investigator for the ILETC project. He is the author of over 800 publications and papers, including the influential books *Visible Learning* and *Visible Learning for Teachers*. He has been involved in numerous national and international research groups and has directed over \$57 million in research grants. John has held numerous senior appointments and consultative roles including advisor to New Zealand Ministers of Education, the National Board for Professional Teaching Standards in the US, chief moderator of the NZ Performance Based Research Fund, past-president of the International Test Commission and is a Fellow of the Australian Council for Educational Leaders and the American Psychological Association. He has held senior roles at The University of Western Australia, University of North Carolina, and The University of Auckland. He was made an officer of the New Zealand Order of Merit in the 2011 Queen's Birthday Honours, received a Gold medal for contributions to the study of educational administration and leadership by Australian Council for Educational Leaders in 2011, the Hedley Beare Award for Writing in Education by the Australian Council for Educational Leadership in 2010, and a Distinguished Teaching Award at the University of Auckland in 2010.



What does teaching and learning look like in different classroom environments?

Dr Terry Byers

University of Melbourne/Anglican Church Grammar School - Australia

ABSTRACT

The very nature of what constitutes an effective learning environment is undergoing substantial re-imagination. Authors have suggested that the spatial affordances of the vast stock of existing learning spaces, often termed conventional or traditional classrooms, is limited and constrains the possible pedagogies available to teachers. Authors, authorities and governments have put forward 'innovative learning environments' (ILEs) as a better alternative, by providing those affordances thought to be somewhat better than traditional classrooms. However, there is little evidence available to show of either spatial type (traditional classroom or ILE) performs pedagogically to either hinder or support the desired approach/es to teaching and learning.

This paper will report on a three-year study that tracked the practice of a large group ($n = 23$) of Secondary school Engineering, Mathematics and Science teachers in their occupation of different spatial layouts. It applied the novel 'Linking Pedagogy, Technology, and Space' (LPTS) observational metric, with its provision of instantaneous quantitative visual analysis, to track teacher practice and student learning in different layouts. Subsequent analysis identified broad trends within the data to identify those factors, spatial, subject or other, which influenced student and teacher activities and behaviours within a Secondary schooling context.

KEYWORDS: LEARNING ENVIRONMENT, PEDAGOGIES, TECHNOLOGIES, LEARNING EXPERIENCES, OBSERVATION, SINGLE SUBJECT RESEARCH DESIGN, VISUAL ANALYSIS

Terry Byers (PhD, MLI and BEd) is currently the Director of the Centenary Library and Innovation in Learning at the Anglican Church Grammar School (Churchie) in Brisbane, Queensland. He oversees the strategic direction and operation of the Centenary Library and works with teachers to understand better their pedagogical practice in technology-enabled and contemporary learning environments and how this affects learning experiences and outcomes. Terry is also a Research Fellow on the 2016-2019 Australian Research Council (ARC) Linkage Project Innovative Learning Environments and Teacher Change'. He recently completed his PhD dissertation in conjunction with the 'Evaluating 21st Century Learning Environments' ARC Linkage project focusing on empirical evidence of the impact of innovative learning environments. His thesis derived quantitative methods to ascertain the impact of different learning spaces on teachers and students.

INTRODUCTION

The critical drivers of disruptive digital technology, neoliberal policy and the subsequent drive for 'quality' teaching and learning, have led some to question the efficacy of conventional or traditional classrooms (Benade, 2016; Dovey & Fisher, 2014). This reconsideration stems from the emerging view that their 'built pedagogy' (Monahan, 2002) is somewhat constrained and favours more teacher-led and didactic instruction (Fisher, 2006; Tanner, 2008; Uptis, 2004). Dovey and Fisher (2014) surmise that this inhibits the ability for teachers to enact a broader spectrum of pedagogies as dictated by current policy that favours a greater incidence of student-centric and technology-enhanced learning.

The appraisal of existing designs has led to the experimentation with more 'contemporary' spatial models often referred to as 'Innovative Learning Environments' (ILEs). The Organisation for Economic Cooperation and Development (OECD) describe ILEs as multi-modal, technology-infused and flexible learning spaces that are responsive to evolving educational practices (OECD, 2013). The intent of ILEs is to provide those affordances and support a view of learning that is thought to be somewhat better than a traditional classroom (Benade, 2016). However, recent reviews found few evaluative approaches (Painter et al., 2013), hence little empirical evidence (Blackmore, Bateman, O'Mara, & Loughlin, 2011), that indicates how ILEs, or in fact traditional classrooms, perform pedagogically (Gislason, 2010).

To address the lack of evaluative approaches and evidence, a three-year longitudinal observational followed teachers in their occupation of different spatial layouts in a Secondary school. This paper will report on the comparative analysis of the longitudinal observation of teachers ($n = 23$) from the 'conceptually similar' subjects of Engineering, Mathematics and Science. Lessons were observed through the Linking Pedagogy, Technology, and Space (LPTS) observational metric, which timed the activity and behaviour of both teachers and students. Subsequent visual analysis ascertained the nature of teaching and learning of these similar subjects in the different spatial types. This novel approach evaluates those factors, spatial or other; that can ascertain the pedagogical performance of different learning environment types.

THE STUDY

This longitudinal study observed Engineering, Mathematics and Science teachers, and their students, in a secondary boys (11 to 18-year-olds) school. It explored the belief that different spaces are 'agents for change' that will lead to changed practice (Oblinger, 2006). As Mulcahy, Cleveland, and Aberton (2015) suggest "how [and if] these changes take effect ... remains an open question [with] little educational research" exist on the impact of traditional or ILEs (p. 576). To evaluate this belief around the impact of different spatial layouts, ascertained by the typology established by Dovey and Fisher (2014), the key research questions for this study were:

1. How do different spatial layouts affect teacher behaviour and pedagogies employed?
2. How do the various spatial types affect the types of learning experiences?

Earlier quasi-experimental studies at this site (see Byers, Hartnell-Young, & Imms, 2016; Byers & Imms, 2014, 2016; Byers, Imms, & Hartnell-Young, 2014; Imms & Byers, 2016) explored the impact of traditional and ILEs on teaching and learning. Findings linked the occupation of an ILE with statistically significant improvements in student perceptions in the utilization of technology, incidence of more active and responsive learning experiences, and enhanced behavioural and cognitive engagement. These changes correlated with statistically significant improvements in English and Mathematics academic achievement (average $g = +.51$). Similar to the findings of Tanner (2008), Hierarchical Linear Modelling across studies calculated an averaged 7% variance in achievement attributed to the different learning environments when the confounding variables of student IQ, class composition, and the teacher were controlled.

Even though these studies presented quantitative data to ascertain the empirical impact of different spaces, their quasi-experimental design lacked the ability to discern the underlying, or micro, changes that affected their impact. In particular, Blackmore et al. (2011) and Gislason (2010) found few studies that evaluated how the occupation of different learning

environments influenced teacher practice to affect the desired learning approach. As Tanner (2008) highlighted, there still remains the “need for current, valid, and reliable data to support or refute the perspectives underlying this inquiry” (p. 449) into the impact of different learning environments.

THE CONTEXT

Since 2010, the site-school engaged in a strategic initiative to understand better the impact of different spaces on teaching and learning. Even though the school had engaged in an iterative process of low-cost refurbishments, the vast majority of classroom were typical of traditional classrooms that Dovey and Fisher (2014) described as Type A spaces. All were conventional cellular spaces accessed by a corridor or veranda. The layout of chairs and desk were set in rows or groups facing the ‘fireplace’ teaching position at the front of the classroom (Reynard, 2009). Even though all Mathematics classes at the school were timetabled in Type A spaces, the teachers within this sample participated in the earlier spatial interventions at the school. As a result, it was assumed that the environment competency of the Mathematics sample was more developed than that of their peers (Lackney, 2008).

The second group of spaces were cellular Science laboratories accessed by a large Learning Commons (Figure 2). These spaces best match those spaces that Dovey and Fisher (2014) identified as Type B spaces. These laboratories had large, fixed benches focused at the front demonstration/teaching position, similar to the Type A spaces. Additional fixed practical areas (standing height benches with gas and water) were situated around the periphery of each lab. However, they differed to other Type A spaces by a large exterior Learning Commons, which contained seating and large display areas.

METHOD

Over a three-year period, 91 observations were conducted using the LPTS observational metric. The Macro-enabled Microsoft Excel LPTS metric timed student and teacher activity and then produced a real-time visual breakdown across five domains (pedagogy, learning experiences, communities of learning, and student and teacher use of technology). Repeated measures observational data for each participant (minimum of three observations) was averaged first, to produce a ‘typical’ lesson. Next, visual analysis identified general trends across the three spatial types. Multivariate visual and nonparametric analysis to identify statistically significant differences in activities and behaviour between teachers, subjects and spatial types, will be the subject of future publications.



Figure 1: Traditional Classroom (Type A) Mathematics Classroom.



Figure 2: Science Laboratory (Type B).



Figure 3: Engineering Space in the Creative Precinct (Type D).

RESULTS AND DISCUSSION

TEACHER BEHAVIOUR AND PEDAGOGIES

The pedagogy domain of the LPTS metric included the attributes of: didactic instruction, interactive instruction, facilitation, providing feedback, class discussion, and questioning. The visual analysis identified notable pedagogical differences between the subjects, which were thought to be somewhat ‘conceptually similar’, in the three spatial types (Figure 4). Typically, teachers in this sample displayed a pedagogical approach best aligned with a variant of teacher-guided (or fully guided) explicit instruction (see Kirschner, Sweller, & Clark, 2006). These subjects favour systematic and well-defined content, and procedural knowledge, which Rosenshine (1987) found is best (when compared to purely constructivist methods) taught through explicit instruction. Furthermore, explicit instruction best support novices (students) to acquire, consolidate and encode the requisite surface knowledge for deeper learning/thinking without overwhelming their working memory (or cognitive load) (Hattie & Donoghue, 2016; Kirschner et al., 2006).

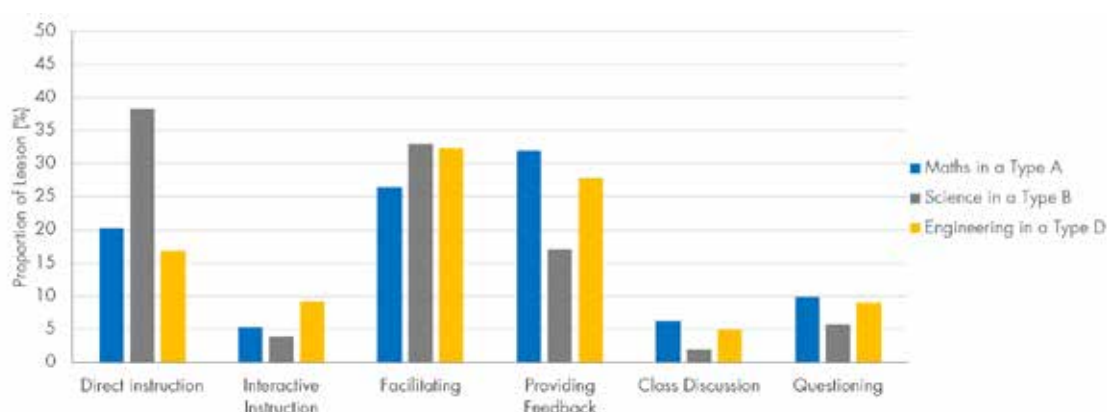


Figure 4: Proportional breakdown of teacher pedagogies in mathematics in Type A (n = 31), science in Type B (n = 29) and engineering in Type D (n = 31) spaces.

Instruction (Didactic/Interactive) was observed in the initial stages of most lessons. The Science teachers in Type B spaces, which were the most rigid (due to the fixed student and teacher benches), instructed from the front fireplace position for approximately 40% of a lesson through teacher-centred modality (Figure 5). Here their built pedagogy was best aligned to and supported teacher-led and didactic instruction, which was the most prevalent pedagogical mode observed.

The Mathematics teachers in their Type A spaces, which furniture was not fixed as in the Type B labs, spent considerably less time (approximately 15% of lesson duration) instructing from the fireplace position. Even though the spaces had a similar built pedagogy to the Science labs, the incidence of Instruction in Mathematics classes was similar to that of the Engineering sample (approximately 25% of lesson duration) in the Type D spaces. Potentially, the enhanced environmental competency of the Mathematics sample somehow supported these teachers to work against the built pedagogy of their spaces, by the shift away from an overt teacher-led, didactic model.

Even though their spatial types differed, the Engineering and Mathematics sample utilized this decreased time spent in an Instructional mode (approximately 15% of lesson difference to the Science sample), to engage in a greater incidence of Discussion and Questioning. Often, the samples utilized these more active and responsive modes to check for student understanding through scaffolded worked examples. These modes better-supported students to consolidate student understanding from which schemas for deeper learning are built upon (Hattie & Donoghue, 2016), while, reducing their cognitive load (Kirschner et al., 2006).

Following the more teacher-led phase, teachers typically transitioned to some form of applied practice facilitated through Facilitation and supported by Feedback. The Engineering and Mathematics samples were quite dynamic about the space during this phase of the lesson. Greater movement about the room moderated behaviour and supported the efficient

provision of feedback to an individual or small group of students. On the other hand, the Science sample remained at the fixed front bench. At times, teachers moved about periphery of the student benches. However, the much more rigid and tight arrangement of benches made efficient student or teacher movement difficult. When feedback was observed, teachers were detached (from a distance) from the student/s asking for assistance, thereby, limiting its efficiency and effectiveness.

LEARNING EXPERIENCES

The learning experiences domain of the LPTS metric included the attributes: formative assessment, receive instruction, remember/recall, understand, apply, analyse, evaluate and creation/practical activity. Dovey and Fisher (2014) and Uptis (2004) suggested that more conventional, traditional classroom spaces predominately operates at the transmission end of the learning continuum (Receive Instruction and Remember/Recall). The visual analysis of the Type B sample (Figures 5) would support this suggestion, with students engaged in activities associated with the receipt and recall of surface knowledge. In particular, the passive reception of instruction (approximately 43% of each lesson) through a teacher-centric modality of learning was the dominant learning modality (Figure 6). Progression through the learning cycle was often linear or lock-step, limiting those opportunities for students to actively engage in the consolidation of surface knowledge and deep learning.

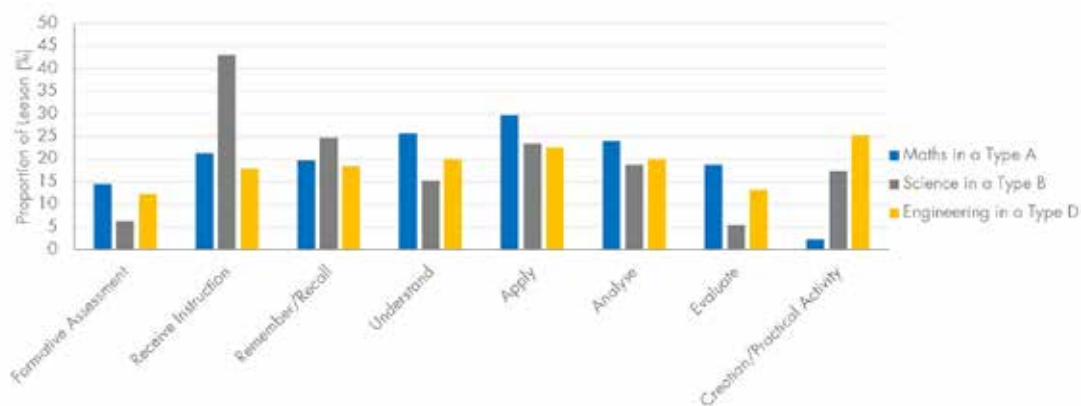


Figure 5: Proportional breakdown of student learning experiences in mathematics in type a (n = 31), science in type b (n = 29) and engineering in type d (n = 31) spaces.

The visual analysis of the Engineering and Mathematics samples revealed a greater differentiation of and increased in total student activity when compared to the Science sample. Both achieved this by facilitating different activities within the learning cycle to occur concurrently, through a greater incidence of student-centric and informal learning modalities (Figure 6). In particular, analysis of the Engineering sample demonstrate their utilisation of the full array spatial affordances, presented by their Type D layout. These teachers successfully utilized the design intent of the open studio spaces to differentiate the modalities of learning and increased the incidence of practical activity. While, but not as pronounced, the Mathematics teachers were able to differentiate activities through the movement of students within the cellular space (some teachers did

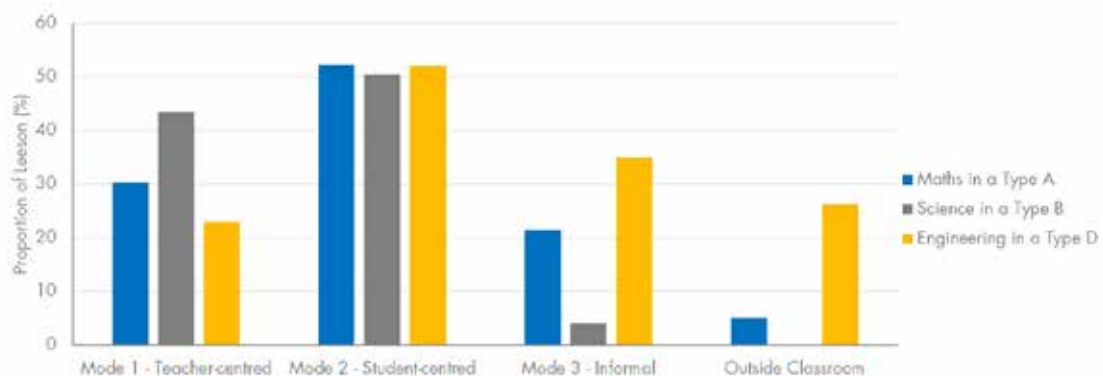


Figure 6: Proportional breakdown of student occupation of the Fisher (2006) modalities of learning in mathematics in type a (n = 31), science in type b (n = 29) and engineering in type d (n = 31) spaces.

utilize the exterior verandah spaces at times). Both samples actively exploit the available spatial affordances to orchestrate the full spectrum of learning experiences that supported the acquisition and consolidation of surface knowledge (Understanding) to the engagement with deeper learning (Apply, Analyse and Evaluate).

CONCLUSION

The current interest in learning environments is driven by the premise that a change in space will act as a conduit for a desired pedagogical change. However, there exists a dearth of empirical evidence, and rigorous evaluative methods, to show if the occupation of these different spaces manifest in this envisioned change. This study attempted to illuminate how different spatial types, traditional (Types A and B) and ILE (Type D), affect both teacher and student activity and behaviour. The longitudinal observation of secondary Engineering, Mathematics and Science teachers through the LPTS observation metric presents initial empirical evidence through a novel evaluative approach.

The comparative analysis of repeated observations of teachers from conceptually similar subjects in these three spatial types revealed two key findings. The first relates to how the different spatial types influenced the pedagogy and learning experiences. The analysis of the Science sample in a Type B layout suggested how its built pedagogy, a rigid layout about a teacher-centric fireplace orientation, contributed to the significant incidence of teacher-led and whole class instruction. On the other hand, the observation of the Engineering teachers in the Type D layout revealed a different teaching and learning model. While these teachers still utilized teacher-led and didactic instruction, it was shorter and refined in its intent. The analysis indicated the built pedagogy of the open studio, somehow supported an increased prevalence of more active pedagogies and student-led learning experiences. It is a generalization to say that Engineering and Science subjects are somewhat conceptual similar, however, it was clear that the significant differences in observed pedagogy and learning was influenced by the difference in spatial type.

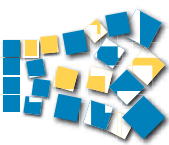
The second finding highlights the potential influence of teacher environmental competency. Even though Lackney (2008) focused on the theoretical development of 'environmental competency', his study did not extend to how it affected pedagogies and the nature of learning in different spatial types. The comparison between the Mathematics and Science teacher samples, in relatively similar spatial layouts, indicated how teachers with a more developed environmental competence, can orchestrate different learning experiences. During the observations, the Mathematics teachers were more attuned to use the given affordances of their traditional, cellular classroom to facilitate more responsive learning experiences through greater levels of activity differentiation. These teachers facilitated a high incidence of student-led and informal modalities of learning, including the use of the exterior veranda area, in what would be considered a teacher-centric box.

These findings do suggest that the LPTS observation metric, applied through a repeated measures approach, has the potential to evaluate teaching and learning in different learning spaces. However, to improve the generality and validity of both the approach, the application of the LPTS metric and initial findings presented here, a longer-term evaluation of the impact of different subject types is required. Subsequent article/s will focus on the deeper multivariate analysis of visual and nonparametric analysis to identify statistically significant changes in activities and behaviour between teachers, subjects, and spatial types.

REFERENCES

- Benade, L. (2016). Is the classroom obsolete in the twenty-first century? *Educational Philosophy and Theory*, 1-12. doi:10.1080/00131857.2016.1269631
- Blackmore, J., Bateman, D., O'Mara, J., & Loughlin, J. (2011). *Research into the connection between built learning spaces and student outcomes: Literature review*. Melbourne: Victorian Department of Education and Early Childhood Development Retrieved from http://www.eduweb.vic.gov.au/edulibrary/public/publ/research/publ/blackmore_learning_spaces.pdf.
- Byers, T., Hartnell-Young, E., & Imms, W. (2016). Empirical evaluation of different classroom spaces on student perceptions of the use and effectiveness of 1 to 1 technology *British Journal of Educational Technology*. doi:10.1111/bjet.12518

- Byers, T., & Imms, W. (2014). *Making the space for space: The effect of the classroom layout on teacher and student usage and perception of one-to-one technology*. Paper presented at the 26th Australian Computers in Education Conference, Adelaide.
- Byers, T., & Imms, W. (2016). Evaluating the change in space in a technology-enabled primary years setting. In K. Fisher (Ed.), *The translation design of schools: An evidence based approach to aligning pedagogy and learning environment design* (pp. 215-236). The Netherlands: Sense.
- Byers, T., Imms, W., & Hartnell-Young, E. (2014). Making the case for space: The effect of learning spaces on teaching and learning. *Curriculum and Teaching*, 29(1), 5-19. doi:10.7459/ct/29.1.02
- Dovey, K., & Fisher, K. (2014). Designing for adaptation: The school as socio-spatial assemblage. *The Journal of Architecture*, 19(1), 43-63. doi:10.1080/13602365.2014.882376
- Fisher, K. D. (2006). *The new learning environment: Hybrid designs for hybrid learning*. Retrieved from Melbourne: http://www.woodsbagot.com/en/Documents/Public_Research/PUBLIC2%20The%20New%20Learning%20Environment.pdf
- Gislason, N. (2010). Architectural design and the learning environment: A framework for school design research. *Learning Environments Research*, 13(2), 127-145. doi:10.1007/s10984-010-9071-x
- Hattie, J. A. C., & Donoghue, G. M. (2016). Learning strategies: A synthesis and conceptual model. *Science of Learning*, 1, 1-13. doi:10.1038/npjscilearn.2016.13
- Imms, W., & Byers, T. (2016). Impact of classroom design on teacher pedagogy and student engagement and performance in mathematics. *Learning Environments Research*, 19(2), 1-14. doi:10.1007/s10984-016-9210-0
- Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational psychologist*, 41(2), 75-86. doi:10.1207/s15326985ep4102_1
- Lackney, J. A. (2008). Teacher environmental competence in elementary school environments. *Children, Youth and Environments*, 18(2), 133-159. doi:www.colorado.edu/journals/cye
- Monahan, T. (2002). Flexible space & built pedagogy: Emerging IT embodiments. *Inventio*, 4(1), 1-19. doi:<http://www.torinmonahan.com/papers/Inventio.html>
- Mulcahy, D., Cleveland, B. W., & Aberton, H. (2015). Learning spaces and pedagogic change: envisioned, enacted and experienced. *Pedagogy, Culture & Society*, 23(4), 1-21. doi:10.1080/14681366.2015.1055128
- Oblinger, D. G. (2006). Space as a change agent. In D. G. Oblinger (Ed.), *Learning spaces* (pp. 1.1-1.4): EDUCAUSE.
- OECD. (2013). *Innovative Learning Environments*. Paris: Organisation for Economic Cooperation and Development.
- Painter, S., Fournier, J., Grape, C., Grummon, P., Morelli, J., Whitmer, S., & Cevetello, J. (2013). *Research on learning space design: Present state, future directions*. Ann Arbor: Society for College and University Planning.
- Reynard, R. (2009). Designing learning spaces for instruction, not control. *Campus Technology*. Retrieved from <http://campustechnology.com/articles/2009/04/29/designing-learning-spaces-for-instruction-not-control.aspx>
- Rosenshine, B. V. (1987). Synthesis of research on explicit teaching. In R. E. Bruce & E. E. Grimsely (Eds.), *Reading in educational supervision* (Vol. 2, pp. 145-153). Alexandria, VA: Association for Supervision and Curriculum Development.
- Tanner, C. K. (2008). Explaining relationships among student outcomes and the school's physical environment. *Journal of Advanced Academics*, 19(3), 444-471.
- Uptis, R. (2004). School architecture and complexity. *Complicity: An International Journal of Complexity & Education*, 1(1), 19-38. doi: www.complexityandeducation.ca



The relationships between learning space and student learning in higher education

Ji Yu

University of Cambridge - England

ABSTRACT

Drawing on theoretical notions of student learning research, the study investigated students' learning experiences within two contrasting learning spaces in higher education - a conventional, didactic learning space, and a flexible, innovative learning space. As a follow-up investigation of a formal survey, this study employed focus group interviews to explore student learning experience of space in depth. The results show that learning space is associated with students' conceptions of learning, as well as their cognitive, regulative, affective and motivational activities of learning. This comparative case study helps to inform an innovative and fruitful way of assessing the alignment between pedagogy, space and learning in higher education.

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

Ji Yu is a PhD candidate from the University of Cambridge, Faculty of Education, affiliated with the Psychology and Education Academic Group. Her research focuses on the bridging of two domains, learning space research and student learning theories. She is particularly interested in the educative value of learning space by using mixed methods to examine students' experiences of space in relation to their learning. She has recently passed the oral defence of her PhD thesis.

TRANSFORMATION OF LEARNING SPACE IN HIGHER EDUCATION

The landscape of learning space in higher education is undergoing a transformation. During the past decade, flexible, innovative learning spaces have been established around the world in response to the changing perspectives on how knowledge is discovered and what constitutes important and appropriate higher education in contemporary society (Harrison & Hutton, 2014; JISC, 2006; Oblinger, 2006). Characteristics of these spaces include motivating learners and promoting learning as an activity, supporting collaborative learning, providing a personalized and inclusive environment, and being flexible in the face of changing needs. Technology also plays a vital part in achieving these aims.

In contrast with the school sector, the existence of evidence on the link between spatial design and pedagogical effectiveness in higher education is still rare. Some exceptions include the studies of Brooks (2011, 2012) and Walker, Brooks, & Baepler (2011), who partnered with instructors and conducted a series of quasi-experimental research studies to investigate the impact of learning space upon students' learning behaviour and learning outcomes. It has been argued that there is a great need for rigorous and multi-layered models and knowledge of the role of learning space in influencing and supporting student learning in higher education (Ellis & Goodyear, 2016; Mirjamdotter et al., 2006; Strange & Banning, 2001; Temple, 2008).

STUDENT LEARNING RESEARCH IN HIGHER EDUCATION

This study draws on theories and concepts in student learning research (Biggs, 1993, 1999; Richardson, 2000), mainly situated in the cognitive psychology of education, in order to provide an insightful and solid way to understand the student learning process and discuss relatively 'desirable' or 'less desirable' learning in contemporary society.

Student learning has been an ongoing subject of study in higher education and includes the following outline frameworks and broad concepts (Entwistle et al., 2002).

- Curriculum frameworks and their influences on learning
- Students' approaches to learning
- The overall teaching-learning context (environment), and students' perceptions of it
- Learning outcomes.

In the existing literature, the Student Approaches to Learning (SAL) tradition originated in the 1970s has exerted a seminal impact in studying how to assess and improve the quality of student learning in higher education. An approach to learning is conceptualized in terms of cognitive strategies and motivation. Two distinct approaches have been identified (Biggs 1988; Entwistle & Ramsden 1983; Marton & Säljö, 1984; Pask, 1988; Schmeck 1988). *Surface approaches to learning* refer to students employing surface learning processes (e.g. rote memorisation of course materials) for the purpose of assessment, while *deep approaches to learning* mean that students use deep learning processes (e.g. seeking for meaning, understanding and relating ideas) with an intrinsic interest in learning and understanding. In general, educators aim to foster a rigorous appreciation of the internal structure of a subject and the development of integrative understanding and deep thinking in students.

Over the last few decades, the research on student learning has further flourished and encompassed a wide range of theoretical perspectives and a variety of ways to investigate different aspects of learning. Researchers (Short & Weisberg-Benchell, 1989; Vermunt & Verloop, 1999) have compared different taxonomies in studies and categorized them into three main components: cognitive processing activities, affective/motivational learning activities, and regulative activities. Cognitive processing activities refer to how students engage in processing subject matter, which leads directly to learning outcomes. Affective learning activities are related to the emotions that arise during learning, and the activities that students employ that lead to a mood that may have a positive, neutral or negative effect on the progress of learning processes. Regulative activities refer to students exerting control over their own cognitive and affective processing activities during learning. This categorization serves as a point of departure in conceptualizing student learning process in this study.

AIM

The aim of this study is to bridge learning space and student learning in higher education through empirical work. It highlights the crucial student view, as many development and redevelopment building projects in higher education are concerned with quality and evaluation of learning, but lack a student's perspective. Bennett (2007) has argued that students have their own ideas about learning space and can be very articulate in discussing the strengths and shortcomings of designed spaces. Therefore, this study seeks to gather an input from students according to their self-reported learning experiences of space.

ETHICAL CONSIDERATIONS

This study involved photographing the spaces and human subjects. The relevant offices gave permission to data collection of this research. Participants in the photos have consented to being photographed and given permission to use the photos for research purposes. They were also asked to inform the researcher if they preferred their faces unidentifiable.

METHOD

CONTEXT: TWO CONTRASTING LEARNING SPACES

Two contrasting learning spaces in a middle-sized Chinese university were selected for investigation. Both were generic learning spaces designed for all types of student. Document analysis and semi-structured interviews with educators and designers revealed that the two spaces are embedded with different intentions. Space A (Figure 1) places more emphasis on discipline and collectivism, reflected in its traditional academic architectural style, plain colours and didactic interior space. Space B (Figure 2) is designed to create a relaxing, interdisciplinary environment with a rich colour scheme, comfortable furnishing, spatial division and flexibility, and the creation of a sense of ownership and autonomy.

The two spaces thus also differ from each other in pedagogical approaches: in Space A, a conventional, teacher-focused approach is used in which the subject matter is determined by the teacher, often in the form of books or chapters, the content of which has to be learned. Content is provided through lectures, which the teacher gives to the students by means of PowerPoint presentations and corresponding materials. Space B employs a project-based learning approach, with students from different disciplines choosing an authentic, real-life assignments or problems to work on, and working in small groups. Students exercise more autonomy and control in deciding what and how to learn. The role of the teacher is to guide the groups and provide feedback when necessary. Students can use both spaces freely when there are no scheduled classes and activities.



Figure 1: The typical classroom in Space A.



Figure 2: Multi-purpose lecture room in Space B
(Photo source: Sino-Finnish Centre, 2016).

This study was a follow-up investigation of a large-scale survey. Students were recruited to participate in in-depth focus group interviews (FGI), in which they were asked a series of open-ended questions about their learning experiences within, and their attitudes towards the spaces. Participants were selected for each FGI with the aim of capturing as much variation as possible on the following variables: gender, year of study and academic discipline. This was based on the consideration that both spaces are generic learning spaces, and also because previous student learning research has shown that these variables are related to how students go about their learning (Richardson, 2000; Vermunt, 2005). The group size was set at four to six participants after a pilot study. A total of 28 participants participated in six FGIs. Each FGI lasted between 1 hour 40 minutes and 2 hours.

DATA ANALYSIS

The recordings of all FGIs were manually transcribed. Coding was conducted, which was an iterative process before arriving at stable elements and categories. Drawing on the conceptual basis of student learning as described above, the development of specific code scheme used a bottom-up strategy to produce the results through a more emergent encounter with the data themselves. About 20 per cent of the overall transcriptions were coded by a second independent researcher to assess the inter-rater reliability. Below four overarching themes regarding the alignment between learning space and student learning are outlined, and the identified codes are indicated with ‘’.

SELECTED RESULTS

THEME ONE: LEARNING SPACE AND STUDENTS' CONCEPTIONS OF LEARNING

On the whole, learning space is associated with how students view and conceive their learning. Students in Space A mostly saw learning space simply as a physical site for learning, as they considered learning is ‘the increase of knowledge’ and ‘the acquisition of facts and skills’, which can be retained and/or utilized in practice. In contrast, students in Space B discussed more about ‘cooperation’ and ‘interpretation’ aimed at the understanding of reality, and paid more attention to intangible benefits of a learning space, for instance, ‘enrichment of learning opportunities’, and ‘possibility of ‘communication’.

THEME TWO: LEARNING SPACE AND COGNITIVE ASPECTS OF LEARNING

Students described that learning space is related to how they process their subject matter in a particular way: they were more likely to use ‘listening/memorizing’ in a traditional space like Space A, and more engage in ‘relating/ structuring/creating thinking’ and ‘group discussion’ in an innovative learning environment like Space B. It means student learning take place as a process of listening to the instruction of the teacher and repeating definitions, formulas, memorizing theories and rehearsing subject matter regularly in the conventional classroom; while a collaborative process of looking for connections between different parts and the merging of new ideas in the innovative environment.

THEME THREE: LEARNING SPACE AND AFFECTIVE ASPECTS OF LEARNING

Space is also associated with affective and motivational aspects of student learning, including their ‘learning motivation’, ‘emotions’ and ‘concentration effort’. This means in the FGIs: (1) students described a reason or reasons for acting or behaving in a particular way in a space, especially the reason in deciding where to learn. (2) Students discussed either positive feelings of happiness, ownership, self-confidence when they learned within the space; or negative emotions, such as anxiety, stress, insecurity and helplessness. (3) Students also talked about the action-distracting, task-irrelevant emotions that arise during learning within the space. As a student summarized at the end of one FGI:

If we could divide the composition of a learning space into three levels of factors - some level largely determines whether I will choose to learn or not learn there, the others affect the emotions that arise during my learning, and another is associated with the degree of how effectively I can learn. All these factors of space, through exerting influence on my subjective feeling, willingness, self-initiation and effectiveness of learning, consequently impact upon the attitude, method and outcome of my learning.

Learning space is also in relation with students' regulative learning activities. The data easily distinguish between 'self-regulation' and 'external regulation' - the former refers to students' self-initiated orienting, planning and adjustment of their learning process and activities through their examination of characteristics of the learning task and the situation within the learning space, while the latter is related to the control of teaching, other students and the surrounding events. 'Flexibility of space' in Space B facilitates students' 'self-regulation' while a conventional classroom with 'fixed seating arrangement' like Space A provides a feeling of tension and relates to 'external regulation'. Below are two examples:

(A student in Space A) When I learn here, the surrounding people have an effect on me, I guess, it is called 'group effect'. If others around you are playing or doing something irrelevant, I won't have much mood for learning.

(A student in Space B) When I learn, for instance, I need to draw something, then I can easily get a small whiteboard here to clear my mind. I feel I can control something by myself, make adjustment and go back to learning.

CONCLUSION

Research on learning space and theories of student learning in higher education are rarely connected; this study aims to link the two domains. The findings show that in general, an innovative learning environment supports a more desirable approach to learning than a traditional classroom, regarding students' achievement of 'constructive' conceptions of learning (Säljö, 1979), their employment of learning strategies that promote understanding and their self-regulation of learning. The results also suggest students' emotions and motivation need to be carefully taken into account in the design and management of learning space.

The theoretical rationale underpinning the student learning research may be worthy of consideration by learning space researchers as the multifacetedness of learning has been investigated extensively, providing greater insight into the dynamic learning process and how learning space affects this process. In making an alliance between our understanding of pedagogy, space and learning, the integration between two research domains is likely to generate a fruitful prospect.

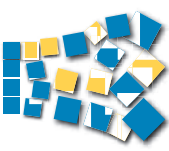
ACKNOWLEDGEMENTS

The author wishes to thank the staff of the two spaces for their cooperation of the study and permission for accessing and using to their materials and records.

REFERENCES

- Bennett, S. (2007). Designing for uncertainty: Three approaches, *The Journal of Academic Librarianship*, 33(2), 165–179. doi:10.1016/j.acalib.2006.12.005
- Biggs, J. B. (1988). Assessing student approaches to learning. *Australian Psychologist*, 23, 197–206. doi: 10.1080/00050068808255604
- Biggs, J. (1993). What do inventories of students' learning processes really measure? A theoretical review and clarification. *British Journal of Educational Psychology*, 63, 3-19. doi: 10.1111/j.2044-8279.1993.tb01038.x
- Biggs, J. (1999). *Teaching for quality learning at university: What the student does*. Buckingham: SRHE & Open University Press.
- Brooks, C. (2011). Space matters: The impact of formal learning environments on student learning. *British Journal of Educational Technology*, 42(5), 719-726. doi: 10.1111/j.1467-8535.2010.01098.x
- Brooks, C. (2012). Space and consequences: The impact of different formal learning spaces on instructor and student behaviour. *Journal of Learning Spaces*, 1(2). Retrieved from <http://libjournal.uncg.edu/index.php/jls/article/view/285>
- Ellis, R. A., & Goodyear, P. (2016). Models of learning space: integrating research on space, place, and learning in higher education, *Review of Education*, 4(2), 149-191. doi: 10.1002/rev3.3056

- Entwistle, N., McCune, V., & Hounsell, D. (2002). *Occasional report 1: Approaches to studying and perceptions of university teaching-learning environments: concepts, measures and preliminary findings*. ETL Project, Universities of Edinburgh, Coventry and Durham. Retrieved from <http://www.ed.ac.uk/etl>.
- Entwistle, N., & Ramsden, P. (1983). *Understanding student learning*. London: Croom Helm.
- Harrison, A., & Hutton, L. (2014). *Design for the changing educational landscape: Space, place and learning*. Abingdon: Routledge.
- Joint Information Systems Committee (JISC) (2006). *Designing spaces for effective learning: A guide to 21st century learning space design*. Bristol, UK. Retrieved from <http://www.jisc.ac.uk/whatwedo/programmes/elearninginnovation/learningspaces.aspx>
- Marton, F., & Säljö, R. (1984). Approaches to learning. In F. Marton, D. Hounsell, & N. Entwistle (Eds.), *The experience of learning* (pp. 36–55). Edinburgh: Scottish Academic Press.
- Mirijamdotter, A., Somerville, M. M., & Holst, M. (2006). An interactive and iterative evaluation approach for creating collaborative learning environments. *The Electronic Journal of Information Systems Evaluation*, 9(2), 83-92.
- Oblinger, D. G. (2006). *Learning spaces*. Washington, DC: EDUCAUSE.
- Pask, G. (1988). Learning strategies, teaching strategies, and conceptual or learning style. In R. R. Schmeck (Ed.), *Learning strategies and learning styles* (pp. 83–100). New York: Plenum Press.
- Richardson, J. T. E. (2000). *Researching student learning: approaches to studying in campus-based and distance education*, Buckingham, UK: Open University Press.
- Säljö, R. (1979). *Learning in the learner's perspective: I. Some common-sense assumptions*, Report No. 75 Göteborg, Institute of Education.
- Schmeck, R. R. (Ed.). (1988). *Learning strategies and learning styles*. New York: Plenum Press.
- Short, E. J., & Weisberg-Benchell, J. A. (1989). The triple alliance for learning: cognition, metacognition and motivation, In C. B. McCormick, G. E. Miller & M. Pressley (Eds.), *Cognitive strategy research: from basic research to educational applications* (pp. 33-63). New York: Springer Verlag.
- Strange, C., & Banning, J. (2001). *Educating by design: Creating campus learning environments that work*. San Francisco: Jossey-Bass.
- Temple, P. (2008). Learning spaces in higher education: an under-researched topic. *London Review of Education*, 6(3), 229-241. doi: 10.1080/14748460802489363
- Vermunt, J. D. (2005). Relations between student learning patterns and personal and contextual factors and academic performance. *Higher education*, 49(3), 205-234. doi: 10.1007/s10734-004-6664-2
- Vermunt, J. D., & Verloop, N. (1999). Congruence and friction between learning and teaching. *Learning and instruction*, 9(3), 257-280. doi: 10.1016/S0959-4752(98)00028-0
- Walker, J.D., Christopher, D., Brooks, C., & Baepler, P. (2011). Pedagogy and space: Empirical research on new learning environments. EDUCAUSE Quarterly. Retrieved from <http://www.educause.edu/erp/article/pedagogy-and-space-empirical-research-new-learning-environments>.



Teacher adaptation to ILEs: Identifying key skills for teachers in 21st century ILEs. We're going through a phase.

Dr Scott Alterator

La Trobe University - Australia

ABSTRACT

Teachers are no longer transmitters of content for passive vessels. Where once the teacher was the knowledge-holder and the content-authority, technology and resultant attitudes have shifted the fundamentals. Innovative learning environments are often conceived as physical embodiments of the democratization of knowledge and empowerment of the learner. As well as being a response to the shifting paradigm, the learning space is a further prompt away from the old educational model. In such a setting the role of the teacher appears vastly removed from historical and industrial norms. This paper will address the following: What key skills are emerging for teachers in twenty-first century ILEs? Conceptually oriented by relational agency (Edwards, 2005) and a model of agentic adaptation (Borko, 2004; Deed & Lesko, 2015), key teacher skills are presented from a multiple-site case study of Victorian secondary schools engaged in delivering twenty-first century teaching and learning in ILEs. The adaptation occurs across a spectrum from early phase through advanced phase. Key skills emerging include heightened collaboration, comfort with scrutiny, flexibility of pedagogical beliefs and practice. Advance phase skills include team orientation and reflexive practice.

KEYWORDS: TEACHER SKILLS; ADAPTATION; RELATIONAL AGENCY

Dr Scott Alterator is a lecturer in the school of Education at La Trobe University, Australia. Since completing his PhD he has continued to focus his research on Innovative Learning Environments at both secondary and tertiary level. His upcoming book (co-edited with Craig Deed) will focus on the occupancy phase of Innovative Learning Environments.

INTRODUCTION

The shift away from a teacher-centred paradigm is driven by contemporary understandings of learning that are student-oriented, agent-oriented, authentic, creative and engaged with a range of technologies. The highly structured and hierarchical industrial norms contrast with the increasing focus on customized education and engagement in the global knowledge-society. The addition of physical environments aligned with this broad educational intent challenges teachers in developing programs and practice that meet the needs of learners and harness the potential of the built form. The role of the teacher is not made redundant but 're-cast' by these altered arrangements. Teacher adaptation becomes a necessity. This study examines emerging skills and relevant expertise as teachers develop and implement twenty-first century learning programs in innovative learning environments.

LITERATURE

EDUCATIONAL IMPETUS

Education in the twenty-first century must consider a range of theoretical and practical developments. The inheritance of constructivist ideas is significant. In particular, Dewey's (1916, 1997/1938) ideas of an active, future-oriented student who learns through social engagement captures the broad framework of the now dominant paradigm. This has seen a steady erosion of transmissive pedagogies and the emergence of techniques requiring critical and creative learners. Pedagogies such as direct instruction are not without justification; however, the expanded repertoire of teacher practice is necessarily read within the influence of the constructivist paradigm.

A review of contemporary education literature reveals an emphasis on technology with a focus on interconnectivity and virtual communities, diversity within classrooms requiring ever greater degrees of personalisation, authentic engagement in real-world problems, and curriculum authorities increasing the focus on skills and capabilities ranging from collaboration to creativity. At the same time, schools are accountable across local, state and international jurisdictions through the National Assessment Program Literacy and Numeracy.

THE ROLE OF ARCHITECTURE AND DESIGN

Innovative Learning Environments (ILEs) have developed in parallel with the educational impetus outlined above. While the particular nuances informing and motivating this development are different across the two disciplines of education and architecture, it is uncontroversial to assert that each have been informed by notions of democracy, student agency, collaborative learning and personalisation (Boys, 2009, 2011; Lippman, 2010). ILEs both represent and embody the fluid, open ended education experience central to the understanding of twenty-first century education.

An important consideration for emerging teacher skills is the understanding of space as an ongoing interaction between space and occupation. Spatiality posits space as socially constructed. It is relational or political featuring textures of authority and power (Hofbauer, 2000; McGregor, 2004). Moreover, space is understood as a construct and relative. The occupation of space becomes an ongoing interaction between the ILE and teacher practice. Concepts such as openness, flexibility, finished beginnings, permanent but incomplete, and co-authoring (Barret & Zhang, 2009; Boys, 2011 and others) are an expression of this idea with relevance to both design and education.

The built learning environment is understood as a provocateur or disruptor. The "free flowing, 'loose fit', multipurpose" (Melhuish, 2011, p. 22) buildings are both a response and a prompt. This is broadly in line with an acceptance that the changes in education during the early part of this century are transformational (Mahony & Hextall, 2012).

The theoretical orientation of spatiality, along with the ongoing occupation of the space requiring co-authoring, or 'finishing', requires teachers to respond to, inhabit and co-design the learning environments as part of their ongoing practice.

TEACHER KNOWLEDGE AND ADAPTATION

Studies examining teacher practice in ILEs have emphasized the changing circumstances of the learning environment and the need for adaptation (see for instance Bradbeer, 2016; Prain et al., 2015). The literature recognizes the impact of inhabiting new environments, particularly when coupled with the features consistent with twenty-first century education experiences: complexity, dynamism, and potential disorientation.

Teacher knowledge is accepted as both theoretical and practical. Knowledge is practical or situated within personal experience of practice, with models of change and development leading to preferences for expertise focused on agility and adaptation (Ben-Peretz, 2011; A. Hargreaves, 2013). It consists of routines, professional cultures and disciplinary traditions (Cooper, 1981; Desforges, 1995; D. Hargreaves, 1980). Adaptation is acknowledged as a necessary component of occupying ILEs as schools continue to alter learning programs to reflect the contemporary goals. Adaptation is taken as "imaginative and dynamic (re) occupying (of *ILEs*) providing a bridging mechanism between narratives of the possibilities/constraints of prior experience and projecting and enacting alternative learning experiences" (Deed, 2015, p. 27).

Adaptive expertise is forwarded within a contested field of expertise. The complex context of contemporary schools demands that teachers respond to the altered arrangements of curriculum structures, learning environments, school-level responses and the shift toward customized learning. Adaptive expertise is taken from adaptive intelligence which is understood as the altering of practice beyond that which has been routinized (Sternberg, 1984). Adaptive expertise occurs when efficiency is high, freeing time for innovation (Schwartz, Bransford, & Sears, 2005). It is also considered as being a mix between innovation and efficiency in relation to problem solving. ILEs emphasize the importance and tension in the negotiation of existing school routines and the opportunities for responding to the educational imperatives.

METHODOLOGY

The study took a multi-theoretical approach. The use of structuration theory (Giddens, 1984) and affordance theory (Gibson, 1977) focused the study on the purposive, situated agents. Structuration theory holds that social activities by individual agents enter a reflexive loop thus maintaining the social structures as long as the practices continue. Affordance theory assumes that the environment provides the agent certain possibilities. Teacher practice is read as agent choice. The elevation of the agent is critical in understanding teacher behaviours as they navigate the new settings and adapt their practice.

RELATIONAL AGENCY

The intensified collaboration occurring in ILEs demands a careful consideration of agent interactions. Relational agency (Edwards, 2005, 2009, 2011; Edwards & D'Arcy, 2004) assists in orienting the reading of agency in these settings, particularly as the instances of connection and interaction increase as a result of openness, proximity and program structure. Relational agency provides a focus on instances of negotiation that are at once joint-focused and object-oriented. They occur at the boundary of expertise and practice with the goal of establishing common knowledge. It prompts agents to find moments of stability through connections in practice. The interactions are characterized as fleeting micro-negotiations. Relational agency is both mediated by common knowledge and provides moments where it may be built.

The reading of ILEs for emerging teacher skills is further oriented by the conceptualization of colleagues as resources. Edwards forwards the idea that resources can be both material artefacts and concepts related to a profession (2009). This allows for the full suite of existing professional and practice-based knowledge to act as resources informing the adaptive work of teachers. Indeed, colleagues become 'turbo-charged' resources for developing common knowledge and developing practice. This places further emphasis on the agent and the work of collaborating with others in the ILE.

MULTIPLE-SITE CASE STUDY

Multiple-site case study method was used as it allowed a deep or thick examination of a real life context. In particular, case study provided the opportunity to examine real contexts with an acknowledgment of context as a "powerful determinant of both causes and effects" (Cohen, Manion, & Morrison, 2011, p. 289). Further, the case study method was consistent with the constructionist and pragmatist focus on experience and individual accounts.

The study was made up of three sites. Each site was part of the town-wide building renewal program in regional Victoria, Australia, that saw all junior secondary schools replaced with largely open plan buildings. Two school sites were junior secondary (7-10) while the third site delivered the senior certificate. The third site was not entirely renewed though the English faculty undertook a redesign of an entire floor in 20-year-old three-storey building. All three schools (Tellurian, Matassa and Alluvial Secondary Colleges) were a part of the regionally administered plan to renew both teaching and learning, and facilities. Facilities incorporated ideas of increased student access and ownership of the environment through large scale multi-use building types designed to house a learning neighbourhood of around 100-150 students. The teaching and learning focus centred on delivering a curriculum that was more aligned with twenty-first century ideas centred on personalisation, authentic inquiry, collaboration and interdisciplinary learning.

Data were collected using a range of ethnographic methods: open ended teacher interviews ($n=12$) repeated 12 months apart; open ended student group interview ($n=1$); classroom observations varying from 5 to 25 hours across multiple occasions. Selective sampling was conducted with the criteria established to ensure twenty-first century teaching and learning was being attempted.

Analysis was conducted using a dual cycle coding approach (Saldana, 2009). First cycle coding was used to establish descriptive codes. A close reading occurred as part of the initial coding process. The second cycle coding were used to develop a coherent synthesis of data toward a more select list of broader concepts. Theoretical coding also took place during the second cycle to ensure more abstracted categories capable of achieving complexity and coherence (Glaser, 2001).

PROGRAM OUTLINE AT EACH SCHOOL SITE

A brief overview of the program features at each site is presented. The programs are characterized as occurring in phases of development: early, mid and advanced. This terminology is an extension of existing attempts to capture the move to ILEs (Blackmore, Bateman, O'Mara, & Loughlin, 2011). Determinations were made in relation to the relative position of the school program to the traditional model of education that preceded their move to the ILE.

EARLY PHASE

Alluvial Secondary College arranged the English and Humanities programs to occur in unison with teams of teachers collaborating across delivery modes. The emphasis in this early phase was on developing team teaching with a predisposition towards collaboration and student autonomy. An interesting feature was the decision to avoid formally allocating teaching spaces. The leadership team hoped that teachers would negotiate the use of space amongst the team with a focus on fit-for-purpose.

MID TO ADVANCED PHASE

Matassa Secondary adopted a program of English delivery that saw a high degree of synchronisation. The program saw the alignment of both classes and curriculum delivery. The English program occurred with the same teachers delivering the same program at the same time in the same place. Program planning and assessment was shared amongst teams of teachers aligned into corresponding subject teams.

ADVANCED PHASE

Tellurian Secondary presented a program of mathematics delivery that was personalized through diagnostic testing leading to individual and collaborative activities. These were designed to be rich learning opportunities requiring students to create and apply; games, storytelling, puzzles, as well as non-fiction applications were used as assessments. A parallel program of skill and drill using Athletics was also adopted.

FINDINGS

The findings are presented around teacher perception and teacher reaction. This framing allows for teacher understanding of available affordances as well as the ongoing response through practice. Emerging teacher skills are determined through a consideration of the perception and reaction to the ILE. The data presented similarities across all three sites. Differences between sites were understood as divergence within a theme, not significant or stark.

Teacher perceptions of affordances of ILEs contain a mix of ideas consistent with design and educational intent as well as reactions to it. All three sites produced teacher perceptions of ILEs as affording flexibility, visibility and scrutiny (expressed in relation to student and teacher autonomy), an altered role for the teacher, and shifting expectations for teaching and learning.

Flexibility was clearly the dominant theme amongst the data. It is worth unpacking in more detail here as it illustrates the context for determining teacher skills. The ILEs were understood to offer an increased range of practice. Flexibility was also used to convey the need for a broadening of the general approach to education. The term was used to express an understanding of the potential for change though it was consistently limited to a general idea. Particular expressions were attached to instances of teaching and learning or collegial interactions. For instance, teachers at Tellurian and Matassa Secondary Colleges were able to express flexibility in relation to particular features of the Mathematics and English programs.

More generally, flexibility acts as a cornerstone for perceptions around the altered role of the teacher and the expectations of teaching and learning. The two themes are interlinked but separated here to emphasize the impact on potential practice and underlying understandings. A salient piece of data represents a sentiment expressed in various forms, “the kids are driving the role of teacher, teachers aren’t dictating terms” (Teacher N).

Teacher reactions to ILEs again presented similarities across the case study sites. The collated themes are not an attempt at suggesting causality between affordances and reactions. The complex nature of the settings and the uneven take-up of possibilities, expressed as phases, demands a nuanced reading. The teacher reaction or occupation of the ILEs reveal the following themes: collective practice, team orientation, necessity of practice and adaptability.

Collective practice at each site occurred as a result of the administratively aligned teams. The occupation of the open staffrooms and shared facilities in small staff teams enhanced the formal work of administering the learning program. The increase in collective practice produced an altered perception of professional orientation. This saw a shift away from individual orientation to a collective or team-based orientation. The team orientation was reported as a necessary feature of the ILE workplace with a constant negotiation of resources of time and space demanding an agile approach to daily tasks and broader features of school planning.

DISCUSSION

The discussion will focus on the emerging skills of teachers within the complex context of ILEs aiming at a twenty-first century education. The various concepts common to education and design literature – flexibility, irregularity, community, co-design, co-author, student-centred, agency – find expression in the ongoing occupation of the ILEs. The data revealed the focused impact of practice in these spaces with the intended disruption to existing traditions of organizing space and time clear. Traditions of teacher expertise are necessarily impacted where the setting and programs are changed to the degree observed in the case study sites.

The expression of flexibility revealed the need for both practical flexibility and a flexible understanding. These may be expressed as agility, fleet-footedness, responsive practice and open-mindedness but they may also take the form of unpredictability, variable and haphazard. The need for a degree of predictability is evident in planning and developing routines for teaching and learning. Teachers must work to maintain or adapt those routines and traditions that best serve the transition in the new setting.

The increased collective practice in intensified collaborative environments reveals a tension between the individual and collective. Balancing the needs of the individual and the needs of the team or organization requires a nuanced approach to avoid the subjugation of the practitioner.

Visibility in the ILEs produced teacher responses generally focused on the generation of a more accountable community, both teacher practice and student behaviour, with clear access to a range of teachers. The negative elements of this category were a sense of scrutiny and the lack of down time. Teacher stress was reportedly higher on account of never being off duty.

The altered role of the teacher must be read in the context of these various pressures and tensions. Where teacher and student agency has changed in the learning environment, the ongoing work of teachers is necessarily adaptive. Reading these findings within the frame of adaptive expertise, a set of teacher skills is offered as qualified generalizations.

TEACHER SKILLS

Edwards (2011) offers a framework in essential features of boundary work for establishing common knowledge. Using this as a lead, emerging features of the advanced phase response sites are identified: focusing on individual trajectories; awareness of teaching and learning vision; awareness of sphere of influence and available expertise; negotiating instances of resource use during live practice; understanding collaborative pedagogy; being team oriented; willingness to be adaptive despite uncertainty; reflecting and responding to all parts of work.

Teacher skills are presented through the categories of early, mid and advanced phase responses. Early to mid phase responses produced practice that was staccato and episodic. This was a result of selective engagement with a limited alignment of resources and a largely unchanged curriculum program. Early phase skill-sets include:

- Collaborative skills – interpersonal skills, communication and cooperation
- Comfort with scrutiny and accountability
- Flexibility of pedagogical beliefs and practice

The advanced phase responses produced practice occurring within curriculum programs developed to amplify features of student agency, collaboration, collective practice through alignment of resources (space and time) and synchronized curriculum structures (teacher expertise). Teacher participation was approaching a mandated status but had achieved critical mass as a result of the tight alignment of the program. The heightened collaboration and synchronized program focused teacher work toward innovative use of resources through shaping available resources. The advanced phase skill-sets are identified as:

- Adaptability of practice within teams and various sized groups geared toward achieving student agency;
- Team orientation: propensity towards goals of team to those of self, adopting the sanctioned vision of teaching and learning;
- Reflexive practice: reflecting on individual and team practice (with specific goal of mutual agency).

CONCLUSION

The combined effect of ILEs and contemporary education programs produces the need for considerable adaptation by teachers. Traditions and routines are disrupted and new modes are emerging in the intensified and collaborative environment. Underpinned by relational agency, collective and individual endeavour merge to demand skills that must adapt from established norms to account for education that is personalized, student-oriented, authentic and rich in technology. Emerging skills are tending toward relational and interpersonal dimensions and must be balanced with disciplinary traditions of knowledge and pedagogy.

REFERENCES

- Barrett, P., & Zhang, Y. (2009). *Optimal learning spaces: Design implications for primary schools* Salford, UK: Salford Centre for Research and Innovation in the Built and Human Environment.
- Ben-Peretz, M. (2011). Teacher knowledge: What is it? How do we uncover it? What are its implications for schooling? *Teaching and Teacher Education*, 27(1), 3-9. doi:10.1016/j.tate.2010.07.015
- Blackmore, J., Bateman, D., O'Mara, J., & Loughlin, J. (2011). *Research into the connection between built learning spaces and student outcomes*. Melbourne: Education Policy and Research Division Retrieved from <http://www.education.vic.gov.au/>.
- Boys, J. (2009). Beyond the beanbag? Towards new ways of thinking about learning spaces. *Networks*, 8.
- Boys, J. (2011). *Towards creative learning spaces: Re-thinking the architecture of post-compulsory education*. London: Routledge.
- Bradbeer, C. (2016). Working together in the sapce inbetween: Pedagogy, learning environment and teacher collaboration. In W. Imms, B. Cleveland, & K. Fisher (Eds.), *Evaluating learning environments* (pp. 75-92). Rotterdam, The Netherlands: Sense.
- Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education*. [EBL Reader version]: Retrieved from [http://ez.library.latrobe.edu.au:2055/\(S\(v1o0hz2e4xgyshvnhw1jyug3\)\)/Reader.aspx?p=1144438&o=155&u=PHWMJTSBVdbVzGj0Z35qWQ%3d%3d&t=1421386476&h=615FBB55C102C566592B2681E94A3D1CB7F2E908&s=16837757&ut=492&pg=1&r=img&c=-1&pat=n&cms=-1&sd=1](http://ez.library.latrobe.edu.au:2055/(S(v1o0hz2e4xgyshvnhw1jyug3))/Reader.aspx?p=1144438&o=155&u=PHWMJTSBVdbVzGj0Z35qWQ%3d%3d&t=1421386476&h=615FBB55C102C566592B2681E94A3D1CB7F2E908&s=16837757&ut=492&pg=1&r=img&c=-1&pat=n&cms=-1&sd=1).
- Cooper, I. (1981). The politics of education and architectural design: The instructive example of British primary education. *British Educational Research Journal*, 7(2), 125-136. doi:10.1080/0141192810070202
- Deed, C. (2015). A model of teacher adaptation to open-plan settings. In V. Prain, P. Cox, C. Deed, J. Dorman, D. Edwards, C. Farrelly, ... Yager (Eds.), *Personalising learning in open-plan schools* (pp. 27-42). Rotterdam, The Netherlands: Sense Publishers.
- Desforges, C. (1995). How does experience affect theoretical knowledge for teaching? *Learning and Instruction*, 5, 385-400. doi:10.1016/0959-4752(95)00024-0
- Dewey, J. (1916). *Democracy and education*. New York: Macmillan.
- Dewey, J. (1997/1938). *Experience and education*. New York: Touchstone. (Original work published 1938).
- Edwards, A. (2005). Relational agency: Learning to be a resourceful practitioner. *International Journal of Research*, 43, 168-182. doi:10.1016/j.ijer.2006.06.010
- Edwards, A. (2009). Relational agency in collaborations for the well-being of children and young people. *Journal of Children's Services*, 4(1), 33-43. doi:10.1108/17466660200900004
- Edwards, A. (2011). Building common knowledge at the boundaries between professional practices: relational agency and relational expertise in systems of distributed expertise. *International Journal of Educational Research*, 50, 33-39. doi:10.1016/j.ijer.2011.04.007
- Edwards, A., & D'Arcy, C. (2004). Relational agency and disposition in sociocultural accounts of learning to teach. *Educational Review*, 56(2), 147-155. doi:10.1080/0031910410001693236
- Gibson, J. (1977). The theory of affordances. In R. Shaw & J. Bransford (Eds.), *Perceiving, acting and knowing: toward an ecological psychology* (pp. 67 - 82). New Jersey: Lawrence Erlbaum Associates.
- Giddens, A. (1984). *The constitution of society*. California: University of California Press.
- Glaser, B. (2001). *The grounded theory perspective: Conceptualisation contrasted with description*. Mill Valley, CA.: Sociology Press.
- Hargreaves, A. (2013). Push, pull, and nudge: The future of teaching and educational change. In X. Zhu & K. Zeichner (Eds.), *Preparing teachers for the 21st century* (pp. 217-236). [EBL Reader version]. doi:10.1007/978-3-642-36970-4
- Hargreaves, D. (1980). The occupational culture of teachers. In P. Woods (Ed.), *Teacher strategies: Explorations in the sociology of the school* (pp. 125 - 148). London: Croom Helm.

- Hofbauer, J. (2000). Bodies in a landscape: Open office design and organisation. In H. Willmott, J. Hassard, & R. Holliday (Eds.), *Body and Organization*. London: SAGE.
- Lippman, P. (2010). *Evidence-based design of elementary and secondary schools*. Hoboken, NJ: John Wiley & Sons.
- Mahony, P., & Hextall, I. (2012). 'Building schools for the Future': 'Transformation' for social justice or expensive blunder? *British Educational Research Journal*. doi:10.1002/berj.3001
- McGregor, J. (2004). Spatiality and the place of the material in schools. *Pedagogy, Culture and Society*, 12(3), 347-372.
doi:10.1080/14681360400200207
- Melhuish, C. (2011). Methods for understanding the relationship between learning and space. In A. Boddington & J. Boys (Eds.), *Re-shaping learning: A critical reader: The future of learning spaces in post-compulsory education* (pp. 19-31). Rotterdam: Sense Publishers.
- Prain, V., Cox, P., Deed, C., Edwards, D., Farrelly, C., Keeffe, M., . . . Waldrip, B. (2015). Remaking schooling through open-plan settings: Some conclusions and the future. In V. Prain, P. Cox, C. Deed, J. Dorman, D. Edwards, C. Farrelly, M. Keeffe, V. Lovejoy, L. Mow, P. Sellings, & B. Waldrip (Eds.), *Personalising learning in open-plan schools* (pp. 221-230). Rotterdam, The Netherlands: Sense Publishers.
- Saldana, J. (2009). *The coding manual for qualitative researchers*. London: Sage Publications.
- Schwartz, D., Bransford, J., & Sears, D. (2005). Efficiency and innovation in transfer. In J. P. Mestre (Ed.), *Transfer of learning from a modern multidisciplinary perspective* (pp. 1-51). Greenwich, CT: Information Age publishing.
- Sternberg, R. (1984). Toward a triarchic theory of human intelligence. *The Behavioural and Brain Sciences*, 7(2), 269-315. doi:10.1017/S0140525X00044629

Closing remarks

Professor Tom Kvan
University of Melbourne - Australia



Let me start by thanking the presenters who have provoked so much thought today. I am impressed by your ability to condense the richness of your thinking into 8 minutes. We all know how difficult this is but it reflects your mastery of the topic.

Congratulations too to the audience. What a day, though. I expect you have a headache or are numbed by being bombarded by the crisply delivered snapshots.

At the end of such a rich and comprehensive immersion such as today I seek a simple summary. If there is one message in my mind, it is that complacency is the most dangerous enemy. Complacency manifests itself in a number of ways. For Olympic level competitors, it can manifest itself at being satisfied with being the best. In research it can be an attitude that discovery is enough. For us, it must not be. The complacency is to focus only on success.

The second complacency is that we are brave pioneers. Framing the day, we recognize too that the topic of our conversation has been around a long time and we have not yet answered it. We face this complacency by asking why this is still a question.

Along the way we have however learned:

- The concern with which children manage the fears of their parents
- The discipline needed to synchronize timeframes
- Raising our awareness of what we might call habits.
- The insights from sailing
- The power of impact

Mary Featherston started the day with reflections on her experiences in the children's museum and school design to articulate a deep understanding of children and their desires and needs in learning. She closed with a challenge to consider schools as a collective project of a self-organizing system. She highlighted the rich legacy on which we can draw. The underlying message is the fundamental connection between educational philosophy and practice with designed form.

INHABITING DESIGN

This was picked up in the presentations that followed. Anna started the session on inhabiting space, drawing on the Finnish experience of inhabiting learning space and presented a model to link intentions with form.

Central to LEaRN's approach to learning environments is the role of evidence. Through a 'data performance', Sarah and Carol brought us into their research into data and our dynamic engagement with data, vividly illustrating the challenges and responsibility of using data. As Richard observed what teachers hear is not always what is happening.

In her introduction Mary recounted the concern of children for parental sensitivities. Peter raised a similar concern with the accommodating needs of special needs education and our institutional (adult) behaviour of separation and de-privileging. In urban design we speak of the opportunity of designing for 8 or 80 ensures covering the needs of all, in schools the opportunity is to make schools special for all, not only special needs.

Speaking of research in practice, Donna and Thomas demonstrated the value of disruption in developing new insights to campus planning, linking practices in workplace design to educational potential.

The session highlighted the challenges of responding to pedagogical practice through design action.

TEACHER PRACTICE

Craig introduced the second session noting the challenge the teacher faces of using the outcomes of design. Teaching and learning is a situated experience, as fellow chief investigator Professor David Clarke observes. Craig framed this as understanding the interaction of the authority of the teacher vs the authority of the teaching space in supporting student learning. Picking up on Mary's introductory comments, this was expanded in the question period to include the authority of the student. This was then articulated in a distinction between teaching spaces and learning spaces, reflecting relative authorities of teachers and students.

Emily highlighted the challenge that teachers face in navigating often contradictory learning spaces. As David Clarke also observed, spaces become innovative when the affordances are engaged. What distinguishes ILEs? Some early outcomes of the ILETC project is data reported from six thousand schools in Australia and New Zealand that over 70% of spaces are traditional yet we have found that innovative teaching is occurring in a good proportion of these. This data resonates with her conclusion that spatial experience is akin to the Mobius strip.

Developing on the framing of space as a socio-spatial perspective, Janet spoke of the four aspects of learning environments (spatial, temporal, social and technological) informing the reframing of curriculum. She raised the question of how permeable is the curriculum to bring in the temporal, technological and spatial. Vicky spoke to the challenge of transferring old habits into new space. Expertise is often understood to be a well rehearsed response to unfamiliar situations. Such well-rehearsed responses can be considered habits as well, as tacit knowledge that is applied to complex and multifaceted opportunities. Spatial knowledge is one aspect of this tacit knowledge and Vicky explored how this can be developed.

CHANGE AND RISK

The third session is on change and risk. Appropriately Steve brought sailing in as an innovative curriculum and as a metaphor. Chris implicitly picked up on this with a discussion of navigating in the wide open. He spoke to collaboration and the need to trade off options in action as we explore the new, in his focus, it was in the self-management of learning. You will know that the best route in sailing is not the shortest, there is a need to tack toward to mark. Chris illuminated how sophisticated collaboration was needed to support a fluid and flexible self-managed learning experience.

As Tamara observes, our ability to engage positively with risk is a key. Familiar to sailors, the need is to shift from risk reduction to risk engagement.

Focussing on science, Suzanne examined the contribution that spaces make in the repositioning of a discipline understood as a knowledge-focussed learning to contemporary learning needs. She spoke of space ownership, a concept antithetical to the collaborative conceptualized experience that Chris explore. This reflects a shift, using Tamara's framing, from self-management of risk to addressing risk in shared activity. This escalates the risk. As I explored in my own research in design collaboration, there are ways to manage this risk by de-escalating from collaboration to cooperation or, yet less, by simply

coordinating. As Steve summarized we need to create a culture to support change – this is a culture that addresses risk and supports the embrace not avoidance of risk. In a school context, with interests from policy makers and parents among others, managing the authorities and permissions is a leadership challenge.

MEASURING IMPACT

The fourth session brought us to the litmus test, of impact. We covered Impact on teaching approaches, on students and on teachers.

Terry explored as a chemist the detail of action in the classrooms as distinct to observing overall impact. From these discrete changes translate good practice to great learning. The opportunity is in teacher mind sets in enabling the changes from surface to deep and translational learning. Terry usefully pointed us to encouraging and managing failure.

Ji introduced her work in identifying spatial impact in students learning strategies, with the ILE supporting better application focussed learning, preparing students for workplace success.

Scott picked up on the aspects of the mind-set, in particular the suppression of self to become appropriately reflective in practice. The challenge of collaboration arose again. His proposition is that the management of ambiguity, imposed by space, is beneficial.

Thanks to all for coming, to partners in particular for making this research possible and to team for arranging this day.

Previous Transitions meetings have led to the publication of books developed from papers delivered during the day. These have been good opportunities for doctoral students to disseminate their work globally.

LEaRN has been active since 2008 and has developed a community of scholars working to understand and put into practice better practices in design and teaching to deliver better learning. A continuous sequence of research project have investigated the design and use of learning environments.

This community has produced doctoral graduates as well as numerous other outcomes. As we noted yesterday in our ILECT partners meeting, the issues we are considering can't be done just through isolated research, they are too complex. We have an increasing awareness of need for collaboration at all stages of school design or redesign – teachers, principals, architects & students.

This topics addresses questions that are globally relevant. We have heard presentations today by scholars in Canada, New Zealand, England and Australia. In the course of our work we have numerous conversations internationally that demonstrate we have unique insights from our experience in Australia.

We start meetings such as this with an acknowledgement that we gather on the lands of the Wurrundjeri. For me, this is an opportunity to reflect on the work in which we are engaged and its connection to a culture that values a continuity of knowledge and, most importantly, its application.

A full day of working together to understand what we have delivered so far and how we can collectively progress toward our larger goal. The perspective of time raises the question of why it takes so long to address these issues. As several people have noted throughout the day, we are not the first to say the issues need to be dealt with.

I issue a challenge - What is your one take away? Wes issued a call to arms, calling the incipient revolution. Craig's 'revolutionary moment' that teacher preparation was failing in providing spatial literacy. Perhaps one revolution is a shift from "we will build an ILE" to "we will look at all spaces as ILE".

We heard how new space provokes new conversations. This reflects a change in culture. At the end of the day, this is a thread I trace through the day, a culture of conversation, of reflection, of action, of tolerance and support, whether in addressing risk, in planning delivery, in articulating goals. Cultural change can be revolutionary or evolutionary. The degree of change suggests the approach. Apparently, we are participating in a revolution on a very slow boil.

Before you go off to storm the Bastille, however, can I ask for one moment more of your attention.

We extend our thanks and appreciation to Mary Featherstone and Julie Willis who started the day and set the scene. In particular Mary brought us her wisdom and experience.

I know we all greatly appreciate the significant contribution of the interlocutors, Richard Leonard, Craig Deed, Steve Cook and John Hattie. You each helped to reveal the meaning of what we heard through your comments.

Thanks too to Marian and those who ferried the microphone around the room during the day and kept us on time.

And finally, the most important honour I have today. Before we end, we wish to present tokens of appreciation for Joann Cattlin, Kirra Liu and Lachlan Stewart for all their hard work in pulling together the conference.

