Leon Benade
Mark Jackson *Editors*

Transforming Education

Design & Governance in Global Contexts

Springer

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Introduction

Transforming Education engages critically, conceptually, theoretically and empirically with the range of forces currently redefining curriculum agendas for education, ranging from primary (elementary)-level education to post-secondary education. The design of the place of learning is, in response to global imperatives, bringing about transformed understandings of curriculum, pedagogy and technology. A critical concern in this book is to engage philosophically, theoretically and sociologically not only with shifting governmental frameworks for administering the financing, maintenance and future planning of school facilities, but also to critique the ways facilities perform a governance function over the users and occupants of space, be it physical or virtual. Finally, the lived experience of such users and occupants speaks through field data, provoking questions concerning constructs and conceptions of space.

Governments demonstrate their desire to strongly influence educational outcomes in several ways. Governmental intent to control educational practices, for example by recommending innovative pedagogies and integrating technology in the curriculum, is deeply evident in moves to establish flexible and innovative learning environments in schools and places of higher education. Governmental support and advocacy of dynamic, modern, eco-friendly and technologically advanced educational buildings ought to raise critical questions relating to the origin or source of these moves, the quality or availability of research to support this ever-increasing replacement of traditional or conventional educational structures, the preparation of teachers and academics to work in such spaces and the deeper underlying relationship between conception, design intention, spatial practice and competing discourses articulating particular ways of designing education facilities.

Education systems in the twenty-first century are encouraged to ensure that children, school-leavers and graduates acquire appropriate lifelong skills. Teachers, school leaders, teacher educators and lecturers are therefore required to approach their work in radically new ways, especially as flexible learning environments become the strategic option for the building of new schools and educational facilities, gradually replacing or supplementing older, sometimes industrialised, building types. These new educational building environments challenge traditional

boundaries between spatial contexts; the delineation between formal and informal learning becomes blurred practically and symbolically, as students freely move from one context to another. The deployment of flexible and modular furniture within large spaces enables the creation of groupings that gel, dissolve and merge with others to form new groupings, all fundamentally challenging to traditional pedagogical models. Flexible temporality is a characteristic of flexible spaces, meaning that learning is increasingly perceived in temporal modalities at variance with traditional notions of timetabling. Learning schedules can be shortened, lengthened, held in limbo or finalised, as required or desired.

Schools' architect, Nair (2011), proposed that the classroom is obsolete, and that standard, formal or traditional single-cell classrooms should be substituted with flexible learning environments. Nair's proposed design principles embody the twenty-first-century worker, the self-directed, 'critical thinker' and collaborator who can work in a globally connected, technologically rich environment. The single-cell classroom is 'obsolete' precisely because it does not emulate the twenty-first-century workplace, whereas the flexible learning environment does. These new spaces of learning, as defined by Nair, are an instance of what Henri Lefebvre termed 'the representations of space'. This is "conceptualized space, the space of scientists, planners, urbanists, technocratic subdividers and social engineers…all of whom identify what is lived and what is perceived with what is conceived" (1991, p. 38). Thus, an important question is whether these spaces facilitate the development of twenty-first-century learning. How do we recognise relations between the discursive spaces of official documents, the institutional spaces of their agency and the lived spaces of their actualisation?

Space can be conceived as lived experience, with an emphasis on what space 'tells' its users through its configurations, its images and symbolic dimensions. What messages are being communicated by, through and about flexible learning spaces? What is the ideology of space, and what are the discourses it articulates? How may space be deciphered (Lefebvre 1991)? Equally, how are spatial practices engaging questions of power (Foucault 1984, 2007)? Do flexible learning environments govern our emerging responses to the knowledge society? And what of the environments created by social media and virtual reality? Do they enable a new subject, increased surveillance or the opportunity to hide from surveillance?

Transforming Education is an edited collection authored or co-authored by researchers and theoretical scholars in the fields of education curriculum, education technology, education philosophy and design for education. The linking focus across these themed sections is the emergence over the last five years of new types of education facilities, termed 'modern learning environments' (MLE) or 'innovative (or 'flexible') learning environments'. These are characterised by open planning methods, flexible programmable space, coinciding with new curriculum innovations that focus on student-centred and student-initiated learning. The chapters are not, however, confined to these developments, and several consider other learning environments.

The overall aim is for a reader to gain a series of detailed forensics into questions of design, pedagogy, schools-governance and learning environments widely

interpreted, while maintaining a holistic integration of these issues to define powerful global, national and local drivers and agents in transformational processes. The main benefit for the reader is to gain a lucid and detailed assaying of the overall governmentality of education, to employ a term developed by Foucault in defining the complex of relations that develop in relations of power invested by the state, along with those relations of force exerted by the governed.

For the reader who may for the first time be seriously engaging with the concept of spatiality in relation to education, this book provides the opportunity to develop a clear understanding of a wide scope of theory, practice and critique in relation to learning environments. The chapter authors engage with immersive and critical investigations into education practices, from the design and planning of schools' facilities through to evaluations of effectiveness of student-initiated curricula and the global export of education models as well as education delivery. They present primary research and theoretical considerations; they provide descriptive accounts and philosophical reflections to provide the reader with a broad sweep of the 'state of play' in thinking about the place and space of learning.

Three distinct divisions of content contribute to achieving the overall aims of the book. Each division has been referred to as a 'Transformation', emphasising the notion of significant change and development. The first and last of these divisions create 'bookends', with both being characterised by chapters whose authors reflect on various forms of qualitative fieldwork research, ranging from questionnaire surveys to observations and interviews. Participants are typically teachers and students, and, in some cases, architectural designers. A further level of interest in the 'bookends' is created by the geographical balance between them; Transformation One has a distinctly Australasian flavour, drawing on examples in New Zealand (although chapter two contrasts a New Zealand and Danish setting) and Australia. Chapters in Transformation Three draw their evidence from contexts across the northern hemisphere, their settings and authors ranging from Russia, Lithuania, through Germany and Iceland, to the USA, to name a few. The middle division sits between the two empirically inclined parts of the book, presenting several chapters that philosophers of education will particularly enjoy. These are written not from the perspective of direct, primary research in the field, yet, as their contents reveal, their authors have each had various forms of engagement with the central phenomenon questioned in this book, namely innovative places and spaces of learning, and the practices they embody.

Transforming Education commences these investigations in Transformation One: Education Through Design, with an overt emphasis on how design might influence behaviours and actions of those who occupy these spaces of learning. Etymologically, design comes from the Latin *designare*, meaning to designate or point out. In this sense design, most generally speaking, is that which brings an ordering-seeing to things such that things stand out and stand up as both surfaces and structures or signs and concepts. In this respect, transformations through design account for a panoply or manifold of composing strata that constitute institutional milieu. In education, curricula, facilities, teacher education, administrative procedures are all designed in ways that define well or badly the complexity of practices

that make such an institution site, or school, function. The initial chapter, "Modern Learning Environments: Embodiment of a Disjunctive Encounter", by Alistair Wells, Mark Jackson and Leon Benade, addresses how we might consider notions of innovation and flexibility of building fabric or architectural design from the viewpoint of post-structuralist approaches to architecture, developed by the Swiss architect, Bernard Tschumi, especially in the 1980s. Tschumi emphasised a disjunctive architecture that continually questions an implicit rationalism embedded in design thinking that assumes formal spatial arrangements and programmatic functioning have to dovetail into one another. We see emphasised in twenty-first-century curricula design and flexible learning spaces design, a disjunctive design approach that leaves open possibilities for experimentation in educational practices.

In what follows, "Spatialised Practices in ILEs: Pedagogical Transformations and Learner Agency", Jennifer Charteris, Dianne Smardon and Angela Page continue to engage a disjunctive encounter with educational design. Addressing the work of Massey (2005), they emphasise that spatiality is performatively produced in practices, rather than something designed as a container for practice. Equally, spatial practices constitute the multiple ways in which the social is constructed, though this *socius* is always under construction, and thus never finalised. They address these concerns though a study of responses by six school principals in New Zealand schools, to questions posed concerning government aims at mandating all new facilities design as flexible learning space. In particular, questions were posed that ask how principals perceive learner enhancement via the agency of newly invoked spatial practices.

The third chapter, concerning transformation and design, again approaches spatiality from the viewpoint of practice, this time in addressing the work of the French philosopher, Henri Lefebvre. In "Reimagining and Reshaping Spaces of Learning: Constituting Innovative and Creative Lifelong Learners", Leon Benade, Eva Bertelsen and Lyn Lewis undertake an empirical study across New Zealand and Danish educational facility design. The premise for the chapter lies in an invocation recognised globally that calls for citizens to be innovative lifelong learners. This impacts on education design in terms of supposed innovative curriculum design, now termed twenty-first-century learning, whose implementation is facilities-driven, in configurations that are termed innovative learning spaces. Lefebvre emphasises the close cyclical relations between mental constructs of space and space as lived experience. The chapter examines notions of designed futures from the point of view of case studies of a Danish university building, completed between 2002 and 2013, and a New Zealand university building refurbishment in 2016.

Ben Cleveland considers the evidence he gathered at three Australian schools from the perspective of complexity theory and complex adaptive systems theory. With its origin in natural science, these theories have been applied to organisations to find a middle ground between highly ordered organisations on one hand, and those characterised by chaos on the other. In the former, there is little opportunity for agentic action; in the latter, agents act freely. In complex adaptive systems, on

the other hand, agents and organisation 'co-evolve', with the former having to conform to some extent to the constraints imposed by the organisations, while at the same time modifying the system. Cleveland addresses this nonlinear theoretical approach to three Victorian schools in the context of persistent inertia in pedagogical approaches to middle years schooling, engaging with the premise that shifting this inertia requires non-traditional, or innovative, learning environments. His thorough study brings together both this premise and theoretical approach in an engaging manner.

The final chapter in this first part of the book, authored by colleagues based at the University of South Australia, Garth Stahl, Stephen Dobson and Stephen Redillas, reflects a similar premise to Cleveland's: that is to say, a notion that the particular design of a learning environment may have a salutary effect on pedagogical practices. In their case, they employ the Deweyian concern with ensuring the integration of theory–practice, which they apply to 'demonstration schools', fashioned on Dewey's laboratory schools. These demonstration schools, designed especially for use in teacher education on university campuses, provide the setting for melding theory and practice. Stahl, Dobson and Redillas, investigating examples of demonstration schools abroad, find some conflicting evidence, with these environments both encouraging reflective opportunities and democratic development, yet some being caught up in challenges to their viability.

The middle chapters, grouped as Transformation Two: The Governmentality of Education, are broadly concerned with a particular notion of governance that was developed by Michel Foucault in lectures he presented in the late 1970s, which aimed to problematise the notion of governmental power as that simply invested in the judicial regulating of a state. Foucault adopted the somewhat awkward term, 'governmentality' to develop understandings of how a state's governing jurisdictions themselves become an issue in how governmental agency operates. In shorthand, Foucault summarises the concerns of governmentality as being those of the conduct of conduct, or how a heterogeneous relation of forces produces the institutional forms by which our normative practices operate. Hence, with respect to the innovations in education facilities, state agencies are simply one of a number of competing forces in the determination of practices. This series of chapters alerts us to a complex of transformative concerns in the development, understanding and governance of innovating learning environments.

The section commences with Adam Wood's "Selling New Learning Spaces— Flexibly Anything for the 21st Century". Commencing with a questioning of the notion of flexibility, Wood suggests that architectural vocabularies, both language-based and built, are currently driven by notions of the flexible. The question to ask is what does such flexibility offer education, or how does such an ontology of space attribute flexibility to space rather than to processes and people? The chapter offers a critique of those who claim that architecture per se, or spatial arrangements determine behaviours, and therefore that flexibility in spatial design leads to flexibility for educational programming. The chapter concludes in addressing an ethical question of coercive spatial practices necessitating

behavioural change and the overall efficacy of such practices in educational transformation driven by facilities design.

Andrew Thompson's "MLE as Non-place" continues a depth discussion on the efficacy and ethics of flexible facilities or environments though takes up this issue in ways dissimilar to those developed by Wood. Referencing the work of Ian Hunter (1994), Thompson initially traces a genealogy of the emergency of modern (or flexible) learning environments, especially in reference to the super-national agency of the OECD as global normalising agent. As with Wood, some simple assumptions on a progressivist argument that MLEs are superior to 'industrial-style' educational facilities are questioned, especially in the context of the political economic imperatives of the OECD itself. Making reference to the now seminal book by Marc Augé, *Non-place: an introduction to supermodernity* (2008), Thompson argues that the educational facility, at its elemental, the classroom, is now configuring in terms of Augé's non-place, as a locale for globalised pedagogy.

The third chapter within concerns of the governmentality of educational transformation moves from the global perspective of Thompson's reference to supermodernity, to the decidedly local concerns of the New Zealand Ministry of Education. Again, stressing that questions of governmentality complicate and question the simple understanding of governance that sets out from a state's juridical structures, Daniel Couch points to a shift in education thinking in New Zealand, coincident with a governmental turn to instrumentalism. Couch's "From Progressivism to Instrumentalism: Innovative Learning Environments According to New Zealand's Ministry of Education" engages especially the work of Henri Lefebvre (1991) to trace the projected 'imaginary' of educational process so formed in the web-based literature of the Ministry. Written in two sections, the chapter initially analyses the Ministry's website for the representations it provides of innovative learning spaces and progressive approaches to curriculum design and delivery. The website constructs a 'mental space' of flexible learning. A second section of this chapter digs deeper into this progressive discourse of innovating learning to disclose an instrumentalism at the heart of the Ministry's agenda, what Couch terms a 'schizoid pedagogue'.

Sean Sturm's "An Art of Orientation: The Possibilities of Learning Spaces" suggests in its Abstract a focus on university education facilities, though in fact the depth discussion that unfolds is far from restrictive to tertiary frameworks. The genuine focus is on how learning management is conceived, how notions of freedom and control are established and constitute what could be termed, the conduct of conduct, the management of probable or the management of possible agencies. Where Thompson suggests the classroom has become a non-place, Sturm playfully offers a series of ways in which a classroom might be thought of as differing from itself: a string puzzle, a network or cat's cradle, a harp with teachers as players, or a labyrinth. This opens discussion to a series of ways in which learning spaces are considered, within two modalities, those of defining spaces of probable outcomes, deterministic to more or lesser degrees, and those defining spaces as possibilities that are open and non-deterministic. Sturm offers five such spaces: disciplinary space and creative space, both of which aim to determine outcomes; and cybernetic

space, critical space and playful space, each of which offers the notion of possible outcomes. Addressing the work of Gilles Deleuze, Sturm concludes on the genuine efficacy and ethics of what he defines as playful space.

The concluding chapter in the section addresses the notion of resistance in educational governance. The chapter is co-authored by contributors across a range of disciplinary fields, from education to design to fine arts and architecture: Stuart Deerness, Andrew Gibbons, Mary-Jo Gilligan, Gregory Breen, Andrew Denton and Richard Heraud. Their chapter, "Questions Concerning Innovative Learning Environments: Intersections in Disciplined Resistance" offers a far-reaching discussion or critique on a range of discourses that have addressed innovative learning environments. Their collaboration is one of 'dissensus' or difference, aiming to present differentiations to rather than convergences around approaches to or understandings of learning facilities. The work of Jacques Rancière is important in this regard. This chapter exemplifies the complexity that develops when critical analyses shift from concerns with governance or singular sites of power, to notions whereby power is dispersed, operating at all points and is made visible via resistances, that is from the governance of education to the governmentality of education.

Transformation Three: Global Perspectives on Education provides a distinctly northern hemispheric perspective on spaces of learning, and the chapters gathered under this heading have each been based on various forms of field data. Finding the Lefebvrean notions of representations of space, representational space and spatial practice (1991) too limiting to explain the findings of her research in Lithuanian schools, Lilija Duobliene turns to Deleuze and Guattari to explore the notion of space as a non-place. In this regard, her work finds an echo in the chapter authored by Andrew Thompson. The 'non-space' is a space but not necessarily a place; it may have no history, and it has the effect of de-identifying its users and occupants. Duobliene's interpretation leads to a less pessimistic conclusion than Thompson's, seeing the non-place as a place of transition, in which students make of space on their own terms, ranging nomadically across it, both physically and digitally. Even where/when schools are formatted, as Duobliene has it, in terms of traditional modalities, rigidly controlled by administrators, students penetrate the interstices that exist in the underground of these school spaces. Digital space provides a communal meeting space requiring no place. In short, students are able, by their movements across space, to break down some of the barriers imposed by the places determined by teachers and administrators.

It is the imposition of traditional configurations in schools that students know best, according to the findings of research in Iceland by Anna Kristín Sigurðardóttir. Yet it is flexible space that allows greater personalisation that students prefer. From a pedagogical perspective, Sigurðardóttir suggests that flexible spatial arrangements are consistent with, and supportive of, student-centred learning. Advancing her argument for these approaches, Sigurðardóttir seeks to link high dropout rates to student disaffection that may be triggered by traditional approaches to education. While this conclusion may be well-rehearsed in educational research, less well known is the role flexible spaces for learning can play in averting student

dissatisfaction with schooling. To deepen knowledge in this respect, Sigurðardóttir suggests education researchers may do well to ask the very users of learning space what they think constitutes 'good' spaces for learning. What they are likely to discover is a serious mismatch between what schools traditionally provide and what students would prefer.

The tension between the space and place of learning, signalled by Duobliene, and the challenge of engaging high school students recorded by Sigurðardóttir are further highlighted by Irina Kuznetcova and Michael Glassman. Whereas the participants in Duobliene's research were identified as seeking non-traditional spaces, Kuznetcova and Glassman report on American research in which alternative virtual space was created on behalf of students. Arguing from the perspective of Ivan Illich's notion of 'convivial tools' (1973), the authors suggest virtual space as one more engaging to students than the traditional, confining four-walled classroom. The authors suggest that developing convivial, Internet-based tools, such as 'virtual life' platforms, and providing students the access across permeable boundaries between 'real life' and 'virtual life', will encourage students to develop the skills of collaboration and democratic decision-making. The advantage of virtual worlds is that they are amenable to personalised formatting by the user and do not direct the user according to a predetermined narrative. The authors thus caution against the imposition by teachers of the traditional classroom set within a virtual world. Conversely, setting students free in a virtual world may lead to one in which teachers have lost control entirely!

Continuing with the theme of alternative digital spaces, and the slippage in teacher control and surveillance, Diana Koroleva and Ashley Simpson consider the role of social networking and its capacity to allow students to slip the gaze of their teachers. Drawing on Foucault's use of the Panopticon (1977), Koroleva and Simpson remind their readers of the general relation between traditional schooling and Foucault's application of the Panopticon, noting, however, that the Internet and digital tools were not the pervasive reality in Foucault's time that they are now. Yet the desire for surveillance by teachers may now simply be transferred to social media. In a study across a range of European states and the USA, the authors sought to understand teachers' attitude to and use of social media in their own teaching. The result, believe the authors, is to identify that there is a coup d'etat in the panopticon, with teachers rapidly losing their traditional stature. Students, meanwhile, are able to develop new identities, away from the gaze of their teachers. Optimistically, the authors see the potential for teachers to harness the revolutionaries.

Finally, the book is ended with a look at the place of play and its role in contributing to the space of learning. Ulrike Stadler-Altmann and Peter Hilger consider schoolyards from the perspectives of students and teachers canvassed in a German study. They echo the idea noted by Wells, Jackson and Benade in the opening chapter, of involving those who occupy spaces of learning in their design. Stadler-Altmann and Hilger suggest that to ignore those views is to overlook the potential of schoolyard spaces to support teaching and learning, and much more besides, such as obvious health benefits. They point out, however, that the

traditional schoolyard is a site of control and surveillance. They caution too that a hidden curriculum may not be far behind the pedagogical benefits of schoolyards. Still, the participation of students and teachers in developing schoolyard design has the obvious benefit of developing collaboration and democratic decision-making, an idea promoted by Kuznetcova and Glassman in their chapter on virtual worlds. Schoolyard design, like that of classrooms and digital platforms suggested in many preceding chapters in this book, captures the notion that the editors sought in the title, *Transforming Education*. We commend the chapters to our readers and trust their contents, ideas and arguments stimulate further debate and discussion regarding the design of learning spaces.

Leon Benade
Mark Jackson

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Part I
Transformation 1: Education Through Design

Modern Learning Environments: Embodiment of a Disjunctive Encounter

Alastair Wells, Mark Jackson and Leon Benade

School buildings have been and continue to be places to warehouse children. New schools just do it in more comfortable settings.

Nair 2002

Abstract Given the freedom to explore environmental technologies for education, a number of designers have been instrumental in transforming school design. They have overtly challenged the theoretical routes of previous educational practice, with spatial configurations correlating with a futuristic imaginary that values realistic, purposeful learning aimed at preparing students for a rapidly changing world. Designer enthusiasm for facilities to enable transformative pedagogic practice and the implementation of a democratic curriculum is somewhat tempered, however. They find themselves wedged between a powerful property bureaucracy, under-prepared communities, and, in the case of new, establishment schools, the limited involvement of the very people who will occupy and use the spaces they are designing. This chapter adds to the discourse about the modern learning environment as an agency of teaching and learning and discusses interpretively the lived experiences of two leading architects commissioned to design two schools at the centre of this study.

Introduction

Since around 2009, the design of New Zealand schools has changed significantly. The Ministry of Education termed these schools 'Modern Learning Environments (MLE),' though since at least 2016, has preferred the term 'Innovative Learning Environments (ILE).' These school design changes are partly in response to international shifts in thinking about education and learning, the flavour of which is

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echoed by The New Zealand Curriculum (Ministry of Education 2007). The Ministry of Education now encourages designers to look beyond the cellular classroom configuration developed for the industrial era, to create more dynamic, future-focused learning environments.

The introduction of flexible learning spaces contradicts previous concepts of school design, their implementation marking a shift in New Zealand school architecture towards what Tschumi (1996) termed 'unprogrammed' space. By 'unprogrammed', Tschumi refers to designed spaces that do not dictate behaviour or movement, or place limitations on possible events that could occur in those spaces. The opening and interconnection of learning environments disrupts conventional classroom and school architecture, such as has been the norm in the New Zealand education system, and elsewhere. These changes bring about a disjunction of conventions, thus dislocating conventional practice for teachers, students and social communities enculturated in didactic education. These disjunctions create tensions.

In this chapter, we contribute to a critical discourse that takes up the questions raised by the Swiss architectural theorist and practitioner, Tschumi (1996), regarding the relationship between spaces and events. His questioning considers whether spaces and events correspond to, or support one another (such as traditional classrooms supporting didactic teaching); whether they conflict with one another; or whether they simply ignore one another (1996). Tschumi did critical work in referencing the characteristics of a dislocative or disjunctive architecture that, on the one hand, radically challenges essential modernist precepts about space and function and, on the other hand, offers a post-structuralist understanding of spatial practices. We are not suggesting that designers of flexible learning environments are proponents of or adherents to Tschumi's work. Rather, it is the case that Tschumi offers far-reaching explanatory understanding of the implications of working between a post-structuralism in disjunctive curriculum reform and correlative post-structuralist approaches to spatialising educational practices. Tschumi notes:

> Architecture and event constantly transgress each other's rules, whether explicitly or implicitly. These rules, these organised compositions, may be questioned, but they always remain points of reference. A building is a point of reference for the activities set to negate it. A theory of architecture is a theory of order threatened by the very uses it permits. (1996, p. 132)

Tschumi emphasises a break during the late twentieth century from an architectural programme in the broadest sense that determined form-giving as functional and symbolic unity, defined by an inherent rationalism that produced the essential relation between spatiality and use. We easily recognise key building typologies of school design through much of the twentieth century in terms of the functioning of cellular classroom design, repetition of formal organisation from macro- to microscales of occupancy, along with individuated and hierarchical divisions with respect to those who teach and those who learn. Good order constituted well-defined boundaries, limits and control. Order was inscribed in spatial configurations that correlated with curricula understood as siloed disciplines and

student segmentation as that based on age, gender and, at times, ethnicity. Against this Tschumi, writing in the 1990s, suggests:

> In its disruptions and disjunctions, its characteristic fragmentation and dissociation, today's cultural circumstances suggest the need to discard established categories of meaning and contextual histories. It might be worthwhile, therefore, to abandon any notion of a postmodern architecture in favour of a 'posthumanist' architecture, one that would stress not only the dispersion of the subject and the force of social regulation, but also the effect of such decentring on the entire notion of unified, coherent architectural form. (1996, p. 208)

Tschumi's pronouncements are far-reaching and need to be engaged in the contexts of his collaborations with the French philosopher, Jacques Derrida, whose philosophy of deconstruction is very much a basis for Tschumi's essential considerations. It was Derrida who coined the term 'post-structuralism' in a paper presented at a conference at the Johns Hopkins University in 1971 in deconstructing the humanism of Claude Levi-Strauss's structural anthropology (Derrida 1972). In a more general sense, the target for Derrida's deconstruction was the architectonics of the Western metaphysical tradition. Deconstruction neither builds nor unbuilds that tradition. It is undecidably both interior and exterior. Derridean philosophy is thus disjunctive and disruptive to the logic of Western metaphysics. Tschumi's analyses of spatiality and event deconstruct the key modernist notions of form—the built spatial arrangements rationally determined—and function—the range of uses or utility afforded by built structures. Modernism's edict was that formal arrangements were themselves governed by functional requirements. In systematically translating functional requirements to spatial configurations, rational design emerges. This supposes that functions are well defined, repetitive and relatively uniform over time.

In this respect, we can define the small number of building typologies determined by the New Zealand Ministry of Education in twentieth century post-war expansion of building stock for education. The building of Naenae College in 1953 established an initial building type (McLintock 1966). Uniform building typologies are useful in simplifying ongoing design considerations, defining uniformity and repetition of spatial configurations, defining structural and materials configurations and so on. The Naenae type was followed by the Henderson type, a single-storey all-timber version of the Naenae type. From 1957, secondary schools were developed using block-classroom configurations. In 1960, the Nelson plan was established and replicated for the next decade. After 1968, the Nelson plan was displaced by the S68 plan—named after a 1968 prototype at Porirua. In 1980, two new plan types were developed, the Whānau plan and the Macleans plan (McLintock 1966). Tschumi (1996) suggests that defined building typologies determine a rational adhering of function and form, space and use, all the while they are actually at odds with one another, disjunctive rather than unified. Tschumi's aim is to begin to consider design from the point of view of disjunction as such. In this, the notion of any building type that would be replicable at the level of formal unity or rational function would no longer be possible. Rather, design must accommodate the disjunctive nature of occupancy and use, affording increasingly flexible kinds of spatial configurations that essentially provide for what is not predictable in terms of

prescriptions or planning. And in these terms we recognise the Ministry of Education in New Zealand, with its twenty-first century approach, abandoning the fundamental notion of school design premised on already-defined building types. That is not to say, however, that the architects responsible for these designs are immured from building typologies altogether. As we will see, these typologies no longer derive from the institutional frameworks of schooling, but rather from twenty-first century typologies for flexible working environments, spatialising office, leisure, domestic and service processes geared to increasing *redefinition* of leisure, domesticity and labour.

The Study

This chapter draws on data gathered in the course of a larger research study that has critically examined the narratives of selected architectural designers, school leaders, teachers and students concerning their lived experiences of bringing into existence two new secondary schools that were built between 2008 and 2012. For the purposes of this chapter, only the voices of the designers will be considered. As the study adopted a hermeneutic approach, that is, a methodology of interpretation (Mantzavinos 2016), it is concerned with the nature of human interpretation and understanding, and lived experience—a feature of the evidence selected and discussed in this chapter. Hermeneutics allows participants to interpret what is perceived and to make sense of their perceptions (Ramberg and Gjesdal 2009). It treats interpretation and understanding as contextualised and concentrates on historical meanings of experience and their developmental and cumulative effects on individual and social levels, (Barclay 1992; Polkinghorne 1983). Researchers too are regarded as having a history, which is likely to influence their interpretations. Similarly, texts are historically located (and, arguably, buildings are texts), and for Kinsella (2006), texts must be understood from a contextualised perspective, thus concluding that interpretations (of findings) are partial. Language is central to a hermeneutic understanding, but so too is listening. As Gadamer noted, in his interview with Carsten Dutt: "We do not need just to hear one another but to *listen to* one another. Only when this happens is there understanding" (Gadamer et al. 2001, p. 39. Emphasis in the original). Following Gadamer, conversation may be regarded as an essential tool for the researcher, whose task it is to listen and 'translate' the voice of participants. This translation, he would have suggested, is characterised, however, by ambiguity, rather than certainty (Kinsella 2006).

The study considered two exemplar New Zealand secondary schools (fictitiously termed, 'Brennan Heights College' and 'Peek Road High School'[1]), both recently constructed in keeping with the principles of flexible, technology-rich and ergonomically furnished open plan design. The study was designed to assess the

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[1] 'BHC' and 'PRHS' henceforth.

schools as exemplars of the idea of 'the Modern Learning Environment as an agent of teaching and learning.' Data were gathered from three sets of participants: the architects who, respectively, designed the schools; the school leaders and a selection of teachers; and a selection of students. Standard qualitative data gathering methods were used, specifically semi-structured interviews of the architects and school personnel; and focus groups of students at each of the two schools. The interviews and focus groups were digitally recorded and transcribed. These transcriptions were analysed for thematic trends, and these sub-coded. The design was approved by the relevant university ethics committee. As noted above, for the purposes of this chapter, only data relating to the designers is referred to, and reflected upon.

Disstructuring Education

Internationally, pressure for reformist change in education is influenced by the development of a global knowledge economy, supported by powerful digital technologies and devices. Widening access to a vast and dynamic Internet has changed the way people live, work, socialise and interact. The influence of the development of digital technology on education is paralleled by, and is no less important than, the increasing emphasis on 'learning' and 'the learner,' intended to de-emphasise the role of content (Beetham and Sharpe 2013). The design of cutting-edge educational facilities and spaces signals an overt intent to address these influences on education, and to recognise the 'knowledge economy' of the twenty-first century as distinct from the industrial, manufacturing economy of the twentieth century. The implementation of new learning environments in other countries to disrupt previously held notions of teaching and learning, has given rise to a growing body of international research literature supporting benefits of new learning environments (examples include Bergsagel et al. 2007; Fisher 2005; Lackney 2002; Nair and Fielding 2005; Semper 2004; Walker et al. 2011; Wolff 2002; Woolner et al. 2012).

The development of a discourse of 'twenty-first-century learning' (see an extended discussion in Benade 2017, and below) is reflected by The New Zealand Curriculum (Ministry of Education 2007) in the 'front end' of the document, with its inclination to a dispositional curriculum, and by the radical opening-up of options for schools and teachers to interpret the intent of The New Zealand Curriculum so that each school has a unique version:

> The New Zealand Curriculum sets the direction for teaching and learning in English-medium New Zealand schools. But *it is a framework rather than a detailed plan*. This means that while every school curriculum must be clearly aligned with the intent of this document, schools have considerable flexibility when determining the detail. In doing this, they can draw on a wide range of ideas, resources, and models. (p. 37. Emphasis added)

This direction adopted by the New Zealand Ministry of Education is consistent with the emergence of literature challenging previously held philosophical notions of education and learning: first, shifting from an industrial economy to the knowledge economy (Brinkley 2008; Bull and Gilbert 2012; Burns 1995; OECD 2006; Wagner 2008); second, renewed questioning of the relevance of current education provision and practices (Bereiter 1992; Dwight and Garrison 2003; Giroux 1988; Sanoff 2001; Schletchy 2001; Senge 1992; Wagner 2008; Washor 2003; Woolner et al. 2012); and third, changes in learning theory and pedagogy in response to the digital revolution and demands of the knowledge economy (Beetham and Sharpe 2013; Benade 2014; Bull and Gilbert 2012; Coppen 2002).

Confronting long-held curriculum traditions so new courses can be charted in the inchoate and evolving global digital culture, requires challenging the structuralist theories that have dominated Western curriculum design since the 'Tyler Rationale' (Tyler 1949).[2] Structuralism (including structuralist theories of curriculum instructional design) receives, according to Dwight and Garrison (2003), its strongest support from a hidden source, namely the tradition of Western metaphysics. Their critique of current dominant models of curriculum rests on challenging theories of curriculum design based on linear notions of a fixed *telos,* manifested by the emphasis on fixed ends of learning. Taking the potential for a nonlinear textual reading experience implied by hypertext as a metaphor of student self-direction, they argue that structuralist Western metaphysics must be challenged. Failure to do so will lead to a situation in which the "structuralist concepts…[of]… traditional curriculum theory [will] squeeze the life out of the possibilities encapsulated in hypertext [and] digital contexts" (p. 2). Eisner (2004) concurs, arguing that even though it is good to have educational intentions, the push towards uniformity of aims, content, assessment and expectation, are of concern.

Dwight and Garrison's (2003) argument for exploiting the potential of hypertext builds upon post-structuralist theories that eschew linear, rationalistic notions of 'essences,' and in the context of curriculum design and pedagogy, embraces the possibilities of emergent learning. They thus reject classical Platonic metaphysics that have influenced traditional theories of curriculum and pedagogy, with its structuralist assumptions about objectives, standards, and the ultimate aims of didactic education. Their argument for hypertext is a valuable metaphor for progressing post-structuralist curriculum design and pedagogy to support a new generation of learners who are exposed to increasing amounts of digital information for knowledge acquisition.

Breathing life into the vision of *The New Zealand Curriculum*, "to develop young people who will be confident, connected, actively involved, lifelong learners" (Ministry of Education 2007, p. 9) requires teachers and educators to reorient their perspectives of learning, their theorisation of education and their practice in

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[2]Tyler asks these four questions: What educational purposes should the school seek to attain? What educational experiences will attain these purposes? How can these experiences be effectively organised? How do we assess that these purposes have been attained?

the classroom. This impetus is complemented by the existence of 'Net Gen,' referred to by Wagner (2008, p. 176) as "prolific communicators, who gravitate toward activities that promote and reinforce social interaction…" Members of this generation enjoy easy access to information and expertise, browsing for valuable 'just in time' knowledge to progress their thinking, socialisation or immediate problem solving and knowledge needs (Stone 2006). Traditional notions of learning are perturbed, not only by these new possibilities, but also by their contribution to what Stone (2006) termed, 'continuous partial attention.'

Excitement in relation to the possibilities of the Internet and digital tools and the danger of traditional teachers being unable to keep pace must be balanced by more-considered assessments of this emergent scenario that do not wholeheartedly endorse notions such as the existence of a generational digital divide. It is important to avoid a 'certainty-complacency spiral' (Bennett and Maton 2010), whereby the glib use of terms such as 'Net Gen' is passed off as fact, and rather, critical questions must be asked of the supposedly yawning gap between expert young users and an older generation for whom technology is alien (Bennett and Maton 2010; Helsper and Eynon 2010).

Nevertheless, despite such critiques, what cannot be ignored is the reorientation in educational thinking that has challenged traditional, didactic education for its implied assumption of a separation between knowing and doing, where knowledge is treated as an integral, self-sufficient substance, theoretically independent of the situations in which it is learned and used (Brown et al. 1989). This assumption is in conflict with the social knowledge that emerges from students' interaction with the Internet, which they use as a tool to reach out (Wagner 2008). Given this situation, schools and teachers are challenged to shift from their traditional role, perceived as the transfer of abstract, decontextualised formal concepts (Brown et al. 1989).

What Brown et al. (1989) were opposing, well in advance of the widespread development and availability of the Internet and digital tools, was the direct instruction associated with a behaviourist model of teaching and learning in favour of knowledge developing by exposure to previous experiences. They emphasised too the importance of understanding learners' physiological well-being, and the significance of visual stimulation. Learners, more recent commentary has suggested, are no longer dependent on the teacher being the font of all knowledge and in fact are more informed in some concepts, than teachers (Beetham and Sharpe 2013; Carmean and Haefner 2002; Coppen 2002; Bull and Gilbert 2012; Schletchy 2001; Wagner 2008). Scardamalia and Bereiter (2006) argued that we should shift from treating students as learners and inquirers to treating them as members of a knowledge building community. Bull and Gilbert (2012) argued: "New approaches are needed if our young people are to develop the 'dispositions' (to knowledge, thinking, learning and work) needed to productively engage in the twenty-first century world" (p. 1).

From the perspective of Brown et al. (1989), (and, indeed, some of the writers just cited), such shifts in thinking align teachers to the role of learning mentor, advisor and facilitator, somewhat more in keeping with a co-constructivist educational theory relevant for a new generation of learners. Furthermore, given the

openness to diversity, differences, and sharing of young Internet users detected by
Wagner (2008), developing digital fluency becomes a further context to disrupt
hierarchies of authority, power, and control in teaching and learning. Potentially
then, this changing scenario in education also raises questions about the kind of
environment in which this liberated form of learning can be enacted. And, indeed,
the kind of environment it seeks to emulate.

The cue (or clue) to this environment may be detected in the following result of a
random online search for 'flexible work environments.' We reference a 'keynote' at
a 2016 real estate conference in Portland, Oregon, by one Vince Ciampi. Under a
heading 'The move to open space and the postmodern workplace' Ciampi notes:

> Once again, blame it on the Millenials! Data currently shows that Millineals have surpassed
> Gen Xers in the United States workforce and as Millenial numbers in the workforce
> continue to rise, modifying the workplace to compliment (sic) the behaviours of the gen-
> eration is important. Generally, Millenials tend to prefer a less structured environment. The
> ability to work from home, flexible work hours and a creative office space are all important
> to the largest group of the workforce. A postmodern workplace philosophy originates with
> a less structured environment and a relaxed office culture…In relation to office space,
> established ideologies can best be described as, private offices, the higher up the hierarchy
> the bigger the office…Postmodernism simplifies and challenges established ideologies…
> larger walking paths, open collaborative meeting spaces and game rooms…Cubicles and
> assigned private offices are norms of the past and there is no room for outdated ideologies in
> the postmodern workplace. (Ciampi 2016)

While Tschumi is perhaps more philosophically demanding and draws an
important distinction between a humanist postmodernism and a posthumanist
post-structuralism, one recognises at once in the above real estate discourse the
imperative to disjunction with respect to definitions of functional boundary, and a
decided twenty-first century discourse that does establish a new design typology,
one pioneered in the late twentieth century in shopping mall design and in airport
design. Indeed, airports are now radically hybridised shopping malls with
increasingly diminished spaces given over to their supposed function: the regi-
mentation of waiting-to-board passengers. So, also, the drivers for *post-Millenial*
educational spacings—those entering the workforce in the next ten years—are
precisely the contemporary destinations for Millenials to work and live. The
enacted curriculum practices to complement flexible spaces correspondingly strive
for emergent knowledge, dispositional virtues and facilitation of social knowledge.

Disjunctive Encounters: Lived Experience
of the Architect Participants

Architects working with the New Zealand Ministry of Education have been given
the opportunity to innovate with new technologies and to challenge the fundamental
foundations of education by redesigning educational environments. Evidence in this
study demonstrates that the participant architects were able to reject previous

common structural themes and to explore alternative spatial configurations and forms for future educational purpose. The basic brief provided to the architect of BHC was reported as follows:

> The brief of school X was 1300 kids, 13,000 metres and build it in a couple of years…It was about 2 paragraphs. [To have such limited criteria was]…fabulous really, you know because otherwise they will give you a prescriptive brief and you just got to design something that has already been thought out by some addled bureaucrat.

In similar vein, the architect of PRHS reported that "you get no brief," though later suggested, his firm was provided "a very pragmatic functional kind of brief." By this he meant, "you will build one of these spaces and one of those spaces and… have this many meeting rooms." Beyond this, however, he was free to "go along with the design…[he had]…organised."

Such a wide, and relatively undefined brief, allowed these architects to challenge existing educational architectural notions that structuralism posits and to interrogate its binary oppositions, thus engaging in the discourse of disjunctive spatiality, as proposed by Tschumi (1996). Tschumi re-examined architecture's responsibility in reinforcing unquestioned cultural narratives and exposed the conventionally defined connections between architectural sequences and spaces, programmes, and movement which produce and reiterate these sequences. He adopted, in place of the modernist notions of form and function, two more expansive notions that insist on a fundamental consideration of architecture as event, which is to say, as temporally encountered. In place of the notion of 'form,' Tschumi adopted the notion of *spatial sequencing*, emphasising movement, threshold conditions and relations. In place of 'function' Tschumi adopted the notion of *programmatic sequencing*, where programme suggests an inherent flexibility as to event, duration, occupancy or utility (1996, pp. 153–168). He further emphasises three possible relations between spatiality and programme.

In one relation, there is a one-to-one correspondence such that the spatial sequencing is uniquely defined for a very determined programme. His example is an aircraft cockpit. It is designed such that all one can really do there is fly a plane. A second relation is the obverse, where a spatiality is entirely open and non-determining, affording many possible and different programmes. Hence, an office block with regular column grids and floor plates could equally be fitted out as a hospital, a school, a prison or an apartment block. There is a third relation, the one Tschumi most preferred, where the relation between spatiality and programme is neither closed and fixed nor entirely open and variable, yet where it is disjunctive and dislocating, where programme and space challenge one another such that new experiments in habitation and occupancy may happen, where unforeseen events emerge.

It is this third, disjunctive encounter that can be seen in what each of the architects pose as their basic concept driver, or design proposition, for each school. Each architect gave special emphasis to the notion of a school being a village or community grouping:

…it is like a village of learning—any school. And you can get a disconnected village or a connected village (Architect, BHC);

One of the big challenges in large schools is a sense of community. So most large schools in New Zealand are very dispersed so there are buildings dashed all over the place…[but] what if a school is a bit more like a village or a town? What would that be like?…How do you have a school where the space is big enough in the school to maybe to have the community in the school? (Architect, PRHS)

A village has defined circulation routes, a village commons and defined 'private' or smaller-community spacings. Each architect approached the whole school community in terms of segmentations of between 130 and 150 students, constituting differential groupings that are able to disperse and come together. Each designer resolved that notion of a village, its commons and circulation differently, and in doing so opened the spatiality to potentials for disjunctive encounters, new and unforeseen uses. In this, we recognise a hybridising of building typologies, from contemporary flexible, open plan office design to urban-scale planning of communities. Former education building typologies clearly emphasised a continuum between the specialised facilitating of closed spatial and programmatic sequencing and open spatial structures that facilitate a good fit for cellular classroom design. Flexible learning spaces cannot be thought at all along this continuum. Their break is with an aim at the unity of spatiality and programme as such. In this disjunctive break, they open the question of space to that of freedom.

One of the architects, working in this way with designs intended to disrupt 'business as usual,' raised concerns however, in connection to the gap between reflection on education and pedagogy and new building designs:

Well there is nobody doing this research. You know the Ministry didn't do it…they are very dedicated to obviously running schools but nobody seems to…looking into teaching practice very much. There are a few…like Hattie and those guys who were doing sort of outstanding work but it seemed to me as an architect the question always remained, what does that mean in terms of how you teach and the environment in which you teach? (Architect, PRHS)

An interesting finding in the study of the design development of both schools was the reported collaborative planning process that involved architects, the establishment boards of the new schools, and an advisory group. These teams nevertheless lacked key stakeholders, such as leadership members, teachers, and students who would inhabit the environment.[3] Taylor (2002) argues, however, that all stakeholders, from students to community, must be involved in the programming and design of learning environments.

Taylor's work reveals basic patterns for reform in school curriculum and facilities design that revolve around the democratic design process where the whole community has input, and through this input the community develops literacy for

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[3]As new schools, one of the tasks of the establishment board would be to appoint a principal, who then, with the board, would appoint the remaining staff. Student enrolment follows much later. The planning of the school building, however, is well underway by the time a principal is appointed.

intelligent participation, appreciating the complexity and benefits for restructuring schools' facilities that cultivate young people as powerful learners. Yet, the reality of new school design in New Zealand is anything but democratic. The designer of Brennan Heights College found in his meetings with the Ministry of Education, for example, that the planning process is led by its property division, not "some curriculum gurus," as he expected. This seems to reinforce the limited educational knowledge of local communities in New Zealand. He referenced meetings with Christchurch schools as an example:

> …we go to these schools to talk about their project and they haven't got a clue. No one has been to speak to them and so suddenly it is up to us, so we are teaching them about MLE… we're obviously not bad at what we are doing in terms of that [educational] message, but I said [to the Ministry people] it is not our job. (Architect, BHC)

The lack of preparation of establishment boards by the Ministry of Education, and the lack of readiness of those boards to engage in the process of planning a new school, made for frustrating experiences for both designers:

> We would like to turn up with a brief and then we will respond to the brief and draw a building. But at the moment we are having to go back to first principles where we have a got a board of trustees, ladies [on the one hand] sitting there going "over my dead body"… and [on the other hand] we got an excited young mum on the Board who says, "I used to be a teacher, this is fantastic" and you just think you have this room of different thinking and then our job is to try and pull that all together…(Architect, BHC)

> [There are] very conservative elements on the Board and those elements [who are] more forward looking…I feel the personal responsibility to do a good job and not to do the same old…[yet] there will be a…powerful Board Member [who] will kind of push the direction of the whole thing. (Architect, PRHS)

Seemingly, in the context of these new, establishment schools, broad consulatation is absent, community views divided and limited by inadequate knowledge and understanding, and bureaucratic decision-making is driven by property priorities rather than curricular and pedagogic ones. Going up against these factors is design thinking that seeks to challenge entrenched cultural narratives. As Lackney (2007) claims, once the learning environment is designed (without the input of principal, teachers and students), many of those who come to occupy the building may be unaware of the myriad ways the facility is designed to support or extend teaching and learning.

Nair and Fielding (2005, p. 2) noted, "from our own experience and from the research, we have begun to understand that one of the biggest roadblocks to innovation is the lack of a common vocabulary that all school stakeholders can share." A major concern raised by the evidence gained in this study is that *if* architectural designers are designing schools without input from key stakeholders (including national curriculum advocates, leaders, teachers and students/community members), then theoretically they are also designing the curriculum by having an influence on pedagogy and learning integration. Is this a disruptive innovation that provocatively challenges structuralist models of learning theory and pedagogy

(without theoretical foundations) or a concrete spatialisation of idealised curricula imposed on the potential educational inhabitants? Will it make a difference to encultured practices?

Even though educators agree that the school facility is important in the educational process and supports their ability to help them function as professionals, the degree to which educators are able to use their learning environment for educational purpose varies considerably (Lackney 2007; Sanoff 2001; Taylor 2002). To assume that all occupants of a modern learning environment will have the necessary knowledge to use the school facility as optimally as possible for teaching and learning, is, in our view, mistaken. In essence, commissioning new educational environments (especially those divergent to any previous design models for secondary schools) presents a unique model for research, action and training that encompasses and parallels the entire building delivery process as a means of embedding curriculum development, as well as, providing a framework for training teachers to use the school building as a Modern Learning Environment.

Conclusion

From our several perspectives as educators with backgrounds in design, architecture, secondary education and critical educational ideas, we have considered the lived experiences of two leading, award-winning, New Zealand architects who have, respectively, designed many of New Zealand's latest educational facilities. In keeping with a hermeneutic tradition of interpretation, we have moved between published research and philosophic ideas and the recorded experiences of the participants. Their interpretations of their own experiences have been considered in the light of established literature, and we have sought to weave a narrative. While partial and tentative, our conclusions suggest that the current development of new educational buildings in New Zealand (and elsewhere) would benefit greatly by deeper community and educational engagement, with less emphasis on seeking bureaucratic solutions. The evidence of this research study indicates that architects (such as the participants in this study) are creating a situation that presents a disjuncture with traditional models of schooling and education. Given the freedom to defamiliarise traditional institutions of education, these designers have created a concrete spatialisation of non-traditional curricular and pedagogic practices. They have disrupted theories entrenched in structuralist Western philosophy, and in so doing, significantly challenge leaders, teachers and students to approach learning differently. In so doing, however, what is becoming clear is an emergent division between architectural design and the expectations of educational professionals and the communities they serve. These interstices present both significant challenges and creative possibilities.

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Spatialised Practices in ILEs: Pedagogical Transformations and Learner Agency

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Abstract Across Organisation for Economic Cooperation and Development countries, there is a systematic research and policy impetus for continuous schooling engagement with digital technologies, improvement agendas and the commensurate redesign of educational spaces (OECD in Innovative learning environments, Educational Research and Innovation. OECD Publishing, Paris, 2013). The current epoch marks a transformation between what has been termed the industrial society and the knowledge age. In this article, we consider implications of the shifting currents in globalised societies for school practitioners and how moves to Innovative Learning Environments (ILEs) (also called new generation learning environments (Imms et al. in Evaluating learning environments. Sense Publishers, Rotterdam, pp. 3–20, 2016) may require close attention if the potential of spatialised practice is to be realised. Innovative learning environments are new generation schooling contexts where space and objects influence and produce spatialised practice. Spatialised practice, in this context, is indicative of a re-examination of classroom relationality. Moreover, it is an embrace of the fluid and flexible redesign of learning spaces alongside ongoing evaluation and reconsideration of curriculum, pedagogy and assessment (Blackmore et al. in Innovative learning environments research study. Department of Education and Early Childhood Development, Victoria, 2011b). Within ILEs, an engagement with spatialised practice can afford learner agency. Massey (For space. Sage Publications, London, 2005) makes three propositions about space that it is a product of interrelations, a sphere of coexisting heterogeneity and multiplicity, and always in process and under construction. Deploying Massey's (For space. Sage

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Publications, London, 2005) three dimensions of space, we consider spatialised relations in schooling settings. Principal interview data are used to illustrate aspects of spatialised practice.

Introduction

Moves to reconceptualise schooling environments through 'unwalling' to promote flexibility in use, are aligned with a range of practices that signal a profound shift in pedagogy. Elements associated with this twenty-first century learning discourse (Benade 2015) are multiplicitous. They include: fostering both relational trust and leadership mentoring at all levels of the school; the development of challenging learning goals to facilitate the co-creation of new knowledge; the use of diverse pedagogical strategies; the nurturing of cultures of collaborative inquiry for professional learning; processes that support high-quality feedback for all learners; and a drive for students, teachers and leaders to continuously discover and utilise digital learning tools and resources (Fullan and Langworthy 2014).

In twenty-first century discourse, students are encouraged to be accountable for their own learning whilst teachers "become the curators of learning experiences" (Imms et al. 2016, p. 6). Proponents of 'new generation learning environments', Imms et al. (2016) observe that "differing in important ways from the 1970s open classroom and 'free-range learning' concept, the best of these spaces can theoretically accommodate a variety of teacher epistemologies…" (p. 6). The intra-actions and power relationships indicated to be associated with historical pedagogical modes and experienced within these previous learning spaces are changed, influenced by technologies which previously were not in existence nor accessible to teachers and students. These mobile technologies, combined with the sustained critique of classrooms as containers (Leander et al. 2010), have resulted in policy makers' widespread embrace of Innovative or Flexible Learning Environments (ILEs) (OECD 2013).

Learner agency is a key element in spaces that afford flexibility in learning. Co-produced within schooling assemblages, agency can be seen in complex, co-constitutive relationships of bodies, discourses and objects in classrooms. There has been interest in mapping socio-material spaces in education over the last decade (Fenwick et al. 2011; McGregor 2004; Mulcahy et al. 2015). Consequentially, a socio-material reading of agency is significant when we consider that recent profound philosophical changes in education may "render previously designed physical environments and long held philosophical views of pedagogic practice redundant" (Wells 2015, p. 73).

Through a socio-material reading of Aotearoa/New Zealand (NZ) school leader's interview comments about flexible learning, we undertake an analysis of spatial practices and the materiality of things as agentic objects that serve to influence the relational spaces of classrooms. We draw from the work of British

social geographer Massey (2005) to consider the implications for the spatial relationality of schooling. We commence the chapter with a consideration of twenty-first century learning practices and pedagogical implications of spatialised practice in ILEs.

'Twenty-First Century' Learning Practices and Schooling Spaces

There is a transformation in schools that has been described as a shift to twenty-first century learning practices (Benade 2015). The shift in the current epoch marks a profound transformation in the relational spaces of schooling, in particular with the implementation of ILEs (Charteris et al. 2017; Imms 2016). The intra-action of spatialised practice is a multiplicitous project, with fluidity in the ongoing "serial re-design" of space (Blackmore et al. 2011b, p. 13). Intra-action involves the entwinement of people and things, or the "mutual constitution of entangled agencies" (Barad 2007, p. 33). A consideration of intra-action of schooling material and non-material elements provides us an opportunity to think differently about classroom spatial relations. There is growing interest in how socio-material relations co-produce learning in schools (Frith 2015; Mills and Comber 2015; Mulcahy 2015).

ILEs are technology-rich learning contexts that capitalise on the pedagogic possibilities of "indoor and outdoor, formal, informal and implicit qualities of space and place as well as the affective and intangible aspects of school experience existent for all members of the learning community" (Blackmore et al. 2011b, p. 17). ILE spaces in schools can address various individual and social learning needs of students (OECD 2015). An intra-active reading of space provides a lens on the possibilities for evolving schooling practices.

Space and Agency

Spatial relations are socially and materially constituted, that is, the relationships that happen within a space are comprised of the interactions occurring between the 'things' that exist there. This means that relations are co-produced through the entanglement of bodies, objects, discourses, policies and histories. Space constructs relations imbued with distributions of power. It therefore follows that agency in schooling settings is co-produced spatially in socio-material assemblages. The power relations that are co-constituted in the spaces of schooling settings influence what children, teachers and school leaders are able to do and be.

Massey (2005) makes three assertions about specific dimensions of spatiality. Firstly spaces are co-constitutive, produced through interrelations that do not exist

prior to the configuration of an assemblage. Therefore, ILEs construct geographies of schooling relations and identities that are co-produced within those spaces. Massey (2005) writes, "[i]t raises questions of the politics of those geographies and of our relationship to and responsibility for them; and it raises, conversely and perhaps less expectedly, the potential geographies of our social responsibility" (p. 10). This concept of spatial relations suggests that we can see new political geographies of relations in redesigned or even reimagined classroom settings where wall dividers, desks and other classroom objects are used to construct newly conjured spatial designs.

Massey's second assertion is that space is necessarily multiplicitous. This translates into the recognition that there is a "contemporaneous plurality" (p. 10) in play, where there are no fixed narratives and even selves are multiplicities. Therefore, there can be no one reading of materialities or the power of affect produced by things. The notion of multiplicity is important for any recognition of the politics of spatiality. "The political corollary is that a genuine, thorough, spatialisation of social theory and political thinking can force into the imagination a fuller recognition of the simultaneous coexistence of others with their own trajectories and their own stories to tell" (Massey 2005, p. 11). Massey's third assertion on the spatial imagination of the political can be seen as aligned with Deleuzoguattarian becoming (Deleuze and Guattari 1987). Space itself is always in process, always in motion and therefore any material reading can only be a product of "relations-between" (Massey 2005, p. 11). In ILEs this idea of ongoing motion aligns with the serial redesign of learning spaces by both learners and teachers (Blackmore et al. 2011b). Therefore, it is possible for new political geographies in classrooms, with opportunities for enhanced learner agency and associated possibilities for pedagogical transformations.

Spatialised Practice

There has been interest in the flexible approaches to learning that can occur within ILEs (Murphy 2016). Moreover, spatialised practices are produced in "spaces of assembly" when "bodies, spaces, subjectivities and the differentiated curriculum… are entangled together" (Mulcahy 2015, p. 507). Students may be able to make decisions about their mode of learning. They can also be withdrawn to designated spaces for specifically targeted micro-lessons in small groups or individually. Research findings suggest that spatialised practices tend to occur when there is "less emphasis on structuring timetables, routines, sound, movement, and other variables, and… more emphasis on teachers and students learning together about how best to make use of space as a learning resource" (Saltmarsh et al. 2015, p. 326). Spatialised practice implies a sense of fluidity, with the continuous redesign of space and ongoing evaluation and reconsideration of curriculum, pedagogy and assessment (Blackmore et al. 2011b). It involves an interplay between pedagogical

structures and spatially influenced classroom interactions. This interplay is an important consideration for ILEs yet it does not imply a 'free for all' where excessive reliance is placed on motivated individuals 'doing their own thing' or coming together spontaneously in learning groups (Istance and Kools 2013, p. 48). In particular, a socio-material reading of these new generation environments suggests that learner agency is influenced by the entire assemblage of histories, discourses, bodies and objects that frame what is possible for human decision making.

Comber and Nixon (2008) suggest that space as a focus for learning and curriculum design is both generative and productive. They highlight that an engagement with spatial practices can enable us to imagine how different spaces may be populated by students, practitioners and the wider community and how spaces may be reconfigured (Comber and Nixon 2008). "A reconsideration of the redesign of schooling spaces foregrounds school philosophies and aspirations for community life. This is the interplay between materiality and social worlds" (Blackmore et al. 2011b).

In order to explore the possibilities that such a relationship may provide, data extracts were drawn from interviews with Principals from New Zealand schools regarding the dimensions of spatiality. There have been moves in the NZ context to mandate that schools adopt ILEs (Ministry of Education 2015). In accordance with the current OECD (2015) policy trend toward ILE, there has been strategic school property reform aimed to embed ILE in NZ schools (Ministry of Education 2015). This context provided a backdrop to the study. Six semi-structured interviews were conducted with Principals from five primary and one intermediate school. These Principals were all working within the context of this policy reform. Three had purpose-built hubs and two strove to create flexible learning spaces in existing, single cell classrooms. During the interviews the participants (given pseudonyms) were asked: What effect do you think the policy mandate to develop ILEs will have on learners? The Principals have shared their understandings, as well as their views on the logistics of spatialised practices. The analysis was informed by the question: What are the dimensions of spatiality evident in the comments made by the school practitioners? The results from these interviews are illustrative of practitioner engagement with spatialised practice in response to the ILEs policy direction for NZ Schools (Ministry of Education 2014).

Considerations for Spatialised Practice

Issues around spatialised practice in ILEs are illustrated in the following socio-materialist reading of Principal data. A discussion follows on the implications of the ILE policy for spatialised practice in NZ schools and possibilities for potential pedagogical transformations.

Customisation of Classroom Space

Marius is the Principal of a newly designed urban primary school that opened in 2015 and caters for 600 students. In the school, there are ILEs that enable children to make choices, share learning, and work independently and collaboratively. Furthermore there are open and shared spaces that allow for teacher and student flexibility in their learning interactions. Marius frames the conjuncture associated with the uptake of twenty-first century learning as an aspirational shift in Education from traditional to personalised child-centred approaches. He makes explicit links with spatialised practice in the classroom as a flexible customisation of classroom space.

> I'd like to think that there's a real shift from that traditional type of learning to a lot more child centered… developing their thinking in a more personalised way. That there is a focus on process as opposed to outcomes…There is real shift of focus in terms of physical environments. It's about the flexibility of the spaces for the children to be able to learn and succeed in a number of ways, whether it is individually, or in small groups, large groups or working explicitly with the teacher…(Marius)

Mark, the Principal of a state-integrated primary school, visited ILEs in Melbourne and Adelaide, Australia, where the architectural design was "phenomenal" and accordingly he has been able to redesign the school to create innovative spatial designs. With the assistance of an architect, the school remodelled a block that was built in 2006 to design two hubs within that space and creating half as much floor space again. The spatial design of the classroom influences the pedagogy possible in the room. While small group instruction occurs in single cell classrooms, Mark's comment illustrates a reflexive shift in relationality, made possible by the different types of learning spaces in an ILE.

> It's a space where children have the ability to learn independently, where teachers don't do any full class teaching. Teachers take individuals or small groups for instruction while the rest of the group is actually involved in learning that is authentic. It is more engaging than the whole class doing reading where one group is with the teacher, and everyone else is follow-up 'keep me busy' or 'keep me quiet' activities. We have gone away from that to try and get learning occurring, where it's actual learning, not just filling in time. So, for us, the Innovative Learning Environment is about creating different spaces that cater for the different needs of children: the wide-open spaces, the collaborative spaces, the cave where they can go where it's quiet -those sorts of things. (Mark)

Influence of Spatialised Practice on Student Engagement

Mark also noted that spatial design has had a "big impact" on the types of learning possible. The spatial design influenced the learning so that students were able to initiate learning. The relationships were enhanced within the classroom, to the degree that fewer students were sent to the principal for inappropriate classroom conduct.

We draw from a fairly affluent community so our kids are pretty well behaved. But if they're bored, and get distracted they become disruptive and so you have all sorts of issues happening in the classroom. I keep a record of all the dealings I've had in the last two years. When we were a single cell and operating with one teacher with a group, I would have about 65 incidents a year that ended up at my desk… This year so far, I have had four and that's solely because children aren't sitting waiting for the teacher. They are not bored, they are actually getting on and they are learning. They are initiating their learning. (Mark)

External Evaluation and Spatialised Practice

Raleigh is a principal of an urban primary school with a roll of 450 students. In the school, major building redevelopment work has been undertaken to create ILEs for pupils and staff. There is extensive use of glass, open space and physical connection in the design that are intended to enhance learning experiences. Raleigh articulates spatialised practice as the intra-action of space and pedagogy. The school spent over two million NZ dollars on the redesign and Raleigh reported working with staff to purposefully consider the question, 'how does space influence learning?' Below he describes how the children responded when they were asked by an external quality assurance officer with the Education Review Office to take photographs to show how learning works in the school. He describes the importance of children being aware of spatial practice and being able to articulate how learning happens.

[They were] taking photos of small work booth type things and saying 'Well, when I want to work on my own, I choose to go there.' So, to me, that actually says that children are aware of physical space and how space works for them. 'There's times when I work in a collaborative space.' 'There are times when I work in a little isolated space.' But I make those choices and I can articulate those choices for people. So when a child is working in a collaborative space, a very standard question would be 'why did you choose to work here?' and the child will be able to say, 'well, I need to work with so and so and we came out to the round table and we're working here together.' 'Oh okay, so where would you go if you just had a task on your own?' 'Well, I might sit down over there.' or 'I might sit in the corner', 'I might go to my own classroom.' And so children are able to articulate that. (Raleigh)

Resourcing ILEs for Spatialised Practice

Katya is a Principal in a small rural public school. She acknowledges the importance of the flexibility of spatialised practice, yet challenges the notion of needing a purposefully remodelled environment and new furniture to do this. The digital devices are agentic in that they make intra-activity possible—co-producing what learners can both be and do.

But pedagogically an Innovative Learning Environment to me is something quite, quite different… I've got old desks and we move those every day depending on what our needs are… Children can be moving into different areas for learning and there are quiet spaces for learning. Mine can take the laptop and sit outside if they want to do that. Because we've got the laptops they can come into group things or whatever. For me the Innovative Learning Envionment should be more about the way that you are teaching. [If] you're still going to teach the way you've always taught, having a million dollar building that looks really nice is a waste of time. (Katya)

Although children can agentically move desks according to their needs in a traditional classroom, having mobile furniture and devices allows for more freedom and easier spatial pedagogy where learners work with environmental materials in ways that spontaneously support their learning. Clare is principal of an urban, full primary school with students ranging from Years 1–8. The school is newly built and has been designed with hubs catering for up to 80 students and three teachers. Clare speaks about the students' redesign of learning space in the ways that they are able to move furniture and their bodies to create places to learn.

I'm always surprised at the way that the furniture is used. That one is a really basic one, but the children are so inventive in the ways that they use the furniture… They create cave spaces under tables and they can turn their chairs into desks… They can say… I'm going to go with my group of peers that are working on the same thing. We are going to hop into a breakout room to do that learning. (Clare)

Nathan is Principal of an urban co-educational intermediate school (Year 7 and 8 students) with approximately 120 students. He suggests that funding can influence what is possible with spatial practice. Although many of the leaders indicated that they are making shifts in the way they locate learner decision making and choice about where and how they undertake their learning, the opportunity to experience new generation learning environments can be influenced by what is possible within their contexts and the vision school leaders, teachers and the school community have of education.

In Innovative Learning Environments there are little areas where kids can go and work by themselves, or classrooms that are all glass. There are a few property things in regard to ILEs, which if you have got lots of money, you can do. But where money is tight, you can't do it. (Nathan)

These contrasting views of fiscal constraints or economic affordances can influence the perceptions of spatialised practice. Having drawn together aspects of spatialised practice, links are now made to the spatial theories in the literature.

Discussion

Learning spaces are context dependent, situational, open to change and shaped through social and material dimensions (Mulcahy 2015). Although it is well established that "teachers and students are mutually constituted with the materiality

of schooling, and have always been so" (McGregor 2004, p. 346) the constitutive and intra-active influence of materiality in educational spaces is not widely acknowledged. In the Principal data, there was evidence of the intra-activity of agency, with furniture and equipment influencing the human relations. Humans—teacher and students—were making emergent and flexible use of the materials and spaces. In many respects, learners themselves were able to initiate this emergent and flexible use.

As more than something we pass through, a consideration of space enables us to think about power and agency in classrooms and how they are co-produced in schooling milieu. Although there has been large-scale remodelling in many classrooms, it may be prudent to carefully consider the agency of the materials that remain in ILEs (for instance, textbooks and whiteboards). These items may suggest the persistence and stability of particular power relations associated with historical pedagogical modes (McGregor 2004). It is also worth noting that as communities are not bounded in space, or time, they are made and remade and therefore, as McGregor (2004) observes, "there is openness for change" and "spaces for a more critical pedagogy and democratic relationship" (p. 369).

The geographies of schooling relations that are co-produced within ILEs are always in flow (Massey 2005). As identified in the Principal comments above, there are transformations in social responsibility as learners are provided with space and opportunities to act, to curate classroom objects and redesign spaces to suit their learning needs. The described classroom assemblages are multiplicitous with various activities and the coexistence of possible selves produced through the curation of objects and structuring of relational space.

In order to maximise the potential of relational space, it is valuable for practitioners to envisage how agency can be socio-materially produced in ILEs. Murphy (2016) cautions that the combination of a lack of well-defined discourse around ILEs reform intentions and inadequate support for teachers in how to actually orchestrate teaching and learning effectively in open spaces, may result in a historic recurrence where 1970s open plan initiatives were not capitalised on. Murphy (2016) writes, "[a]lthough the purpose-built spaces are modern, if the rationale is still in flux and the practical applications not clear, there is potential danger that what happened in the 1970s will occur again" (p. 25). As articulated by Clare, moving from a single cell environment allows for a plethora of classroom activities that stream as a series of tangential and intersecting trajectories. As highlighted in the Principal comments above, these complex environments, the relationality of classroom spaces, are always in flow, in a process of being serially redesigned (Blackmore et al. 2011b).

Just as spaces themselves are transitory assemblages, the Principals' data signal transformational processes. There was a sense of flux with leaders coming to terms with changes in relation to spatialised practice. ILEs pose a challenge for traditional teacher/student power relations and prompt a rethinking of agency. Spatialised practice implies new relationships and new pedagogical possibilities. For ILEs to be truly innovative as a disruptive materiality that produces different ways of conceptualising education, we suggest educators reconsider relationships between

pedagogy and space. We join Wells (2015) to challenge educators to consider whether ILEs are examples of idealised curricula or merely disruptive innovations. Wells (2015) points out that philosophical shifts from previous models of schooling both significantly influence learning environment design and surface opportunities to question the relevance of current pedagogy and curriculum.

The deterritorialising of traditional classroom relations can be seen at policy level (Mulcahy 2016) where governments in affluent countries are committing large-scale investment in building redesign and refurbishment (Imms et al. 2016). These moves are clearly signalled in the OECD literature (2013) and visible in schools where overlapping networks of relations, technologies and practices are constantly remade in space-time relations (Blackmore et al. 2011c). However, there is still a question around the degree to which students are actually involved as active participants in ILEs. To what extent do students co-determine governance, influence curricula and planning and have input into assessment-related practices in ILEs? With possibilities for new political geographies of relations producing an international emphasis on the rise of ILEs as dynamic schooling spaces, it is beneficial for practitioners to know how to collaboratively navigate and closely read the relations in Innovative Learning Environment spaces. It must also be acknowledged that the dynamics of spatial relations can only ever be partially read.

Further Research

It is clearly a limitation that we draw only on reports from principal interviews to describe the socio-materialism of spatialised practice, thus privileging a linguistic method of data collection over a material engagement in the research contexts. A fruitful direction for further research could be the use of time-lapse photography to track and map the dynamics of spaces over time (Blackmore et al. 2011a). Video capture software with a robotic swivel could be used to record images and audio to support teacher professional inquiries into the dynamics of spatialised practices. Visual analysis methods can be used to record daily narratives of children's and teachers' relationality. Visual data may be logged against a time scale which enables patterns to be identified and comparisons made between different time-lapse sequences (Frith 2015). It is worth considering the relational flows in ILEs that create spatialised practice.

We pose a range of questions for further consideration: how can the disruptive materiality of technologies and architectural redesign challenge and enable a reconceptualisation of embedded pedagogic practices? (This reconceptualisation foregrounds the notion of co-produced agency within socio-material assemblages.) Further, how might the affordances of reconstituted spatiality best address the changing needs of learners, who require an education to equip them for a rapidly changing society? What do we need to understand about spatialised practice, where space and practice reflexively impact on each other in classrooms?

Particular consideration could also be given to questions on spatial dynamics posed by Leander et al. (2010):

> What are the specific spatiotemporal dynamics of a particular learning "environment"- its rhythms, tempos, extensibilities, connections to other social spaces, durations, internal divisions, accelerations, fluidities, and other qualities? What would accounting for these spatiotemporal dynamics tell us about a learning environment, that simply considering it as a resource cache—a box for learning "affordances"—would leave out? (p. 383)

There is also scope to research the extent to which specific spatialised practices influence student outcomes and in what ways (Byers and Imms 2016).

Conclusion

By underestimating the importance of socio-material relations in ILEs, the potential richness of spatialised practice may be marginalised to become instead a greater technicism in the guise of learner agency. If the agencies embedded in the intra-actions of human and non-human dimensions are ignored, the potential for new, reconfigured relationalities could be overlooked. Classroom spaces could yet again be constructed to replicate the 'industrial' "egg crate structures" (Lortie 1975) that are self-contained and cellular. Teacher education is an important element if practitioners are to see, and think differently about, the spatiality of their contexts and to envisage the potential of Innovative Learning Environment spaces in reconstructing relations.

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Reimagining and Reshaping Spaces of Learning: Constituting Innovative and Creative Lifelong Learners

Leon Benade, Eva Bertelsen and Lyn Lewis

Abstract Nation states are increasingly linked by a homogenised imaginary of a future that calls for individual citizens to be innovative and creative lifelong learners, who have to be provided the skills and dispositions to compete successfully in creative, twenty-first century knowledge societies. An emerging strategy in working towards this imaginary is to drastically reshape the physical environment of learning. This chapter considers two separate and different examples of such reshaping occurring in two different national contexts. These examples are used in this chapter to develop an application of Lefebvrian theoretical constructs and a critique of the way space influences, shapes and directs the work of educators, and the messages it conveys regarding what counts as worthwhile education for students in the twenty-first century.

Introduction

European research on higher education in Europe and beyond has for the past 15 years been working on establishing a 'European Education Space' (Lawn 2003; Nóvoa and Lawn 2002; Ozga et al. 2011) in order to articulate the role of national educational systems in developing a European cultural identity. Supranational agents such as the Organisation for Economic Cooperation and Development (OECD) and the European Union—and, in higher education, the Bologna Process —influence national policies through standard-setting comparisons of national

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performance data and policy advice. Furthermore, OECD educational research, conducted among member states, and on behalf of member states, is influential on forming the national education policies of member states.

Notwithstanding any national intentions to develop cultural identity through educational institutions, ironically, many nations now find their systems homogenised by the imaginary of a future that calls for individual citizens to be innovative and creative lifelong learners, able to be employable in twenty-first century knowledge societies. An emerging strategy in working towards this imaginary is to drastically reshape the physical environment of learning. Nair (2011), for example, has argued that traditional, single-cell classrooms are 'obsolete' because they fail to reproduce the twenty-first-century worker, the self-directed, 'critical thinker' and collaborator able to work in a globally connected technologically rich environment. In contrast, flexible and collaborative spaces are attuned to the needs of the creative knowledge economy of the twenty-first century.

This chapter is inspired by collaborative research work across international boundaries, bringing together work taking place in New Zealand and Denmark. This collaboration emphasises the links between global and local policy making, while simultaneously recognising that there is not a simple, linear relationship between global and local (Robertson 2012). The authors ('we' and 'our' going forward) have a common link in the work of Lefebvre, and a concern with the way space influences, shapes and directs the work of educators, and the messages it conveys regarding what counts as worthwhile education for students in the twenty-first century (Benade 2015, 2017; Bertelsen 2013; Bertelsen and Rasmussen, forthcoming). We furthermore have an interest in the discourse and rhetoric associated with the reach of global governance policy (such as that of the OECD) and wider global economic imperatives more generally. These theoretical and critical ideas support our analysis and discussion of separate instances of reconceptualised and reconstituted spaces in two different national contexts.

We critically consider the messages being communicated by, through and about these flexible spaces, examining why that space exists and why it takes the form it does. This consideration includes what flexible, collaborative and shared spaces mean for those who work and learn in them. Transcribed, recorded and interpreted data generated from semi-structured interviews of lecturers and other stakeholders provide empirical examples to support the chapter.

Theoretical Context

Our studies of learning environments over the past few years have included a number of schools and universities. This chapter draws on the evidence gleaned from our joint and separate studies in New Zealand and Denmark, and here we focus particularly on a renovated common student social space and staff work area in one university in Denmark, and the development of a non-traditional learning space in one New Zealand university School of Education. These examples will be

engaged to demonstrate different elements of Lefebvre's triad of *conceived space*, *perceived space* and *lived space*. Although all three elements are present, to one extent or another, in the two different settings, the Danish case will primarily revolve around conceived space and the New Zealand case around lived space. Despite local and substantive differences, these cases are ideologically connected. Our focus will particularly be on how redesigning processes alter the conditions and opportunities for educators to be present, think about education and be successful teachers and academics. Geographically the analysis moves from a Danish context to a New Zealand context. Analytically the analysis shifts between Lefebvre's conceived, perceived and lived space.

The critical insights offered by Lefebvre in his classic, *The Production of Space* (1991) offered a 'unitary theory' to reconcile the chasm between space as a mental construct, and space as lived reality. He identified the influence of modern capitalism in the physical construction of space in society, though he recognised the presence of capitalist domination over the non-material elements of cultural life. Lefebvre offered several tripartite conceptualisations, the most well known being his notion of *representations of space*; *representational space*; and *spatial practice*.

Conceived space, or 'the representations of space', is "conceptualized space, the space of scientists, planners, urbanists, technocratic subdividers and social engineers…all of whom identify what is lived and what is perceived with what is conceived" (1991, p. 38). Lefebvre noted that 'representational spaces' will "tend towards more or less coherent systems of non-verbal symbols and signs" (p. 39). This is space as lived experience, with the emphasis being on what the space 'tells' its users through its images and symbols. Thus, in this sense, it can be suggested that flexible and collaborative spaces have their own 'hidden curriculum'. What messages are being communicated by, through and about these spaces? This question leads to what Lefebvre has termed, 'spatial practice', the ideology of space, articulated through the discourse of society. Lefebvre says society 'secretes' this ideology (the spatial practice) slowly and dialectically; that is to say, there is a steady proposition of the practice, mastery of it by members of society, and the society as a whole. The "spatial practice of a society is revealed through the deciphering of its space" (p. 38), and thus we may ask critical questions concerning the particular purpose of space, by examining why that space exists and why it takes the form it does. In the construct of spatial practice, Lefebvre developed a critical link between the spaces of our daily reality and the production of the particular social form and relations envisaged by the dominant society.

The overall study blends the insights of critical theory and critical hermeneutics. Critical hermeneutics is a dialectical method that (1) moves from interpretation to action and (2) requires an active researcher who creates understanding that might lead to social action and change towards more equity and democracy in society. (3) Critical hermeneutic researchers are also required to be aware of their personal history, beliefs and assumptions, as well as being aware of their social and cultural context. Further, (4) the researcher must be self-reflective and contextualise his or her research findings adequately (Roberge 2011). Critical theory is committed to social justice. According to Bohman (2005), critical theory must be explanatory,

practical—in a moral, not instrumental sense—and normative. It rejects positivism, exercises an option for social justice, overtly positions the researcher, seeks to strip away ideological layers of power and aims to have practical value in sociopolitical life (Steinberg and Kincheloe 2012). As researchers and authors, we therefore accept we have individual and richly contextualised histories, which influence our thinking about education. We thus eschew notions of scientific 'objectivity', but are committed to research that is ethical and truthful. We recognise and in this chapter draw attention to the existence of power in education, and its influence on teachers, academics and students.

Following Chadderton and Torrance (2011), the enactment and representation of organisational behaviours by the inhabitants/users/occupants of the flexible learning spaces provides the 'case' in the specific physical settings mentioned above. Thus, the focus in this interpretation of the study is not to treat each organisation and its lecturers/students as a case in comparison with the others. Rather, the case is reconstituted space, and the focus is (a) what constitutes appropriate practices for participants in these reconstituted spaces and (b) how these practices are implemented and enacted (lived out).

Constructing a Learning Space

The Centre for Educational Research and Innovation (CERI) of the OECD regards 'learning environments' to be "an organic, holistic concept—an eco-system that includes the activity and the outcomes of the learning" (OECD 2013, p. 11). For CERI, the organisation of learning is the starting point, not educational institutions, nor physical buildings. Buildings ought to be part of the learning process, not separate from it. The CERI research thus set out first to define learning (Dumont et al. 2010), followed by a study of innovative learning environments (ILE) in contextual practice. This enabled the CERI researchers to develop the learning principles that could form the basis of practice in ILE (OECD 2013). These principles must *all* be in place and met, if education is going to be innovative. They included:

- the centring of learners and learning[1];
- peer collaboration;
- prioritisation of affective and student motivational factors;
- granting significant value to individual difference and prior knowledge;
- teachers maintaining high learner expectations, ensuring assessment processes are underpinned by formative feedback, and developing integrated curriculum strategies, including linking learning to the outside world (Dumont et al. 2010).

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[1]Referring to a de-emphasis on 'teachers' and 'teaching'.

It is possible to imagine 'learning' occurring in multiple settings, thanks to the wide definition of ILE determined by CERI (OECD 2013). Thus, not all learning needs to occur in the formal classroom (Dumont and Istance 2010). The relationship between learners, teachers, various learning professionals, content, facilities and technologies, all contribute to constituting a learning environment (2010). The possibilities for learning beyond the confines of the physical school (or university) must be explored and developed if learning is to be genuinely personalised, argued Green et al. (2005) some years earlier. Knowledge does not reside with teachers alone; thus, experts outside the school are key ingredients in the learning environment. It is for the school to act in ways that will facilitate these important connections (2005).

Arguably, the CERI 'Innovative Learning Environments (ILE)' research (2013) may potentially influence education globally, as OECD policies are taken up by its member states. Coincidentally, with the knowledge gained from its research, CERI seeks "to positively influence the contemporary education reform agenda with forward-looking insights about learning and innovation" (2013, p. 3). That it is able to do so has come about, in part, by the emergence over the past fifteen to twenty years of a critique of traditional schooling and education, and the positing of a futures discourse.

Futures Critique

The Discourse of a Twenty-First Century Future

For some years now, a vibrant and sometimes trenchant critique has been shaped around concerns with traditional, conventional schooling. This system is regarded to be something of a relic of twentieth-century industrialisation, featuring a 'one size fits all' approach to education (Bolstad et al. 2012). This schooling system served twentieth-century economies well, traditionally equipping school leavers with a general preparation for responsible adulthood and future employment (Bolstad and Gilbert 2008; Potter 2012)—a system predicated on the promise of ample and stable employment in economies dominated by mass production and consumption. This education system, characterised by stagnant approaches to knowledge, teaching and learning (Bolstad et al. 2012; Gilbert 2005; Miller et al. 2008; O'Brien et al. 2013), is, however, disengaging to students, leading to high dropout rates (Robinson 2013). What critics call for instead, is a system that is radically personalised (Miller et al. 2008), and which prepares all students for an economy in which all forms of work are highly skilled (Gilbert 2005).

Not only does the industrial age approach to education lack any personal touch or meet individual aspirations, it fails to prepare school leavers and graduates for a knowledge economy that does not guarantee secure and stable employment and that is characterised by service delivery and niche production for increasingly discerning

consumers. The shift from mass industrialisation to a knowledge economy required a new imaginary to be articulated (Lawn 2003), thus requiring education systems to reorient themselves. Central to this imaginary, particularly in Europe, was the ideology of lifelong learning (2003). This quality was considered by the Commission of the European Communities (2000) to be central to securing an employable and adaptable workforce to support European economic competitiveness. Such calls have helped erode the traditional monopoly over knowledge long-held by higher education learning institutions (Miller et al. 2008).

Pedagogical Shifts: Twenty-First Century Learning

Futures critics (such as the aforementioned) argue that teaching and learning cannot continue to be conceived and executed in traditional form, if the focus of education is to shift away from knowledge content acquisition, to lifelong learning and the development of generic or 'soft' skills, such as communication, problem solving, teamwork and cultural integration (Gonczi and Hager 2010; Stasz 2001). Digital development, particularly since 2000, has encouraged a drive to learner-driven education, disrupting traditional notions of relation between teacher and learner (Bolstad et al. 2012; Miller et al. 2008). The World Wide Web (WWW) and Internet enable collaborative and 'anywhere, anytime' learning. Digital technology disrupts conventions and norms, suggesting the likely overhaul of attitudes to teaching and learning (Beetham and Sharpe 2013). Furthermore, digitisation provides added impetus for adults to be lifelong learners and fuels the imaginary of a twenty-first century worker as a digitally connected person, working collaboratively with others in deprivatised office space; indeed, in connected, mobile environments that do not necessarily require physical attendance.

Increasingly, we note that this futuristic imaginary is a focal point for the designs of schools and higher education institutes, such as universities. Modern, twenty-first century designs of educational facilities emphasise flexibility, digital technologies, and student comfort and convenience. It may be expected that 'user' practices will develop to suit these designs, and be, to some extent, influenced by them. These changes in combination are therefore influencing the way teachers and lecturers work, and how they reflect on their work.

The Danish Case: South Campus

Context: The Modernisation of the South Campus

In the mid-1990s, the southern part of University of Copenhagen was modernised, and in 1997 the first proposed building plan for the whole area was drawn, including a first draft of what would become KUA1 [Københavns Universitet

Amager[2] 1]. KUA1 was ready for inauguration in 2002 and consisted of a collection of new six-storey, elongated buildings in beige sandstone. The second and third phase (KUA2 and KUA3) of the construction was preceded by a design competition announced in 2001. Part of the set assignment for the winning architectural firm was that existing buildings in one way or another should be recycled. KUA2 was ready for occupation in the spring of 2013 and is built on the shell of the original 1970s buildings. The last phase KUA3 has just been put into use.

Together, all three buildings today are called 'South Campus', referring to the location of these facilities in south Copenhagen.

The Research Procedure

The primary empirical data in this part of the study consist of observations of space and a guided tour and continuous interview with the project manager for the campus construction (here called 'Jan'). Jan was a key figure in the development of South Campus, from the development of KUA1, through the conception of KUA2 to its establishment and construction. He has been involved in this process, first working in the studio, which designed KUA1, and then as an internal employee at KU. As an architect, his experiences and perspective were of particular interest in this research for the analysis of conceived space. Two of the co-authors, namely Benade and Bertelsen, conducted the interview in September 2015, which was audio-recorded and later transcribed by an independent transcriber. The transcript was provided to Jan in compliance with a commitment to member checking. This transcript (along with others collected from related data gathering at other institutions in the same period, but not included for consideration here) was thematically analysed by Benade and Bertelsen.

Additional data included a University of Copenhagen report on how to attain an improved learning environment (University of Copenhagen 2006). This report proposed a vision for the future of the University of Copenhagen as conceived by the management of the university. The aim of this (Danish) study is to examine the relationships between the conception of a building and the thinking underpinning the social production of a current university space.

Analysis of Findings

In what follows, the findings established by physical observation and the extended interview of the architect participant, Jan, by co-authors, Benade and Bertelsen, are considered and reflected upon. This discussion is related to themes of building

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[2]Amager being the suburban location of the campus.

design, evolving function of the building, the student experience and the lecturer experience. More detailed discussion linking back to theoretical considerations is left for the final part of the chapter.

Building Design

KUA2 consists of four new wings of five floors. The four wings are oriented with gables facing Njalsgade in the North and University Square to the south. These buildings are connected by two transverse building elements that are largely of glass. One transverse building, located in the northern part of the building away from the main entrance to the south, is home to the departments and the teaching staff. The second transverse building links the southern part of the wings with a so-called learning street, where the classrooms, knowledge centres[3] and study areas are located, with the Faculty Square (see Fig. 1) forming the heart of the building.

The Faculty Square is located in the main entrance and rises three stories high featuring cafe-like seating areas, canteen 'pit stop', student cafe, bookstore, information and other services. Here students, for example, can buy course books and print their papers. An iconic winding, white staircase is noted, and the Faculty Square showcases from multiple perspectives many activities, such as walking, eating, drinking, speaking, writing and reading. Glass and concrete predominate; the colour palette reflects the colours of nature, white and grey. Characteristic Danish design furniture dominates, while refurbished and renovated furniture found in the old KUA has been installed in the new building, freshly painted in black and white.

Evolving Building Function

As the modernisation of KUA continued over a lengthy period, the modernisation rationale shifted over the period of the project. The initial sense that the old KUA was structurally obsolete and required replacement came to be overshadowed by the emerging notion that the new buildings could lead to a positive shift in the prevailing academic culture. Jan, the architect and the project manager, conveyed this understanding, echoing the OECD perspective mentioned earlier, which is focussed on the untapped potential of building redesign to influence education.

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[3]Formerly known as libraries. The book collection in the knowledge centres represents decimated versions of the ones that could be found in the original building. When moving from old to the new building, many books were either burned or placed in a storage magazine. Currently the book collection and the employees who work with these are again subject to austerity plans: as part of the ongoing plans to effect considerable savings across the entire faculty of humanities, likely mergers (and thus further reductions) are awaiting at the time of writing.

Fig. 1 Faculty Square, Humanities, University of Copenhagen

He underlined that the design process sought to create space that would change the academic culture by creating a greater sense of 'life' in the building by emphasising transparency and student attendance. Effecting this change required a vibrant space that could relay stories about the university while simultaneously generating a sense of anticipation. In Jan's terms, the design portrayed the university as a productive entity—and that production can be displayed and express life: "I mean this is a production facility…We produce students and research". A new building must thus create the optimum conditions for this production and allow it to be displayed.

The discourse of culture and cultural change is, however, counterbalanced by neoliberal discourses of resource rationalisation. Several times during a walking tour of the facility, spaces lacking a clear function seemed to trouble Jan, who commented that rent must nevertheless be paid for these underutilised square metres. The shifting discourses are explained in part by Jan's reference to the transition from elected to appointed management of Danish universities in the eleven years (2002–2013) between the construction of KUA1 and KUA2. Thus, the plans for modernisation were revisited in light of these administrative changes. The revisited plans called for a reduced footprint and greater focus on the 'student experience'. Jan explained: "We went from a need-based area perspective to a rent-based perspective, so we had to reduce approximately 20–22%". In this perspective, private space, such as single offices, is underused space, implying an inefficient use of resources. A productive building pays for itself, both as a resource producing desired (and desirable) outcomes (the student experience and research outputs), and as a resource that can and should be rationalised in the economic sense.

The Students' Experience

Students and their experience of university life featured prominently in both Jan's discourse and in university publications relating to the redesign of the university. In particular, *Feel the rush—10 sharp proposals for a better study environment at the University of Copenhagen* (University of Copenhagen 2006) proposed an imaginary of the KU study environment of the future. The publication stated that the quality of the KU study environment is significant because the student experience has increasingly become a crucial competitive factor for universities in the global world. Without improving its study environment, KU will become uncompetitive against other universities, which offer more attractive conditions—from more inviting classrooms and cafés to new forms of research-based teaching. And without an improved learning environment students generally get less out of their learning experience than they otherwise might have (University of Copenhagen 2006, p. 4).[4]

The study environment is thus critical to attracting students and is an area in which the University of Copenhagen believed it was being left behind. The publication describes the desired university of the future in terms of '24/7' accessibility, creative learning environments, and student cafés located centrally on campus in an intimate setting, emphasising a mix of relaxed greenery, leisure, academic events and study (2006).

It is noteworthy that KUA2 closely fits this description. The students were also in focus from the beginning of the design process: "From my perspective we had to create a better branding of the faculty and create value for the students to confirm them in their choice of education" (Jan). Unlike the academic staff, it has, according to Jan, been easy to meet the students' wishes for a new building: they just want extended access to the building and to have a place where they could socialise. In the design process, Jan therefore worked with three basic student needs:

> …24/7 access (to the building)…Wi-Fi and…coffee. If we can supply them with this, a student would stay outside lecture hours and we wanted the students to be here as much as possible because *presence is a condition for sharing knowledge*. (Emphasis added)

As such, Jan thus confirmed the strategy of changing the physical environment to meet students' needs as expressed in *'Feel the rush'* and unveiled some of the basic learning philosophy that permeates the building and the choices made in it. The building provides a framework for participation and knowledge sharing—types of activity associated with learning. This is to be accomplished by providing a sense of activity and good working facilities in order to attract students. Thus, the student in focus is equally customer and learner in the company, 'University'.

A particular innovation in the design of the new build was to locate lecturers in glass-walled offices. Jan noted that the use of glass contributed to the student experience of an academic culture. Furthermore, the placement of these offices in

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[4]Author translation.

close proximity to the library (now the 'knowledge centre') heightened the chances of the 'accidental meeting' of students and lecturers who may be browsing the shelves, or who may meet by chance as a lecturer is moving to or from the office area. Such meetings, suggested Jan, may take up no more than two minutes and yet intensify the student experience of learning. Whether such 'accidental meetings' take up only two minutes in reality is, of course, an open question. Furthermore, our guided tour indicated to us that many lecturers have consciously fixed posters to the glass walls of their offices, so that their presence/absence is impossible to gauge.

The Lecturer Experience

When Jan spoke of amending the academic culture, the intended outcome was not only that KU become a more attractive choice for students. A further outcome of the redesigned building was to manifest in teaching innovation and lecturer attendance or physical presence on site. This mission, according to Jan, has not been entirely successful. Despite many attempts to propose and develop innovative learning (classroom) environments in the design process, the outcome was to adhere to the traditional classroom with straight rows of tables facing one lecturer at the front. While the design process offered an opportunity to change learning spaces, lecturers simply saw no reason to change what they believed had proven effective for many years. Jan's opinion differed: the traditional classroom "is not the best situation…[and] must be equally horrible both for the lecturer and the students…To me it's not the best way of utilising 60 min or however long the time is". Academic staff members were not swayed, however, despite the physical construction of three trial learning spaces to demonstrate options to the traditional formula. Despite his regret that the academic staff did not take this opportunity, Jan at least could envisage the 'accidental meeting' of staff and students in the redesigned common spaces, such as the café, on the stairs, or in the knowledge centre.

The location of lecturers in glass-walled offices adjacent to the knowledge centre was not coincidental. A design goal was to convert the traditional library, with rows and rows of shelves crammed with books, into a modern information resource for students. Renaming it "deflated the value of the book" (Jan) and inflated the value of information resources, which include the academic staff. Jan noted, however, that several lecturers complained of feeling exposed (hence some covering their walls). He nevertheless justified the transparency of academics' offices as an "acknowledgement of a resource (lecturers) being present and therefore able to be utilised [whereas in the case of solidly-walled offices] if the resource is here, nobody knows, then it's not an available resource…" Not only then is the redesigned building showcasing life and activity, but also it enables the academic staff to become, and literally be seen, as a resource that can and should be used and available when visible. Production is therefore visible in (and through) the glass, which contributes to the visibility of the teacher as a resource for students on a par with books, Wi-fi and coffee.

The New Zealand Case: Auckland University of Technology/School of Education

Research Context: Policy

In the New Zealand context, the Ministry of Education has a property vision of flexible learning environments that "*empower students to learn and teachers to teach*" (2011, p. 4. Emphasis added). Furthermore, the Ministry of Education has pledged to disrupt the traditional "teacher-centred system [by seeking to] ensure that *the performance of the physical environment is linked to educational outcomes*". (p. 13. Emphasis added). To attain this vision, the Ministry has set 2021 as the target year by which time all schools will have been expected to modernise their teaching spaces, in effect, by building flexible learning spaces.

Leadership-level discussion in the School of Education of the Auckland University of Technology in 2015 considered ways to prepare student teachers for working in these rapidly emerging flexible learning environments. Therefore, in 2016, the School of Education offered two unique papers[5] as part of its Bachelor of Education (initial teacher education) programme. All Primary[6] and Early Childhood[7] Education students took these separate papers, offered over the two semesters of 2016, in their third and fourth semesters.[8] The papers were characterised by a futures education paradigm, and a learner-centred, interdisciplinary, integrated problem and resource-based learning approach. The delivery of the papers modelled the pedagogy[9] suited to working in flexible spaces.

The leadership team of the School of Education (which included co-authors, Benade and Lewis) discussed a proposal to emulate a flexible learning environment in an already available, single large space. This venue, measuring some 135 m^2, was to be refurnished in the style of schools that had developed flexible learning environments (Fig. 2). A mobile plasma screen was to be introduced, to help de-centre the usual placement of a fixed computer and digital projector that establishes a 'front of room' or what Byers (2016) refers to as the 'fireplace'.

This refurnished venue would be the location for the delivery of the new papers. In addition to what has already been noted in connection with these papers, is that the entire cohort (of around 70 students) was scheduled simultaneously in this venue, and three lecturers were assigned to this class so that they could teach and facilitate the paper content as a team. 'Teaching' was based on collaborative planning of classes where teaching was not didactic or outcomes focussed, but that

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[5]A semester 'course' or offering that contributes credits towards the overall degree programme.

[6]Referred to as 'elementary' in some countries, this is the period of schooling in New Zealand catering to children aged five to twelve (Years One to Eight).

[7]In New Zealand, this sector provides various educational services for children until they turn five.

[8]The B.Ed degree is offered over three years of full-time study or six semesters.

[9]In use here, this refers to both teachers' thinking about practice and practical classroom methodology.

Fig. 2 Introduction of flexible furniture to existing learning space

required significant student ownership of learning in relation to a thematic topic structure. Students were required to work in small teams, a model that was applied to their assignments as well. These assignments provided significant scope for student direction within a broad framework of expectations.

This approach to teaching and learning represented a radical departure from the other paper offerings in the B.Ed programme, which typically feature one lecturer teaching a class of around 25 or 30 students. The usual delivery of papers can tend to be lecturer-centred, and the content follows a predictable pattern. In those offerings, the paper content is curriculum specific to one learning area of the New Zealand Curriculum (2007),[10] whereas these papers integrated two learning areas (Technology and Social Sciences). In many ways, the conventional offerings, although subject to regular review, have altered little over the past five years, and the general didactic approach is well known and well understood by both lecturers and students. The aim of the new papers was to disrupt these conventions and to create significant cognitive dissonance for both lecturers and students.

The Research Procedure

A research team was formed to both conduct, and participate in, research projects related to documenting and evaluating the period of pre-planning (July to

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[10]Typically, one of the seven learning areas of the New Zealand Curriculum, such as English, Social Science and Technology (Ministry of Education 2007).

November 2015)[11] and the first year of introducing the new paper offerings (February to November 2016). This team consisted of leadership stakeholders (Head and Deputy Head of School and Director of Research), while the teaching team consisted of three lecturers in each of Primary and Early Childhood streams.[12] The Primary team included the aforementioned Director of Research, who is one of the co-authors of this chapter.

Semi-structured interviews of six of these participants were held between November 2015 and February 2016. These were digitally recorded and transcribed, and the transcriptions (at the time of writing this chapter) have been subjected to one interpretive pass, in which NVivo was deployed as a mechanism to store the transcripts and analyse them into various thematic nodes. This analysis was undertaken by two of the co-authors, namely Benade and Lewis.

Analysis of Findings

The commentary that follows is based on the first round of transcript analysis of the 2015/2016 leader and lecturer interviews. It addresses some initial lecturer presuppositions, reflects on the tension between power and resistance that was evident in some of the lecturer responses, and examines the challenges and compromises the lecturers experienced in the period of pre-planning. Again, theoretical discussion is left to the end of the chapter.

Initial Presuppositions

Even prior to the interviews, a persistent lecturer-participant concern related to the demands of team work, collaboration and sharing among the teaching staff. During the planning period of July to November 2015, participants struggled to attain a sense of clarity regarding either the teaching or the research dimensions of the overall project: "There's things there in terms of the roles of the project and the team members in it, that I think need to be more clearly discussed and ascertained" (Early Childhood participant 1). A further, related concern regarded the workload demands of engaging in radically new papers and pedagogy, and the inevitable time commitment required to successfully work in teams.

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[11]This period included an effort to build a community of practice, using an external facilitator. In addition, the teaching teams were meeting to conceptualise, frame and plan the papers.

[12]A fourth member joined the Primary team in July 2016, in the second semester of the year, in anticipation of that person replacing one who would leave the team at the end of 2016.

It is questionable whether six months were adequate for examining the various issues and suggested changes. Given more time, the entire project team may have been able to consider the project from a critical perspective. One participant argued,

> serious engagement with these issues has been difficult to promote in the [pre-planning] meetings, with remarks being made about the theory being too complex…so [this project] seems to be about packaging something cool rather than engaging in serious educational questions and reflection. (Early Childhood participant 2)

All team members would not accept this position, however:

> Before the papers went to the Board of Studies we met quite regularly, once a week or something. We…constructed the papers from scratch, so there was a lot of talk about philosophy, underpinning philosophy and how the paper would be delivered…we got feedback…and that helped us inform the study guide again. (Primary participant 1)

This view illustrates the demands of making time to work as a team, but also reveals a degree of theorisation others claimed was missing.

Some participants valued the inception of the project and development of its pedagogical aspect as an opportunity to develop their skills and understanding of digital technology and related e-learning pedagogy. The particular focus on personalised learning and the opportunity to develop inquiry learning and project-focussed work featured positively in the anticipatory thinking of some team members in the early stages of the planning cycle. The challenging nature of the likely content and pedagogical development of the trial papers was welcomed as "an opportunity to create…an opportunity to enable students to…deepen their knowledge, if they had freedom to choose the area that they were going to actually study" (Early Childhood participant 1). This participant was excited by the possibilities the trial papers offered to use space to extend learning, while arguing at the same time that learning is not determined by space. Indeed, this participant wanted to explore the possibilities of education beyond the classroom: "learning takes place, not necessarily in the formality of the lecture room but in a variety of environments". As an example, this participant mentioned, "using Instagram and using other tools and going outside into the community" (Early Childhood participant 1). These comments suggest an appreciation of learning that occurs beyond traditional place, possibly in virtual spaces.

Power and Resistance

While it may have been implied till now, the question of power and resistance should be laid out more explicitly, given the lessons it can teach about implementing significant organisational changes, such as the introduction of these, curriculum innovations, premised on a futures orientation and interruption of conventional pedagogical approaches. As outlined earlier, the leadership team of the School of Education provided the initial impetus to develop this initiative. Thus, it may be reasonably assumed that certain power and influence vests in this

leadership team, without which, the entire project is unlikely to have seen the light of day. As one leader put it, "I believe that we must include the concepts related to flexible learning environments within our own practice, therefore modelling for student teachers and be able to articulate how flexible learning pedagogy works" (Leader participant 2).

Despite these well-meaning intentions, some participants believed that the project was an example of top-down, hierarchical implementation: "…the way in which the project goals have been established, are contradictory to the ideas and values that drive twenty-first century learning" (Early Childhood participant 2). For this participant, the goals of the project were predetermined, lacked consultation, and were characterised by deficit thinking, such as appointing an external facilitator to support the 'rethinking pedagogy' process: "Basically the position of leadership seems to be one of 'this is very hard and you are going to need some help' " (Early Childhood participant 2). These views and attitudes were not lost on members of the leadership team, who were aware of some elements of resistance or even antagonism. "Staff on the whole, were not open to the possibilities of this project… which…is probably largely due to…the change process in the school, happening at the same time" (Leader participant 1). The 'change process' being a cycle of staffing redundancies and associated plans that enabled 'surplus' staff to opt for severance or face retrenchment. Several Early Childhood staff were affected. Arguably, however, resistance cannot be attributed to job insecurity alone, but may be ascribed to a range of issues, including a questioning of leadership structures, and heavy workloads.

On the team itself, resistance led to "low turnout [to meetings] with a lot of apologies or simply non attendance suggesting that the project was not a priority for staff" (Early Childhood participant 2). This participant's colleague was sceptical too of the research aspect of the project, suggesting it was going to "build other people's careers" and went on to suggest "there are issues there in terms of who exploits who" (Early Childhood participant 1).

Challenges and Compromises

The participants were asked what challenged them particularly, and what kinds of compromises they had to make. A recurrent challenge, already mentioned, was the requirement to work in a team, which had implications for lecturers who ordinarily work alone and independently. For one, "working with [Colleague 5] and [Colleague 6] to nut out a paper or a couple of papers, two papers, one for each semester" was most challenging (Primary participant 2). Adapting to this new style of working would have serious implications not only for workload, but time commitment too. Compromising their relative autonomy was, however, traded off against the prospect of developing a new and radically different collection of course materials and being part of an innovative project.

Shifting mental frames of thought in regard to teaching and learning practice presented challenges: "They [the lecturers] didn't like the idea of what we wanted to do…[such as]…to get them into a different headspace" (Leader participant 3), while another anticipated student dissatisfaction once the trial papers commenced, as they were likely "to come into a classroom expecting us to spoon-feed them like always and they're going to find we're not going to spoon-feed them". These comments thus suggest that the introduction and development of the trial papers was not going to be without some personal pain and sacrifice. This was evident in the staff beyond the research team: general staff resistance was articulated over the choice of venue to be redesigned as the flexible learning environment, as this particular venue was widely used in the School of Education, prompting several to express irritation and, arguably, anxiety, over having to teach in a significantly altered learning space.

Frequently, the Early Childhood participants in the research team engaged in more generalised critique, while their Primary colleagues tended to focus on work-related issues. The perception of the former was that the intended changes were hierarchical and non-consultative, and were challenging to their personal professional integrity. The conceptualisation of the new requirements "seemed to be light on the idea of a community of practice, with very little apparent consultation with the whole school and with individual academic staff who were selected or invited to be involved" (Early Childhood participant 2). Working in an arrangement they characterised as lacking democratic principles constituted a compromise for these participants. This is so, despite the opportunities for engagement in the development of a community of practice (see Footnote 11) that was open to all School of Education staff.

Analysis and Discussion: Global Knowledge Economy Demands and the Social Production of Space

Earlier in the chapter, we noted the emergence of the notion of twenty-first century workers as quite distinct from their 'industrial age' forbears of the twentieth century, when large-scale manufacturing and related compliance to uniformity dominated the political economy. The twenty-first century knowledge economy, characterised by digital ubiquity, requires collaborative skills and individual creativity. We noted too, the centrality of new learning environment design and personalised pedagogy to the production of the learning conditions required to develop this kind of person. These changing learning conditions call for school and university teachers to be able to model skills of resilience, flexibility, creativity and critical thinking. The most idealised picture of this teacher is one who works collaboratively in teams, and engages in deprivatised teaching practice. For such a teacher, being able to work with integrated curriculum in open, flexible learning spaces that encourage student-centred, personalised learning is becoming the new 'gold standard' (see Nair 2011, 2014, as an example of such thinking). Such a

person can no longer be described as a teacher, but as a 'facilitator', 'coach' or 'learning advisor'. What further characterises these teachers of the twenty-first century is their ability to function as reflective practitioners, who look inwardly and outwardly for the inspiration to challenge their own teaching practice (Benade 2015).

The growing demand for learning institutions and their teachers to exemplify innovative teaching and learning can be understood in the context of an international policy framework (with its pronounced emphasis on *learning*). The OECD is a leading player in setting this policy agenda. Its critique of 'industrial age' education can be linked back as early as its key competency research (2003). More recently, its *Innovative Learning Environments* (2013) research has opened the way for developing a specific policy agenda to influence education internationally. Similarly, the long-running quest to develop a 'European Education Space' has evolved from establishing a common European (market) agenda and culture in the twentieth century, to an urgent emphasis on lifelong learning aimed at employability, in the twenty-first century (Lawn 2003). This latter scenario devolves responsibility from the state to the individual and yet is presented in terms of the ideologies of collaborative, team learning and shared problem solving. The development of flexible, innovative learning environments provides the promise of enabling the pedagogies that will satisfy these evolving and emerging knowledge economy demands, a trend felt in Denmark as it is in New Zealand, accentuating the influence of globalised education policy.

What our joint and several research demonstrates—apart from the influence of global policy making—is the linear connection designers seek to establish between the conceptualisation of space and the way it is perceived and lived, as suggested by Lefebvre (1991). In the Danish example, Jan, the designer, made his intentions clear. Indeed, he was carrying out the design intentions of his employer, a university administration motivated by the demands of a neoliberal market economy in which consumer choice is paramount. In the interests of securing a positive 'student experience', knowledge came to be seen as a resource that is locked in the heads of lecturers, and to that extent, their presence must be physical and visible if that knowledge is to be made explicit and visible. Only in this way, can the circulation of this knowledge capital be guaranteed, so that it ceases to be the private possession of the lecturers or the institution. Thus, in the mind of Jan and the university planners, a completed building project is an embodiment of a conception, and the lives lived within this built environment are in accordance with this conception. Evidently this has not entirely materialised, however, as indicated by lecturer resistance to the design intent of creating flexible, shared learning spaces, as reported by Jan. Despite building trial spaces to produce the evidence to illustrate to lecturers the wisdom of this intent, his design team had to settle for the maintenance of traditional lecture rooms.

It may be noted that the notion of a linear relationship between conceived, perceived and lived space was no less evident in the New Zealand example, where a pedagogical trial in a reimagined and reshaped space was established in 2016. In that case, the leadership team was motivated to create a situation that would serve as

desirable student teacher preparation for the 'real world', in the process, effecting a 'top-down' implementation. While this approach was somewhat born of necessity, given the policy framework and intent of the Ministry of Education, the comments of some members of the academic team who became at the same time research participants, indicate that hierarchical approaches to significant change will find opposition. Although offering the opportunities for the respective staff members to engage in developing a community of practice, the pre-planning stages did not, at least for some of the participants, provide adequate time for thinking, theorising and coherent course planning.

Following Chadderton and Torrance (2011), the case presented in this chapter is reimagined and reshaped space, with a concern for (a) what constitutes appropriate practices for participants in these new spaces and (b) how these practices are implemented and enacted (lived out). Two examples were provided, and each yields responses to these provocations. In the Danish example, it is evident that the university administration (represented at one level by glossy marketing material, and at another by Jan, the designer) considered it appropriate for the building to be redesigned to meet the needs and demands of the student consumer, thus positioning the university to compete on an equal footing with other universities. In this milieu, a commercial transaction is conducted between students and lecturers, with knowledge being the commodity in circulation. In this imaginary, the lecturer is merely a visible and present resource. Thus, it is appropriate for lecturers to behave accordingly, by, for example, being open to the 'accidental meeting' of student and lecturer. This neat linearity is, however, disrupted by those lecturers who choose to 'wall' their glass offices with posters, and by the resistance of the lecturers to giving up traditional lecture and seminar rooms.

The New Zealand example presents a significantly different study. Here strategic positioning in relation to broader global and national education policy was a motivator, coupled with the strategic intent of the School of Education leadership to be a national player in the development of pedagogy for flexible learning environments. Thus, the creation of a unique space to support innovative teaching and learning and the development of creative and critical thinking was considered by the leadership team to be an inspired decision. It was appropriate therefore that the leaders would expect the lecturers to be equally inspired and motivated to execute the decision. Again, the neat linearity between conceived, perceived and lived space that exists in the minds of planners (Lefevbre 1991) was disrupted, first by lecturers who resisted attendance at the 'community-building' meetings, and second by some voicing concerns regarding the process and its substance.

What this discussion suggests, across both examples, is that there is not a linear link between conception, planning/design, construction and enactment. Such a link, as suggested by Lefevbre (1991) is a figment in the minds of planners. While the practicality of careful consultation and adequate planning is questionable, the point is nevertheless relevant to any school, university or other place of learning, namely that such steps are critical when significant changes to the place of learning are proposed. It is not merely the physical changes that are at stake—it is the very way

in which the inhabitants of the space live in, occupy and produce that space that is at stake. In particular, the occupants of flexible learning space, be they lecturers, teachers, or students, are required to radically deprivatise their ways of working, and come to terms with collaborative practices—perhaps the key change that will determine the viability of any reimagined and reshaped flexible learning space. Moreover, questions are raised around developing spatial practices (1991) for spaces where traditional understandings of knowledge are being eroded, to be replaced with ways of *doing* (or, in other words, skills and competencies). Our examples presented in this chapter, while separated by hemisphere, language and locale, are intrinsically and intimately linked by neoliberal agendas spawned and spread by the demands of global capital. It behoves ethical educators to remain mindful and actively aware of these influences, seek to counter-influence them, yet at the same time to prepare students as best they can to take up critically discerning roles in the structures that support such political economies.

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Innovative Learning Environments as Complex Adaptive Systems: Enabling Middle Years' Education

Benjamin Cleveland

Abstract In a period of post-industrial education, how can we understand school learning environments i.e. educational spaces and practices that are concurrently physical, social and cultural? How might theoretical constructs that deal with ideas associated with 'complexity', 'emergence' and 'self-organisation' aid our interpretations of learning environments in the knowledge era? This chapter explores the emergence, co-evolution and mutual adaptation of the physical, social and cultural practices in three schools (primary and secondary) that attempted to develop contemporary pedagogical cultures of practice between 2008 and 2011 in non-traditional learning spaces. Employing theoretical frameworks derived from the literature on 'complexity theory' and 'complex adaptive systems theory', this chapter explores the influences of new socio-spatial contexts for learning (i.e. innovative learning environments) on the engagement of middle years' students. To conclude, an argument is put forward for considering school learning environments, schools and school systems as 'complex adaptive systems': educational settings that can 'learn' in response to positive feedback loops to provide dynamic socio-pedagogical cultures of practice that are aligned with current middle years' educational theories.

Introduction

This chapter presents research into middle years' learning environments that was undertaken between 2008 and 2011 as part of a Ph.D. study titled *Engaging spaces: Innovative learning environments, pedagogies and student engagement in the middle years' of school*. For the purpose of the project, learning environments were considered to be educational spaces and practices that are concurrently physical, social and cultural. The study was situated in three schools in Melbourne, Victoria

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and Australia and was associated with an Australian Research Council Linkage project titled *Smart Green Schools*.

The research was framed by the ongoing discourse about middle years' education reform and inertia of incumbent middle years' pedagogies. The Middle Years Research and Development (MYRAD) Project (DEET 2002, p. web) typifies the reform agenda highlighted in the literature. To advance middle years' education, this report recommended:

- Strengthening teacher–student relationships;
- Involving students in decision-making about content, process and assessment;
- Presenting authentic tasks that require complex thought and allowing time for exploration;
- Inclusion of processes involving cooperation, communication, negotiation and social competencies; and
- Providing for individual differences in interest, achievement and learning styles.

However, the reform agenda outlined in the literature appears to have suffered from what Elmore described as the inertia of resident school cultures that result in school communities powerfully resisting change (Elmore, 1996; Fullan et al. 2007). Indeed, it is generally agreed that reform initiatives in the middle years' have not been widely adopted (Cartmel 2013; Pendergast 2006; Pendergast and Bahr 2005).

Situated at the intersections of physical learning environments, pedagogies and student engagement (see Fig. 1), this chapter makes explicit the theoretical analysis that was undertaken to interpret qualitative field data collected across three sites (schools) as part of a multiple case study (Bryman 2004). The aspects of the study that are presented here are those associated with the following questions:

Fig. 1 The study's field of inquiry: the relationships between physical learning environments, pedagogies and student engagement
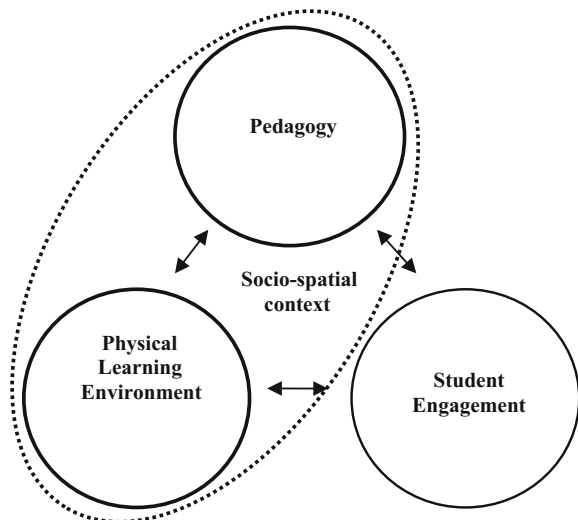
- How are innovative learning environments and contemporary constructivist pedagogies collectively influencing socio-pedagogical cultures in the middle years and what impact is this having on student engagement?
- How can the effectiveness of innovative middle years learning environments be assessed for their influence on pedagogical practices and student engagement?

In response to the research questions—and as emerged from analysis of the field data—this chapter is divided into three main findings and discussion sections:

- The development of new socio-pedagogical cultures in innovative learning environments;
- Emergent behaviours and student engagement; and
- The overall effectiveness of innovative learning environments.

These sections are preceded by a brief outline of the research design and a discussion about the theoretical frameworks that were used to analyse and interpret the field data. This discussion includes an introduction to the literature on 'complexity theory' and 'complex adaptive systems theory'. These conceptual tools were used to:

(a) Explore the influences that new socio-spatial contexts for learning had on middle years' socio-pedagogical cultures and student engagement;
(b) Discuss the effectiveness of the innovative learning environments; and
(c) Identify how the educational effectiveness of innovative learning environments can be assessed.

To illustrate particular phenomena, the findings are supplemented with quotes extracted from interviews and focus groups with school leaders, teachers and students—critically championing their voices.

Research Design

A critical analysis (Ewert 1991; Habermas 1971, 1974, 1989) of middle years' learning environments in three Melbourne-based schools was undertaken using multiple case study (Bryman 2004), ethnographic (Bryman 2004) and participatory action research methodologies (Cohen et al. 2007; Mattsson and Kemmis 2007).

The research design was informed by critical social theory (Habermas 1971, 1974, 1989), a middle-range theory that suggests that through trying to change a social setting, the nature of its social context may be revealed, and understandings of its function and potential may be attained. Whereas "critical theory tries to understand why the social world is the way it is and, through that process of critique, strives to know how it should be" (Ewert 1991, p. 356), critical social theory takes this process a step further by exploring knowledge derived from periods of change, or emancipatory praxis.

Carr and Kemmis (1986) identified critical social theory as a theoretical perspective that legitimised the adoption of action research and advocated this perspective as the most rational way to think about research in education. They suggested that critical educational research should aim to transform education, rather than merely attempt to explain or understand moments in the transformative process. Carr and Kemmis (1986, p. 156) described the role of critical research in education as follows:

> A critical educational science … has a view of educational reform that is participatory and collaborative; it envisages a form of educational research which is conducted by those involved in education themselves. It takes a view of educational research as critical analysis directed at the transformation of educational practices, the educational understandings and educational values of those involved in the process, and the social and institutional structures which provide frameworks for their action…critical educational science is not research on or about education, it is research in and for education.

In keeping with Mattsson and Kemmis' (2007, p. 204) suggestion that participatory action research (PAR) may "contribute to the development of individuals' or groups' capacities for organisational and structural change", the PAR phase of the study facilitated a dialogical process that furthered each school community's understandings of their socio-spatial settings and socio-pedagogical cultures—ultimately leading to some significant spatial and pedagogic changes in the participating schools.

The PAR phase involved collaborating with school leaders, teachers and students to investigate emergent issues related to the relationships between innovative learning environments, pedagogies and student engagement. A framework adapted from Cohen et al. (2007) directed the PAR methodology at each participating school. This is outlined below and illustrated in Fig. 2:

Fig. 2 Participatory action research framework/cycle. Adapted from Cohen et al. (2007)
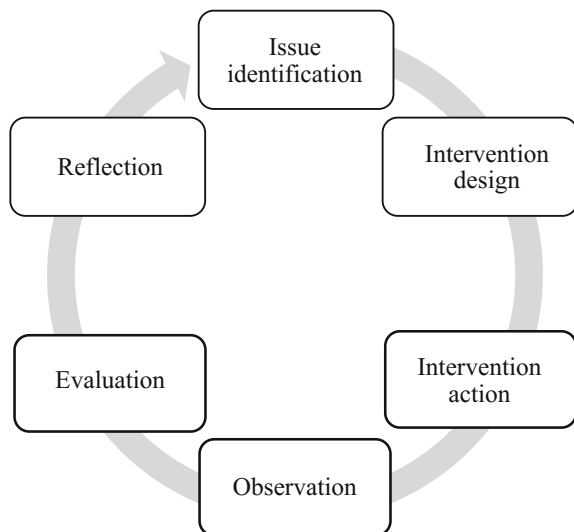
1. Issue identification—Form understandings of the social setting in its current state and create a vision for the future of the setting;
2. Intervention design—Consider how the social setting could be improved to match the vision and subsequently design interventions;
3. Intervention action—Implement interventions;
4. Observation—Form understandings of the social setting during the process of changing the social setting (the emancipatory process), potentially revealing hidden dependencies and assumptions made by social actors;
5. Evaluation—Evaluate the social setting in its changed form;
6. Reflection—Reflect on the changes observed; and
7. Repeat all of the above as required.

Three case study sites (state funded public schools) were selected for the study using a process of convenience sampling (Bryman 2004): one was a primary school and two were secondary schools. These schools catered for significantly different numbers of students (between 270 and 2100), were geographically distributed across the Melbourne metropolitan area, served communities across the socio-economic spectrum, and the designs of the 'innovative' learning spaces found at each varied in significant ways, yet also had common spatial elements.

Given the focus on the theoretical analysis of learning environments through the lenses of complexity theory and complex adaptive systems theory—and for brevity —the three participating schools are not described in this chapter, although they are referred to as Suburban High School, Inner City Primary School and Seaside Secondary College, respectively. Details about each school, including details about the design of their learning spaces, may be found in another book chapter, *Addressing the spatial to catalyse socio-pedagogical reform in middle years' education* (Cleveland 2016).

Data were collected between September 2008 and September 2010 using a variety of qualitative methods. These included the observation of teaching and learning (including prior to and following the provision of new learning spaces); semi-structured interviews with school leaders, teachers and students; focus groups with teachers; and design-oriented workshops with school leaders, teachers and architects.

The qualitative data collected were analysed using a process of thematic narrative analysis adapted from Riessman (2008). The data from individual cases (observational notes, interview transcripts and summary notes from focus groups and workshops) were not fractured into thematic categories for cross analysis; rather, individual cases were maintained intact for coding. Attention was paid to both micro and macro contexts by preserving the data within each case in long chronological sequences, allowing the finer details of the stories embedded in the data to be interpreted within historical contexts. Through the interpretation of individual cases, understandings of the socio-spatial settings and socio-pedagogical cultures of practice at each school were formed (Cleveland 2016).

The study's focus on periods of change (emancipatory praxis) aligned well with the interpretive theoretical frameworks/analytical lens used i.e. complexity theory

(Heylighten 2008; Heylighten et al. 2007; Law and Urry 2004) and complex adaptive systems theory (Davis and Sumara 2006; Heylighten 2008; Urry 2008). Informed by critical social theory, the approach and the multiple case study, ethnographic and PAR methodologies gave rise to a research design that enabled deep insights into processes of 'emergence', 'co-evolution' and 'mutual adaptation' to be gained across multiple sites. Furthermore, the longitudinal design (data were collected over two years) enabled processes of 'self-organisation' and 'learning' on the part of the participant schools to be recognised as they responded to change over time (i.e. 'positive feedback loops') in their systems.

Further details about complexity theory and complex adaptive systems theory (i.e. the theoretical frameworks used to analyse the field data) are discussed below.

Complexity: Theoretical Frameworks for Analysing Innovative Learning Environments

Complexity and Sociology

Complexity theory was established during the 1980s in a move away from Newtonian reductionist models of scientific inquiry. In Newtonian models, phenomena are reduced to their simplest components in an attempt to objectively investigate and describe a system's properties. Conversely, complexity theory posits that it is impossible to achieve accurate understandings of a system's properties through the application of reductionist approaches because such models do not deal adequately with the emergent properties of systems produced via dynamic interactions between agents and/or components (Heylighten 2008). Heylighen, Cilliers and Gershenson (2007, p. 11) outlined complexity theory/science as follows:

> What distinguishes complexity science is its focus on phenomena that are characterized neither by order …, nor by disorder …, but that are situated somewhere in between … In a truly complex system … components are to some degree independent, and thus autonomous in their behaviour, while undergoing various direct and indirect interactions. This makes the global behaviour of the system very difficult to predict, although it is not random.

Since the 1990s, complexity theory has grown in parallel with postmodern philosophy (Heylighten et al. 2007) and has been used by sociologists seeking nonlinear analyses of structure or agency/action. Law and Urry (2004) argued that social science in contemporary society is more about connection and flow than about nineteenth-century concepts of territorial boundaries. They suggested that inherited sensibilities in the social sciences are under pressure from complexity theory and identified it as a useful lens through which to investigate, but not predict, 'emergent' and 'self-organising' systemic properties associated with nonlinear systems that involve people.

Complex Adaptive Systems

Complexity theory has given rise to the concept of complex adaptive systems: systems that "spontaneously organize themselves so as to better cope with various internal and external perturbations and conflicts" (Heylighten 2008, p. 2). Urry (2008) identified such systems as being simultaneously economic, physical, technological, political and social and described them as powerful systems in the contemporary world. He suggested that these self-organising systems are characterised by the presence of 'positive feedback loops' which ensure a state of continuous change within a particular system. The dynamic and nonlinear nature of these systems is also thought to create systems that 'learn' as they respond to changes in the system (Davis and Sumara 2006).

Complex adaptive systems may be contrasted with systems governed by 'negative feedback loops'. Law and Urry (2004) suggested that complex adaptive systems cope well with turbulence or shocks because change is a consistent aspect of the function of these systems. They suggested that static systems, governed by negative feedback loops, have difficulty dealing with shocks or stresses because change is not common to, or welcomed, by such systems. While systems informed by negative feedback loops try to re-establish equilibrium within the system when disruptive events occur, complex adaptive systems, governed by positive feedback loops, allow adjustments to be made to the system in response to change agents.

Emergence, Co-evolution and Mutual Adaptation

The concept of 'emergence' is central to complexity theory. In a sociological context, emergent properties may refer to the development of regularities of behaviour that transcend the components of a system. Emergent behaviours cannot be attributed to the component parts of a system and emergent properties of a system cannot be reduced to individual factors/parts (Urry 2008). Rather, emergent behaviours occur as the result of the nonlinear and dynamic interactions that take place within a complex adaptive system.

It is believed that complex adaptive systems generate emergent social behaviours through 'co-evolution' and 'mutual adaptation'. Urry (2008, p. 265) commented on these ideas as follows:

> Because of how systems co-evolve and mutually adapt it is almost impossible for social groups to anticipate what in certain circumstances would be the means of effecting appropriate system change. So although many social groups are seeking to realize various projects of change it is enormously hard to do so in ways that produce anything like the intended outcomes.

In addressing the concept of co-evolution, Walby (2003) suggested that complexity theory can now be used to re-frame accounts of social change as co-evolution may replace the notion of cause and effect between agents/entities.

Complexity Theory and Education

Davis and Sumara (2006) presented 'complexity thinking' as an appropriate attitude for educators and educational researchers. They identified a 'complex perspective' as one that supported subjective understandings of "interpersonal dynamics, cultural evolution and issues regarding the unfolding of more-than-the-human world" (Davis and Sumara 2006, p. 3).

Further to this, Cohen et al. (2007) suggested that conducting educational research through the lens of complexity facilitated a holistic view of phenomena—including individuals, families, students, classes, schools, communities and societies. They described complexity theory as an emerging paradigm in educational research and elaborated on the role of complexity theory as follows (p. 34):

> Complexity theory, a comparatively new perspective in educational research, offers considerable leverage into understanding societal, community, individual, and institutional change … In addressing holism, complexity theory suggests the need for case study research methodology, action research and participatory forms of research, premised in many ways on interactionist qualitative accounts, i.e. looking at situations through the eyes of as many participants or stakeholders as possible. This enables multiple causality, multiple perspectives and multiple effects to be chartered … research in education could concern itself with the symbiosis of internal and external researchers and partnerships. Just as complexity theory suggests that there are multiple views of reality, so this accords not only with the need for several perspectives on a situation (using multi-methods), but resonates with those tenets of critical research that argue for different voices and views to be heard.

Complexity Theory and School Architecture

This chapter builds on the discourse initiated by Upitis (2004, 2010a, b) regarding the connections between complexity theory, educational practices and school architecture. Upitis explored schools as complex systems and discussed the dynamic interactions between social and physical agents within and beyond schools. She put forward the notion that educational reform could not happen within the context of traditional school buildings and suggested that there was opportunity for architects and educators to effect change in building structures to better align the environments in which students learn with contemporary educational philosophies and practices.

Findings and Discussion

Complexity theory and complex adaptive systems theory are used here as conceptual tools to discuss and develop understandings of the emergent behaviours that occurred in the case study schools, to assess the effectiveness of the innovative

learning environments in these schools and to develop ideas regarding the role of architecture in a complex adaptive system of education. These, and related matters, are discussed below.

The Development of New Socio-Pedagogical Cultures in Innovative Learning Environments

The Case Study Schools as Complex Adaptive Systems

Throughout this section, an argument is developed for the case study schools to be conceived of as complex adaptive systems. This is not a new idea. Bower (2006), Cohen et al. (2007), Davis and Sumara (2006), Semetsky (2005) and Sumara and Davis (2009) all promoted complexity theory as an appropriate lens through which to explore the complex nature of schools and school reform. While these academics focused largely on the social components of these systems, the conception of 'the school' as a complex adaptive system that is promoted here includes the physical environment as part of the system—a conception that is aligned with that of Upitis (2004), who identified physical space as an important agent in these nonlinear and dynamic systems.

Creating New Socio-Spatial Contexts for Learning

The creation of physical learning environments that were composed of purposeful, diverse and interconnected settings enabled particular spaces to be appropriated for specific learning activities. For example, the first floor layout in each of the seven School Within School (SWiS) buildings at Suburban High School included a) intimate settings for reflective or individual work, b) areas for collaborative or active work, c) spaces to gather tutorial groups and d) large areas for cohort meetings and other communal experiences (see Fig. 3). Similar settings were found and/or developed at the other two schools.

Accommodating 150 students from Year 7–9 (in year-level cohorts of 50 students working with three teachers), the interconnected nature of these settings in the SWiS buildings at Suburban High School provided students with the opportunity to shift between learning modalities without having to wait for access to an appropriate setting during a subsequent lesson—as had been the case only months before in traditional classroom environments. In these innovative learning environments, a variety of pedagogical encounters was supported. New socio-spatial contexts for learning emerged as purposeful settings became better integrated. Different settings mediated different forms of social interaction due to their structure and the types and arrangement of furniture items. However, it was the linking of these settings physically and socially, via more geographically distributed pedagogical
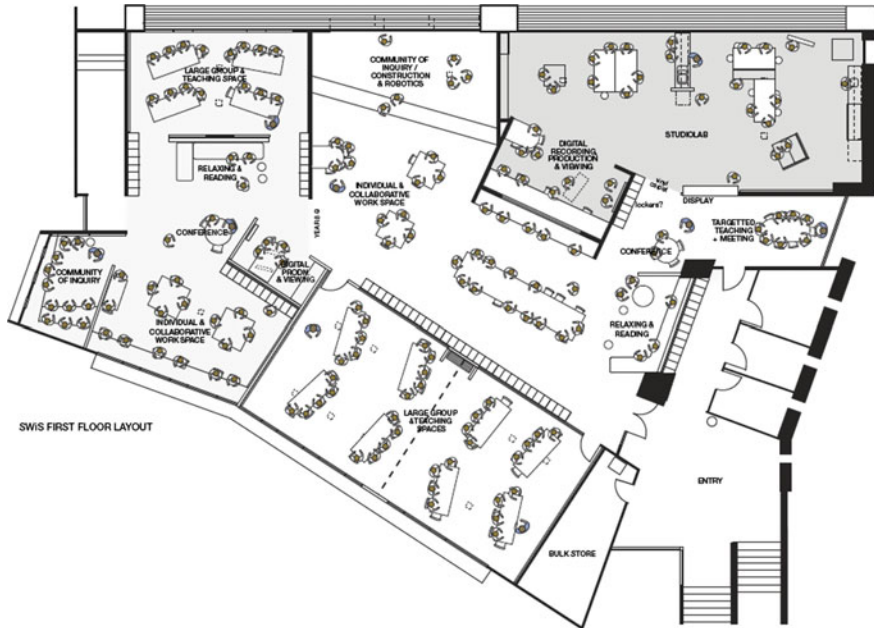
Fig. 3 Suburban High School, School Within School (SWiS) building first floor plan (image: Hayball & Mary Featherston Design)

approaches, that gave rise to a new social dynamic. The resulting flow of people, materials and information between purposeful settings meant that teachers and students were able to interact with each other in new ways to develop a variety of desired learning behaviours.

New Socio-Spatial Contexts for Learning and Curriculum Integration

New socio-spatial contexts for learning also provided new opportunities for curriculum integration. Indeed, a number of teachers suggested that curriculum integration was more likely to occur in these new contexts than in traditional classrooms. Opportunities for curriculum integration appeared to be supported by the integration of diverse settings and by the new social dynamics that were emerging.

Despite these opportunities, curriculum was, however, not integrated as commonly as might have been expected, nor as often as was desired by school leaders. Explanations for this in the high schools appeared to be associated with the devotion of teachers to their favoured disciplines and with the externally mandated curriculum, assessment and reporting frameworks they were obliged to follow. Additionally, the integration of curriculum appeared to be limited by issues associated with the management of learning resources. For example, staff at both high

schools struggled to provide resources for hands-on/craft activities in 'wet area' settings. The issue of who was responsible for purchasing and managing these materials was observed to slow the integration of curricula and the development of pedagogies that involved hands-on learning experiences. This tension was somewhat overcome by allocating an art teacher to one of the teacher teams at Seaside Secondary College. Her inclusion in the socio-spatial context not only supported the resourcing of the wet area, but also facilitated the expanded use of this setting as a site for interdisciplinary activities.

Characterising the Socio-Pedagogical Cultures that Emerged Within New Socio-Spatial Contexts for Learning

Culture was described by Jackson and Smith (1984) as a system of shared meanings that are dynamic and negotiable. Further to this, they suggested that culture may have spatial qualities and be associated with a sense of place. In discussing this link between culture and place, Dovey (2008) suggested that most theories of 'place' stem from philosophy, social theory and geography and are aligned with terms such as, 'identity', 'community', 'character' and 'home'. He believed, however, the common definition of place, as "a location experienced as meaningful within a larger spatial context" (p. 45), was too narrow. His contention was that "places frame and construct social programs and representational narratives, as they are framed and constructed by them" (p. 45).

Informed by these theories about culture and place (Jackson and Smith 1984; Dovey 2008), the new socio-pedagogical cultures that emerged in the case study schools are discussed below. These emerged as teachers and students developed new conceptions of place through their interactions with each other and with their physical surrounds.

Even amidst some of the ongoing tensions that existed in the case study schools, the new socio-pedagogical cultures that emerged were significantly different from those that had preceded them. School leaders reported that earlier cultures had been characterised by teacher-directed activities that provided students with limited choices regarding how they might engage in learning activities and interact with other students. They also reported that cultures had largely been defined by individual teachers and had differed between the spaces defined by traditional classrooms. However, the socio-pedagogical cultures that emerged within the new socio-spatial contexts in the case study schools supported teachers and students in adopting new roles and identities.

As teachers employed constructivist pedagogies, they progressively abandoned enforcing rigid social expectations on students and allowed them to develop their own approaches to learning. In addition, team-teaching structures liberated teachers from traditional roles and allowed them to become more collaborative practitioners. This change in role enabled them to communicate with students more frequently as individuals, rather than as collectives. Thus, the cultures that developed were increasingly accepting of student-directed learning and diverse activity.

Students formed new identities as they harnessed opportunities to become more self-reliant. Rather than wait for instructions from teachers, many students demonstrated increased initiative and independence. The majority of students relished their relative freedom. This was demonstrated through their behaviours and communicated during interviews. Many teachers also shared in this opinion, including Assistant Principal, Clare, at Suburban High School (28/1/2010):

> We have found that if the students feel comfortable in the environment they are in they settle down without rules and their work ethic improves. The students are now being treated and respected as individuals and seem to be emotionally settled and ready to learn. The relationship between students and teachers is much closer… It is something to do with the groups of 50, the teams of teachers and the spaces.

Of course, some students took the opportunity to 'opt out' and not consistently participate in learning activities. These evasive students required additional attention from teachers in order to keep them 'on task'.

New Socio-Pedagogical Cultures, Student Behaviour and Control

A positive characteristic of the new socio-pedagogical cultures was that students were generally well behaved. This led to a pervading sense of calm, as students settled into learning activities without the need for teachers to use 'standover tactics' to control their behaviour. Allan (26/8/2009), a teacher at Inner City Primary School, attributed improved student behaviour to the new social structures that had emerged following the refurbishment of the Year 5/6 area. He commented as follows:

> So instead of that kid being in the classroom where the teacher is telling him off half the time because he is a behavioural issue, he is actually in an environment where there are three teachers who are giving him support and guiding him through … it has a lot to do with the structure.

Assistant Principal, Clare, at Suburban High School (16/9/2009) also suggested that student behaviour had improved in their new learning environments:

> We have the two most challenging Year 8 groups in the school. They were so challenging that we could hardly manage them in term one [prior to occupying the school's new buildings]. But now that is not the case at all. Their behaviour has improved. They are the ones that we got the Minister [State Minister for Education] to walk through, and work with, when she visited.

Further to this, Assistant Principal, Clare (16/9/2009), suggested that teachers did not have to spend as much time trying to 'control' students because more students were engaged more of the time. She went on to say that "the fear was that as soon as you let them out of that little box your ability to control that behaviour and modify that behaviour might be reduced, but it hasn't been at all".

It appeared that the new socio-pedagogical cultures that emerged in the case study schools acted as overarching 'control measures' to guide student participation in constructivist learning experiences. The complex education systems that evolved

were framed by new physical, pedagogical and temporal arrangements and exhibited self-organising properties. The overall influence of these emergent cultures was that they supported improved student behaviour and engagement (discussed below).

Emergent Behaviours and Student Engagement

The objective in this section is to describe how a select few agents—principally those associated with innovative learning environments and constructivist pedagogies—interacted to influence students' behaviours and their engagement in learning activities. As cause and effect relationships can be difficult to identify in complex systems, it is important to qualify these findings by saying that student engagement was influenced by interactions between many agents—only a few of which were to be identified. This perspective is in keeping with Fredericks et al.'s (2004, p. 59) description of student engagement as a multidimensional construct that is "malleable, responsive to contextual features, and amenable to environmental change".

Signs of Student Engagement

Fredricks et al. (2004) identified three engagement subtypes: behavioural engagement, emotional engagement and cognitive engagement. They described each of these as follows:

- *Behavioural engagement* draws on the idea of participation; it includes involvement in academic and social or extracurricular activities and is considered crucial for achieving positive academic outcomes and preventing dropping out.
- *Emotional engagement* encompasses positive and negative reactions to teachers, classmates, academics and school and is presumed to create ties to an institution and influence willingness to do the work.
- *Cognitive engagement* draws on the idea of investment; it incorporates thoughtfulness and willingness to exert the effort necessary to comprehend complex ideas and master difficult skills (p. 60).

The following discussion draws on 15 months of regular observation of students in the case study schools.

Observations of Small Group Activities

Students' body language was identified early in this study as a useful indicator of student engagement. Body language provided evidence of students' willingness to participate in learning activities (behavioural engagement), revealed their reactions

to teachers, classmates and events (emotional engagement) and exposed their readiness to exert effort to master difficult concepts or skills (cognitive engagement).

Observation of collaborative small group activities revealed that students who sat with their heads close together, looking at and discussing common learning materials, were highly engaged, while those who sat even a small distance apart, perhaps just leaning back on their chairs, were less engaged. These less engaged students demonstrated little interest in looking at or discussing common learning materials.

Researchers who have studied student interaction and dialogue in small group settings have reported similar findings (e.g. Wilks 2005). Webb (1982) suggested that student interaction was influenced by characteristics of the individual, group and setting, and identified an individual's role in group interaction as an important influence on learning. Lodge (2005) described dialogue as a vehicle for engagement and suggested that student engagement was often expressed in excitement, raised energy levels, and physical proximity. As the proximity between students was often mediated by furniture items, these findings had spatial implications, suggesting that furniture items that enabled students to sit close together supported deeper engagement in collaborative group activities.

Observation also indicated that small collaborative groups operated better when there was some distance between groups (i.e. groups were dispersed). It appeared that although high student density was desirable within groups, it was not desirable between groups. Some distance between collaborative groups appeared to have a calming effect that allowed students to stay focused and involved in the activities of their group. These findings aligned with those of Weinstein (1979), who found that high levels of student density across open-plan learning environments were associated with dissatisfaction, decreased social interaction and increased aggression on the part of students.

Observations of Teacher Led Activities

Higher levels of engagement were observed when tutorial or discussion groups were limited to 15–17 students, as such numbers generally allowed students and teachers to sit facing each other. When arranged in circles or semicircles, the proximity between students in groups of this size was found to be close enough for them to feel part of a functioning unit. When students were gathered in larger groups, these functioning units tended to break down—especially when teachers gathered student cohorts of 50–75 and attempted to engage them in discussions for more than a few minutes. Even groups of 25 students appeared to be too big to support the engagement of all students due to restricting face-to-face interactions with other members of the group. In support of these observations, students made the following comments:

In a smaller group we get more say. If there are 75 kids you won't get to choose really what you want. But if it is a smaller group you get more say about what to do … I like it when it is not too big (Rowan, Inner City PS student, 15/12/09).

When we divide into smaller groups, we can better understand what we are supposed to be doing (Shanti, Suburban HS student, 29/10/09).

It seemed that the longer a discussion/activity went on, the smaller the group size needed to be for the discussion/activity to be productive. The key factor that appeared to influence this relationship was the need for face-to-face contact between group members.

Students' Geographic Experiences and Student Engagement

The geographic experiences that were afforded by the innovative learning environments in the case study schools appeared to have a positive influence on the engagement of the majority of students. The buildings mediated social settings in which most students felt comfortable and the majority of students appeared to be more engaged when able to move and inhabit settings as they wished.

The relative geographic freedom that students experienced appeared to not only support their physical transition between learning activities, but also their mental transition between activities. With regard to the high levels of student engagement, Craig (26/8/2009), a teacher at Inner City Primary School, made the following comment:

All indications are that our kids are engaged, the parent feedback is that the kids haven't ever been happier at school, the vast majority of them … there is no one in here that is just dumping their head on the table going, you know this is boring … I think it has been contained really well, particularly compared to other times at the school [in the past], where we had big problems with the Year 6 s acting up and getting bored over the last six months [of the school year], thinking it is a waste of time.

Enabling students to participate in a range of pedagogical encounters within the same overall learning environment was found to foster positive outcomes. High levels of engagement were supported by:

- Opportunities for students to engage in a range of diverse activities;
- Opportunities for flexible group arrangements that offered students regular transition between working on their own and as members of groups; and
- Access to a variety of learning materials and resources.

These findings corroborated with those reported by Weinstein (1979), who identified connections between more 'humane' spaces and better attendance, greater participation and more positive attitudes towards the class, the instructor and classmates.

Constructivist Learning and Student Engagement

The new socio-pedagogical cultures that emerged in the case study schools provided opportunities for students to move beyond learning experiences that were primarily directed by teachers to participate in constructivist learning activities (Strommen and Lincoln 1992). These opportunities allowed students to show initiative and take ownership of their learning—a situation they appeared to relish. Daniel (29/9/2009), a student at Suburban HS, made the following comment in relation to an opportunity that he and his peers were given to pursue a project of their choosing:

> During immersion week we had to make a product that was environmentally friendly. We could either make it or draw it and we actually made it. We made a solar panel charger … I got to work with my friends and we made this, like, huge model that actually worked.

Assistant principal, Clare (16/9/2009), at Suburban HS also commented on this situation. She recalled a conversation a female colleague had with students in which they expressed their desire to have ownership and control over their learning:

> She asked them, 'do you like doing this project?', and they all said 'oh we love it'. And she said, 'why do you love it kids'? And they said, 'because we are in control … and it is great because we can do what we want, when we want to do it, and we can move around and this is really fun'. And one of them said, 'we know it is English and stuff but you wouldn't think so. English is good because you get to do other stuff, so you don't realise that you are learning even when you are'.

Teachers at both Inner City Primary School and Seaside Secondary College also reported that student engagement was higher when students were provided with opportunities to work on constructivist, project-based activities that enabled them to work individually or in small groups on multiple aspects of a task, across a variety of activity settings. Allan (26/8/2009), a teacher at Inner City Primary School, described the engagement of students when making choices about which pieces of work they should put in their portfolios:

> It's about students being concentrated on the task. Totally on task—going through, looking at their work, making judgements about the work, talking to their mates and saying, 'what you think about this piece of work'?… Can you read that for me? Do you think I have learnt about paragraphs in that?… For me it (quality student engagement) looks like, kids at computers working on their own, kids at computers working with a friend, kids sharing, kids working individually, kids focused on their learning and thinking about their learning. Finishing tasks because they want to complete aspects of their learning, or they want to show their learning. And it's not just to prove it to the teacher or to get a mark. It is so they can say, 'I am putting this in my portfolio because I really want to show you that this is what I have learned, and that I have been engaged in this task'… It is not about getting A,B, C, 9/10 or 8/10 (marks). It is actually about showing learning.

Interaction with Teachers and Student Engagement

Student engagement was supported by team-teaching arrangements. Individual teachers were able to take on a number of different roles and spend significant

amounts of time with those students who required additional support, while other teachers moved around to attend to the needs of those students who required less teacher direction. To this end, Craig (26/8/2009), a teacher at Inner City Primary School, reported that, "we have had feedback, direct feedback from students and parents, telling us that they really enjoy having more than one teacher".

It was acknowledged by teachers and school leaders that collective efficacy within teacher teams was important to ensure that students did not 'slip between the cracks' and avoid participating in learning activities. Nevertheless, a few students still managed to avoid 'doing the work' by quietly moving to remote areas of learning environments, beyond the clear view of teachers. Allan, a teacher at Inner City Primary School, suggested that these students could be a little difficult to keep track of. However, he was of the opinion that once the new education model at the school became better established they would be better equipped to ensure the needs of all students were addressed.

ICT and Student Engagement

The resource that really enabled students to maintain high levels of engagement while working with some independence from teachers was information and communication technology (ICT). Near ubiquitous access to ICT at all three schools enabled students to frequently transition between physical and virtual/digital media. This did not mean that students used computers all the time. In general, students did not appear to be any more or less engaged in tasks when using pen and paper or computers—so long as they could transition between these media as required.

Teachers across the case study schools identified that consistent access to ICT enabled students to work well on their own, even when other students were working within close proximity. This observation indicated that ICT supported student engagement in individual activities. In addition, students were observed to work well in pairs on computers. Such collaborative efforts often supported rich dialogue between students, aiding their engagement in academic tasks and supporting knowledge transfer between students. Of course, some students abused their relative freedom and played online computer games; however, such behaviour was observed infrequently.

Such findings aligned well with Monahan's (2005) conclusions that technologies can operate as extensions of space and computers can reinforce or challenge traditional expectations about spatial arrangements and pedagogical practices. These observations also suggested that the emergence of hybrid learning environments (Skill and Young 2002; Weiss 2007) followed a nonlinear path that involved both students and teachers contributing to the development of new pedagogical practices and the creation of connections between people, environment and technology. Certainly, the emergence of hybrid, or blended, learning environments was associated with contemporary ideas about pedagogy, integrated curricula, individualisation of learning, learning through cooperative group work and a focus on higher-order thinking (Zandvliet and Fraser 2004).

The Overall Effectiveness of Innovative Learning Environments

The participatory action research (PAR) methodology that was central to this study explored the development of space and practice in the case study schools. At Suburban High School and Inner City Primary School, the PAR focused mainly on how innovative learning environments could be used to support the development of new pedagogical models. At Seaside Secondary College, the PAR developed into an educational visioning and spatial design project, following the school's decision to update the physical environment in a selected space called the Hub. Across the sites, the common theme that was revealed via the PAR process was that the effectiveness of innovative learning environments was primarily a function of how well space and practice aligned.

The Effectiveness of Innovative Learning Environments: A Matter of Alignment

This research revealed that the effectiveness of innovative learning environments is primarily associated with how well particular pedagogies, curricula, assessment practices and social factors are supported by, or aligned with, particular environments. With regard to constructivist pedagogies, the effectiveness of innovative learning environments was found to be associated with the ways dynamic 'complex' interactions were supported by particular spaces.

Gaining insight into the educational visions, or philosophies, behind spatial designs was found to be essential for evaluating the effectiveness of innovative learning environments. For example, some visitors to Suburban High School who were not privy to the schools' objectives were witnessed to report negative reactions to the design of the school's new buildings. They suggested that the learning environments were too busy, too noisy and provided too little containment for the delivery of a high-quality education. Once new pedagogical practices were given a chance to emerge, however, the new learning spaces performed well when examined through the lens of the schools' educational vision. Indeed, many of schools' spatio-pedagogical objectives were met within the first year of occupation. The new spaces enabled team-teaching approaches, catalysed the adoption of constructivist pedagogies, facilitated social connectedness within learning communities, supported collaboration between students and between students and teachers and provided opportunities for students to pursue personalised learning goals through inquiry-, project- and problem-based learning activities.

Furthermore, it was found that the effectiveness of innovative learning environments was closely related to how well collaborative socio-pedagogical cultures could be supported by physical surrounds. For example, the effectiveness of the

Year 5/6 learning environment at Inner City Primary School was demonstrated on two occasions when two of the three regular teachers were away. With only one regular teacher and two casual relief teachers, the continuity of the educational programme was hardly disrupted. The sole regular teacher was aware of the day's schedule for all 75 students and did not need to change any of the day's activities. Indeed, the casual relief teachers were sparingly required as the students were able to pursue self-directed activities that required only infrequent input from the teachers. The team-teaching structures that had been put in place negated any potential disruption to the students learning that may have occurred due to the absence of the teachers. The effectiveness of the learning environment was associated with the socio-pedagogical dynamics that had emerged within this environment: dynamics that had been enabled by the spatial design and developed through regular discussions between teachers and students about how people should interact and use their environment to support learning. Allan (26/8/2009), a teacher at the school, commented:

> I think that another very, very, very, powerful part of it is the student voice and the learning partnership. So from day one … the three of us talked with our kids, and the language has always been, 'the team' … We are all responsible for what happens in here in terms of learning. We are all responsible for our own learning and we are all equally responsible for each other's learning. So that notion of the team, of sharing, of working together, of shared responsibility, as well as individual responsibility, founded on values, trust and respect [is important] … I think, you couldn't have done it as powerfully in an individual classroom as you can do it in a collective sense because the teachers are modelling it. The teachers are living every minute of the day and so therefore the culture is a living, breathing, vibrant thing.

Although the effect of spatio-pedagogical reforms on students' academic outcomes was beyond the scope of this research, the positive influences of the spatial and pedagogical reforms implemented in the case study schools were confirmed by the words and actions of the teachers and students.

Conclusion

Conducting this research through the lens of complexity theory and complex adaptive systems theory facilitated a holistic view of phenomena. These conceptual tools offered an intrinsically subjective (Heylighten et al. 2007) perspective on the settings in the participant schools, a perspective that dealt with uncertainty, connectedness, self-organisation, emergence over time and development through adaptation and change (Cohen et al. 2007). This perspective allowed societal, community, institutional and individual change to be recognised and multiple perspectives and multiple effects to be simultaneously chartered.

In conclusion, the most prominent of the interactions between learning environments, pedagogies and student engagement is highlighted below.

The Emergence of New Socio-Spatial Contexts and Socio-Pedagogical Cultures

The study revealed that innovative learning environments and constructivist pedagogies interacted to create new socio-spatial contexts for learning. These supported the flow of people, materials and information between purposeful activity settings and enabled teachers and students to develop a variety of new learning behaviours that were in keeping with contemporary middle years' educational theory (e.g. Barratt 1998; Beare 2000; Carrington 2006; DEET 2002; Hill and Russell 1999; Pendergast 2006; Pendergast and Bahr 2005).

Subsequently, new socio-pedagogical cultures emerged through complex and nonlinear interactions between the social and physical components of these socio-spatial contexts. Framed by new physical, pedagogical and temporal arrangements, these cultures of practice frequently exhibited self-organising properties and often acted as overarching 'control measures' to guide student participation in an array of learning experiences.

Student Engagement in Emergent Socio-Spatial Contexts and Socio-Pedagogical Cultures

The socio-spatial contexts and socio-pedagogical cultures that co-evolved and mutually adapted in the participant schools were observed to have a positive overall influence on student engagement. Engagement was supported by opportunities for students to engage in diverse activities, transition between working on their own and as members of various sized groups, and access to a variety of learning materials and resources. Students were most highly engaged when working on constructivist, project-based activities that enabled them to work individually or in small groups on multiple aspects of a task, across a variety of activity settings.

Student engagement was supported by team-teaching arrangements. Collective efficacy within teacher teams was important to ensure that students did not 'slip between the cracks' and avoid participating in learning activities. Collaboration between teachers improved as teachers became more comfortable working within new socio-spatial contexts and gained vital experience working together. In situations where both teachers and students recognised their 'collective responsibility' and their role as part of 'the team', the ensuing democratic socio-pedagogical cultures that emerged had a pronounced positive influence on student engagement.

Access to ICT enhanced student engagement when students were required to work independently of teachers. Access to online information and a variety of presentation media supported students as they engaged in constructivist

inquiry-based projects, enabled them to frequently transition between physical and virtual/digital media and helped break down boundaries between learning at school and at home. In agreement with the findings of Zandvliet and Fraser (2004), the emergence of hybrid (blended) learning environments was found to be associated with contemporary ideas about pedagogy, integrated curricula, individualisation of learning and learning through collaboration. In addition, nonlinear interactions between people, environments and technology contributed to the emergence of hybrid (blended) learning environments and the development of new pedagogies. These emergent practices demonstrated that in-class (physical) and out-of-class (virtual/online) activities could be integrated and that these learning experiences could be highly engaging.

The Effectiveness of the Innovative Learning Environments in the Case Study Schools

The socio-pedagogical cultures that best supported constructivist pedagogies and student engagement were characterised neither by social order, nor by disorder, but by social dynamics that were "situated somewhere in between" (Heylighten et al. 2007, p. 11). Indeed, these settings functioned best when students (social components of these complex systems) were partially independent and autonomous in their behaviour, while undergoing direct and indirect interactions with their environment, technologies, peers and teachers.

These findings indicated that the effectiveness of these innovative learning environments was associated with how well they supported complex interactions i.e. a product of how well particular pedagogies, curricula, assessment practices and social factors were aligned with the environment.

Assessing the Educational Effectiveness of Learning Environments

If innovative learning environments are to be assessed for the ways they support constructivist pedagogies and student engagement, they must be assessed within the context of the educational systems that they are intended to support. Therefore, subjective assessments that are based on the opinions of people who have experienced the complex physical and social interactions that occur in these settings are required i.e. the effectiveness of a learning environment cannot be assessed objectively, or in isolation from the educational programme that it is intended to support. Insight into the educational visions behind spatial designs is required for the effectiveness of innovative learning environments to be properly assessed.

The Role of Innovative Architecture in a Complex Adaptive System of Education

Internationally, the majority of schools and schooling systems are governed by negative feedback loops. This means that schools and their supporting agents are often highly resistant to change and do not deal well with turbulence or shocks to the system. The majority try to maintain the homoeostatic nature of the system in preference to making adjustments to adapt the system to new circumstances. In the increasingly globalised world, rapid change has become the norm and schooling systems need to learn how to make regular adjustments if they are to remain relevant to students and the needs of society. Thinking of learning environments, schools and school systems as complex adaptive systems may help them respond more effectively to the current and future needs of individuals, school communities and wider society.

This study showed that, when well designed, innovative architecture can enable middle schools to function as complex adaptive systems and self-organise to cope with a variety of pressures and disturbances. Replacing traditional classrooms and educational systems designed around notions of industrialisation with spaces and educational models that can facilitate connection and flow (Law and Urry 2004) was observed to support pedagogical innovation and the emergence of new socio-pedagogical cultures that were characterised by individualised learning, collaborative learning, integrated curricula and formative assessment practices. Furthermore, these cultures were found to support constructivist learning experiences and generally high levels of student engagement.

Not only that these dynamic and nonlinear systems were able to 'learn' (Davis and Sumara 2006) as they responded to positive feedback loops. Such 'learning' enabled middle years' cohorts to self-organise to a significant degree to cope with a variety of pressures and disturbances, while supporting contemporary learning experiences aligned with current middle years' educational theories (e.g. Barratt 1998; Beare 2000; Carrington 2006; DEET 2002; Hill and Russell 1999; Pendergast 2006; Pendergast and Bahr 2005).

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Trialling Innovation: Studying the Philosophical and Conceptual Rationales of Demonstration Schools in Universities

Garth Stahl, Stephen Dobson and Stephen Redillas

Abstract The concept of the demonstration school (a community of learning and applied research inquiry in an integrative designed space) dates back to the Peripatos of Aristotle. In contemporary times, demonstration schools—housed on university campuses and often integrated with teacher training programmes—have been supported with Deweyan arguments about trialling learning environments that meld theory and practice. Many are sites of educational research, where educationalists, practicing teachers and pre-service practitioners collaborate to teach, study, reflect and debate. Some have integrated problem-based curricula approaches with learning analytics, design thinking, digital adaptation and eco-friendly uses of technology. At the same time, some are also places in which competing imperatives play out, as those on site seek to adapt pedagogic, infrastructural, funding and governance arrangements to accommodate stakeholders. This chapter first recounts the historical legacy of demonstration schools before analysing contemporary realisations of demonstration schools' sites drawing on recent research in Asia, Europe and the USA. The focus is on how these modern learning environments are shaped by discursive connections between philosophy, learning science, design, innovation policy and science and technology studies. Drawing on expertise across these fields, we investigate how these sites meet the contemporary challenge to link the pedagogic, spatial and technological/digital in sites where social and educational innovation coexist.

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Introduction

The concept of a demonstration school dates back to Aristotle's *Peripatetic School*, a community of learners, which gathered on the grounds of the Lyceum around 335 BCE. This was an informal collective whose members devoted themselves "to collecting and explaining the most varied phenomena of the physical world" (Natali 2013, p. 111). A characteristic of Aristotle's school that may provide the seminal conception of demonstration school is the "idea that a good way of living the *bios theoretikos* is to devote oneself to collecting and explaining the most varied phenomena of the physical world" (2013). Therefore, at its very core, a demonstration school is focused upon ongoing investigation and analysis. In contemporary times, these institutions—housed on university campuses and integrated with teacher training and research programmes—have been supported in the twentieth century with Deweyan arguments about trialling and developing learning environments that are intent on putting theory into practice and vice versa.

Dewey's educational theory, and efforts to reconceptualise approaches to curriculum development, heavily accounts for the theory-practice split. An example of this split appeared in the works of curriculum theorists such as Pinar and Grumet where they explicitly rejected the scientific conception of theory and reinstituted the importance of contemplative exercise over practice (see Wraga 1999 for more details). For Dewey, the link between the method of science and curriculum improvement was unassailable. According to Dewey, whether research results from any field "really serve [educational purposes] or not can be found out only in practice" (1929, p. 3) and must be done systematically rather than incidentally. Rather than separating science from the humanities, Dewey suggested that "the value of science, the history and philosophy of education acquired in the training school, resides in the enlightenment and guidance it supplies to observation and judgment of actual situations as they arise" (p. 31). Furthermore, in reference again to Dewey's melding of theory and practice we call attention to Dewey's emphasis that the application of the scientific method be democratic. The demonstration school, with its overreliance on external powers, makes the system imbalanced, and therefore, democracy is challenged by virtue of the stakeholders' ability to exert influence.

We define 'demonstration schools' as active functioning schools on university campuses, which typically include integrated teacher training and research. Built upon Dewey's laboratory schools, educators and researchers utilise this infrastructure to identify and test ideas critical to educators' practice (Schwartz and Gerlach 2011). Therefore, their connection to the university setting was essential for the freedom of inquiry it could provide (Hausfather 2001). In contemporary times, these multi-purpose design spaces function as communities of learning where research inquires how the day-to-day activities are integrated to constitute learning. As institutional cultures, demonstration schools comprise multiple contexts both within and beyond the institution (Brennan and Osborne 2005). In these institutions, educationalists, practicing teachers and pre-service practitioners collaborate

to teach, study, reflect and debate. Similar to Aristotle and his students, an ongoing reflective dialogue is typically integral to these institutions. Yet each demonstration school is unique; contemporary realisations have integrated problem-based approaches with creative pedagogies, learning analytics, design thinking, digital adaptation and the eco-friendly uses of technology. Many also embody constrained spaces, in which competing imperatives are balanced. Educators who work in demonstration schools must adapt their practice within constraints of infrastructure, funding, stakeholders and governance arrangements. Where Aristotle's peripatetic gatherings at the Lyceum were informal (with no set curriculum, requirements for students, or even fees for membership), the demonstration schools of today are altogether different communities of teaching and learning. In exploring some of the philosophical and conceptual rationales underpinning them, we call attention to the historical development of the demonstration school before analysing how they work in contemporary times.

As a physical structure, the demonstration school was first realised in Europe with J.J. Findlay's work in 1903. For Findlay (1910/2006), specific principles embodied in the demonstration school are the following: "space for training, recognizing the continuous development and link of theory and practice, employs multiple but student-centered method, teacher is a scholar (researcher), interactive and collaborative, and where school experience and abstract principles are coordinated with student as life-practitioner". When he was appointed to the Sarah Fielden Chair at University of Manchester, Findlay's interest in a demonstration school intensified and he became the first professor to secure funding and promote a new approach to teacher training. Findlay had learnt in Germany the need for a new concept, a *Universitats Padagogik*, which was focused on the daily workings of professional practice to, in turn, examine this in the light of larger and deeper principles. Between 1903 and the early 1920s, Findlay was devoted to establishing the Fielden Demonstration School, which largely drew on the broad principles of Aristotle's teachings but more specifically Dewey's scholarship. Robertson (1992, p. 362) writes: "When he talked of 'laboratory', Findlay was thinking of the context of learning and discovery in an open-minded and collaborative way, rather than of experimental method in a scientific sense". Yet, despite some modest gains, the idea struggled due to funding issues and underwent many reiterations before eventually dying out.

Demonstration schools, as we will see, have always faced a variety of challenges in terms of ideology, space and funding. The Fielden Demonstration School is the first example, but many followed including the famous Dewey's Laboratory School at the University of Chicago, which still continues to this day. The beneficence of establishing a continuous link between learning and research was evident as Dewey viewed his school as a laboratory for researching and verifying new and innovative educational theories and principles (Tanner 1997). As an international phenomenon, many demonstration schools today are affiliated with the International Association of Laboratory Schools (IALS), which focuses on five areas: research; professional development; curriculum development; teacher training; and educational experimentation. While Findlay's *Universitats Padagogik* lacked a focused

research component, current demonstration schools are largely research-intensive places where, in many cases, the research is an integral part of the funding structure at most demonstration schools globally. Such research initiatives are infused with contemporary prerogatives concerning how education systems required their users to acquire appropriate lifelong skills. Within these demonstration schools (or "learning laboratories"), educators—whether they be teachers, school leaders, teacher educators or lecturers, often approach their work in ways which negotiate significant constraint to ensuring their continued viability.

This chapter first describes the purpose and intent of the research project before analysing both the historical legacy and contemporary conceptualisation of demonstration schools drawing on data collected from education precincts across three continents. An analysis of what is happening in these institutions and the ideas that link them and inform their daily practices means tracing discursive connections between philosophy, learning science, design, innovation policy and science and technology studies. Drawing on expertise across these fields, we investigate how these sites meet the contemporary challenge to link the pedagogic, spatial and technological/digital in sites where social and educational innovation coexist.

The Research Project

Australian tertiary education is facing unprecedented challenges about the quality of its graduates. Debates exist concerning how prepared graduates are to work as teachers in classrooms, social workers and psychologists operating in care settings, or as graduates working in digital media, communication, creative industries or design. Graduates working in the caring professions will have to possess emotional intelligence and advanced understanding of human development and cognition, as well as problem-solving capacity, international adaptability, linguistic skills, digital and design facility, open-source information exchange and competence in producing and interpreting large amounts of data. Furthermore, graduates will need to be culturally informed and imaginative: able to build indigenous knowledge into their practice, but also familiar with Confucian, Scandinavian or British, and North American educational models and practices of learning. Australian graduates will contend with high levels of multicultural diversity in which it is predicted an unprecedented increase in the population of both refugees and international students into the education system.

In contemporary times, demonstration schools housed on university campuses and integrated with teacher training programmes have been supported with pragmatic arguments about trialling innovative learning environments and outcomes. The *Education and Design Living Laboratories Study (EaDLLS)* is an international cross-comparative project at University of South Australia (UniSA) designed to research demonstration schools as modern learning environments to better understand their effectiveness, how they worked and their best practices. Thus, the key question is how the space of demonstration schools facilitates the development of

twenty-first-century learning and research designed to benefit both pupils and pre-service teachers. The immediate research team was diverse, composed of architects, designers, scholars in the social sciences, educational theorists and members of university managements. We sought to know what challenges they faced and what could be borrowed for a site of our own. Conducted in Asia, Europe and the USA, the research is intended to provide a compelling rationale on a formal bid for government to fund a demonstration school on the Magill campus in Adelaide, Australia. Though the term demonstration school is used in Australia, there are no examples of such on university campuses and working in close conjunction with teacher education programmes. In their prerogative to meld theory and practice, many demonstration schools are also sites of innovative educational research where staff collaborate in partnership to study, reflect and advance learning in discursive spaces both for students they serve and for pre-service teachers in training. As these institutions pursue trialling progressive approaches to learning, they often face tensions in terms of funding, governance, adaptation as well as spatial challenges.

Understanding Philosophical and Conceptual Rationales

In our research, we draw upon the concepts of John Dewey and also from theorisation of institutional cultures. For Dewey, "[k]nowledge from the cognate disciplines certainly could inform education, but only when applied to the educational situation" (Wraga 1999, p. 8). Beholden to the application of scientific principles when theorising curricula, Dewey (1929, p. 41) writes: "Much of the barrenness and loose speculation in the humane sciences is directly due to remoteness from the material that would stimulate, direct and test thought." Findlay's work on the Fielden Demonstration School capitalised on this philosophy where, in Dewey's ideal world, teachers would engage in reflecting about and testing possible solutions to practical problems.

As standards-based curricula are emerging universally, it is an appropriate time to turn to Dewey's (1972) understanding that "educational theory is marked by opposition between the idea that education is development from within and that it is formation from without". In our study, this contrast emerged in the observation that educational policies which structure demonstration schools could be viewed as conditioned from "without" while how individuals, particularly the leadership teams and teachers we spoke with are positioned as corresponding agents of 'developments from within'. As our focus is on how history informs current practices in these institutions, we consider how Dewey's concept of *experience as chronological*, and his understanding of competing pressures (*without* and *within*), positions the educator as a reflective practitioner (Jeffries and Maeder 2011) who reconstructs their experience whereby: "to reflect is to look back over what has been done so as to extract the net meanings which are the capital stock for intelligent dealing with further experiences. It is the heart of intellectual organization and of

the disciplined mind" (Dewey 1972, p. 87). This notion of critical thinking expressed in reflective act helps revisit a critic that Dewey paid little attention to forms of systematic oppression and hegemony (Noddings 2012) in the context of his demonstration school.

In devising conceptual rationales for undertaking this research, it is essential to consider the shifting governmental frameworks for administering the financing, maintenance and future planning of school facilities. In terms of governance, these global sites are extremely diverse in their structures and while they may be innovative in their approach, they are still constrained by consistent lack of funding and challenge of translating their design integral/useful in terms of research. To better comprehend these institutions, we need to first understand the forces currently at play in redefining their agendas for their users, university lecturers, pupils, pre-service teachers, etc.

Keeping the complexity and diversity of factors influencing demonstration schools, we proceeded to probe its significance to social work, cognitive psychology, languages, indigenous/cultural studies, learning innovations, learning analytics, information and communication technology. The research was grounded on the need for pedagogic, policy and architectural understanding of international traditions and new models but also the constraints each individual site faced. To this end, we also looked into the physical designs of demonstration schools (classrooms, school spaces, etc.). We theorised demonstration schools as institutional cultures—or an institutionally mediated "way of life"—comprising multiple contexts both within and beyond the institution, accessible through structural and physical organisation as well as curricula (Brennan and Osborne 2005; Bronfenbrenner 1979). Values, culture, history and other social demographics are embedded in these institutions; such a theorisation illuminates how competing imperatives play out on site in the areas of pedagogy, funding and governance, and infrastructural arrangements. The critical link between space, time and the curriculum within a comprehensive model of how students learn within particular fields of knowledge (Nespor 2014) sustains the relevance of studying demonstration schools in relation to teacher education.

In the study of higher education, curriculum is not the only institutional factor deemed to mediate learning in higher education (Brennan and Osborne 2005). Refining this focus, Brennan and Osborne consider the factors that mediate learning in universities. Placing curriculum at the centre of their thesis, they argue that:

> The way curricula are organized can determine who will study alongside whom, whether learning is a collective or individual experience, the nature of student interaction with academic staff, and whether student leisure and friendship patterns are shaped 'within' the study programme or are largely outside it (2005, p. 5).

Consideration is also given to the organisation running the institution where Tierney's (1988) concepts of institutional mission, strategy and leadership are forefronted, as are the ways in which an institution chooses to organise. Keeping in mind shifts to inquiry-based teaching, we must look critically at how demonstration schools work with the university in what our participants often define as an

awkward partnership. Indeed, to do this, we must consider the wider higher education organisation both in terms of the structural organisation (staff departments and student programmes) and in terms of the physical organisation of the space available (the organisation of institutional buildings). The ways, then, in which the demonstration schools are structurally and physically organised as well as the rules and procedures that govern them are—along with curricula—taken as central components of comprehending the interworkings of institutional culture.

In investigating contemporary demonstration schools, we consider what Henri Lefebvre (1991, p. 38) termed 'the representations of space' where 'conceptualized space, the space of scientists, planners, urbanists, technocratic subdividers and social engineers […] all of whom identify what is lived and what is perceived with what is conceived'. In considering philosophical and conceptual rationales, our focus is on *what counts* and *why it counts*. In Foucauldian terms, we see this as the concept and challenge of heterotopia, how spaces that surround the subject in social existence can reduce its autonomy and even the sense of its own identity.

> This problem of the human site or living space […] includes the interrogation of what relations of propinquity, what type of storage, circulation, marking, and classification of human elements should be adopted in a given situation in order to achieve a given end (Foucault and Miskowiec 1986, p. 23).

Theorising the demonstration school in this way warrants an inquiry on how power is negotiated between varieties of stakeholders, what expedites innovation and what remain significant barriers.

Methodology

In *Stage 1*, desktop research established the key sites. During this time, we consulted primary and secondary historical sources, websites and policy documents, and news articles from local and national sources. Within key documents, we performed several readings and made notations as to how the institution was ideologically constituted. In *Stage 2*, visits were conducted in Asia, Europe and the USA by team members with supplementary expertise; these site visits were staged over several months and involved observations, interviews and collection of materials such as photographs, design blueprints and data on learning outcomes or on community and user responses. In each country, there were multiple sites allowing for cross-comparisons within the countries themselves and also international comparisons. The primary method of data collection was qualitative interviews conducted remotely or on location. To date, we have had purposeful conversations with school leaders in demonstration schools in nineteen sites.

Turning to literature on institutional or organisational culture, Tierney (1988, p. 8)—writing on organisational culture in higher education—proposes six 'essential' concepts required to access the culture of a university: environment, mission, socialisation, information, strategy and leadership. To understand how the

Deweyan notion of developing learning environments intent on putting theory into practice and vice versa, we consider how it is conceptualised and promoted within these unique and innovative settings. To analyse these learning environments, we broke them down according to:

- History and Contexts
- Values and Ideology
- Curriculum and Pedagogy
- Budgets and Governance
- Pupils
- Teachers
- Pedagogical and Spatial Insights
- Social/Learning Innovation and Research
- Relationship with the Community.

While there was a team leading on the project, the research was a highly inclusive activity that sought to get feedback and input from the entire staff at UniSA. This was done through presenting the findings at various events and feedback sessions. The expertise of the immediate team of researchers has been discussed, but it should be noted that the analysis was interdisciplinary and focused upon how these institutions meet the contemporary challenge to link the pedagogic, spatial and technological/digital in sites where social and educational innovation must coexist. Drawing on the philosophical and conceptual rationales associated with Dewey as well as institutional theory, we focus on the pedagogic, spatial and technological/digital in demonstration schools where the potential for social and educational transformation coexists. To address this, for the purposes of this chapter, we address (1) the funding and governance and (2) the relationship between space and learning.

Findings

Funding

The constraints of funding are a perennial issue raised by nearly all the sites in the research. More specifically, *consistent* funding was a cause of continual concern. In some of the sites in the USA, it was apparent that funding ebbed and flowed, whereas in South Korea the funding was consistent. Inconsistencies in funding reflect the vulnerability of these schools to political climate, nation's economy and state priorities. It did appear that sites in which the funding was more consistent and predictable were where long-term and short-term innovation could be fostered which was apparent in Denmark and the Philippines.

In nearly all the sites we studied, funding was heavily relied upon from both the university and outside sources. Therefore, funding structures were often an

amalgamation of government subsidies, tuition fees, donations and others through securing external grant funding. For example one site in the USA had an interesting three-way structure to secure its financial viability: a foundation within the university, fee money and public fundraisers, whereas, in contrast, another American site in Florida had a more consistent funding structure due to special state legislation. In this second site there was a trade-off with staff being legally required to go into other schools and provide them with high-level consultancy and to also accept research initiatives from the university. Since the extent of funding helps to determine the quality of learning and research innovation in these schools, it also influences how education theories are squared with practice in these demonstration schools. As such, the sources of funding—as an external pressure—do not only determine the level of innovation or transformation but also the extent of each demonstration school's autonomy in relation to the university.

Governance and Autonomy

In an aspirational document by Australian Primary Principals' Association (2015), they defined school autonomy [as that which] "allows (for greater) local decision-making in the allocation of human and physical resources, curriculum implementation and collaboration with other schools". Nearly all the sites in the study were fairly autonomous in terms of their daily governance though in financial terms most of them were dependent on university and state funding. The extent of autonomy is largely determined by the composition of school board and the leadership who organised the daily activities within the demonstration schools. For demonstration schools closely aligned with universities (such as those in the USA, the Philippines and South Korea), school boards typically include ranking university officials and local elected officials, while for independent schools the board is composed of owners and those who are directly involved in school operation (the UK, Denmark and Spain). We found that school boards—though different in terms of manifestations across the data set—determine the extent of autonomy not only in terms of curriculum and pedagogy but also on access to expertise (multi- and interdisciplinary), the nature of possible research as well as the outreach dimension. Furthermore, while no particular site discussed feeling their vision of education was compromised in any way, several respondents voiced the importance of autonomy in sustaining learning and research innovations. For instance, among publicly funded demonstration schools, the demand for autonomy is more manifest in the subject of research which includes among others the critical evaluation of state configured curriculum and pedagogy.

Funding and governance dictate *what counts* and *why it counts*. In our study, funding dynamics—as well as areas and levels of educational autonomy intertwined with them—contribute to the institutional culture as a 'way of life' in and of demonstration schools. Indeed, for Berger and Luckmann, institutions "by the very fact of their existence … control human conduct by setting up predefined patterns of

conduct, which channel it in one direction as against the many other directions that would theoretically be possible" (1967, p. 55). This notion of institutional culture cannot be more palpable than in the 'space' (demonstration school) wherein Dewey's commitment to the application of theory and research is relied on to address ongoing inquiry.

Relationship Between Space and Learning

Following Gieryn, we investigate spaces of the institutional field as defined by "location, material form and meaningfulness" (2000, p. 466). It has been argued that space can be conceived as lived experience, with an emphasis on what space 'tells' its users through its configurations, its images and symbolic dimensions. Within demonstration schools, as flexible and evolving learning environments, there are consistent threads and positioning both on how the space is constituted (adaptable classrooms, learning clusters, break-out rooms) on a daily basis but also on what messages regarding learning these spaces communicate. In the interrogation of this internal configuration and external communication, important questions are: what is the ideology of space, and what are the discourses it articulates? How, in the study of demonstration schools, may space be deciphered (Lefevbre 1991)?

Interrelated to funding and governance, space was mentioned by nearly every site as a critical issue directly related to a demonstration school's ability to innovate or transform. The conversations regarding space functioned in a variety of ways. The expansion of space (and the technology within it) costs money, though with more space these institutions can add students and obviously technological innovation has its marketing value. Therefore, arguably, their 'meaningfulness' is differentiated not only by funding but how educators and leadership teams utilise these spaces. As we saw in the USA, for state-funded demonstration schools, they also provide social equity to rural and marginalised students where this was less apparent in Spain where fees and selectivity procedures were in place. There is, however, always a *quid pro quo* in these seemingly egalitarian arrangements. For instance, in exchange for free matriculation of students enrolled at demonstration schools, pre-service teachers are allowed to utilise this space for their practice teaching. Demonstration schools also contribute to institutional multidisciplinary researches as a site for what is termed as "cross-pollination between academics". These fundamental aspirations of the institution reflects the philosophical and ideological underpinnings both of Dewey which, to varying extents, influence the institutional identity (e.g. the school's vision and mission) and help configure educational programmes and structure the learning and research space.

Another common characteristic of these schools is their view that contemporary learning and research innovation are tied to their capacity for implementing ICT to bolster the quality of research. Many sites highlighted that while they endeavoured to access more research funding, they were also constrained by the need for more electrical outlets, embedded recording equipment, small interview spaces, sound

privacy options, natural light and ceiling drop microphones. This was particularly a concern in the USA and the Philippines, in contrast to countries such as South Korea and Spain. Integrating technology allows for further depth in terms of application of scientific principles when theorising curricula (Dewey 1929, p. 41). The capacity—or the lack of it—to utilise technology for the purposes of educational research appears to be a contemporary definition of learning and research innovation in these spaces. In terms of ICT, it was the leadership teams which were positioned in Deweyian terms as corresponding agents of "developments from within" negotiating competing pressures. Aside from ensuring a learning environment that promotes experimentation and research aided by the utilisation of emergent technology, the spaces were also conducive to collaborative research and team teaching. This was particularly apparent with some of the sites in the USA (windows, two-way mirrors) and also Spain (small laboratories). In other words, learning and research in demonstration schools is not just influenced by the vision of the school or university nor by the sponsors of funds but by the actual physical space.

Discussion

Sellman et al. (2002, p. 891) argue that culture "can be represented as the weaving together of layers of context". In such a conceptualisation, activity in a local setting is enclosed within the immediate context in which it takes place (i.e., the lesson), by the classroom, by the school, by the local authority and by national policy. In other words, school cultures, such as demonstration schools in this instance, continue to be influenced by how governance (i.e., in terms of external influence and school management) configures schools' "dependence on the system; focus on buildings and facilities; and the strategic focus of the board" (Leggett et al. 2016). In understanding institutional cultures, Bronfenbrenner (1979), for example, puts forward what he terms an 'ecological model' whereby school is a microsystem, surrounded by many other microsystems such as home and community. Microsystems relate to each other to form mesosystems, which in turn relate to exosystems such as government policy, and to macrosystems which capture dominant culture (Lamont 2002). The *Education and Design Living Laboratories Study* (*EaDLLS*) propelled us to question not only how Dewey's educational practices are realised in the USA, Europe and Asia but also to interrogate how historically, the nature of ownership (state or privately owned)—the exosystems or mesosystems—continues to influence the governance of these demonstration schools (microsystems) in three areas: funding, space (design and location) and autonomy (curriculum, pedagogy and organisation). The implication of this is that the identity of a demonstration school, mirrored in its components—including the objectives to which it was conceptualised, its physical design and the manner by which the programme is operationalised—are shaped by the confluence of these often-competing systems.

From the data, it is clear that despite their differences (and vastly different locations), demonstration schools remain spaces in which competing imperatives play out, as those on site seek to adapt pedagogic, infrastructural, funding and governance arrangements to accommodate stakeholders. Therefore, it appears incontrovertible that spatial practices oscillates within questions of power (Foucault and Miskowiec 1986; Crampton and Elden 2007; Grbin 2015). Within these parameters, James and Biesta (2007, p. 23) argue that "cultures are (re)produced by individuals just as much as individuals are (re)produced by cultures". In other words, a 'way of life' is both constructed by individuals and cast influence over those individuals. Indeed, culture, in sociocultural theory, posits that culture is "produced and reproduced in moments as people 'do' life…culture is both carried by individuals and created in moment-to-moment interactions with one another as they participate in (and reconstruct) cultural practices" (Nasir and Hand 2006, p. 450). In our research, issues surrounding research agenda (e.g., what should be researched, ownership of data, and how other stakeholders may benefit) and learning innovation in terms of what is foregrounded (e.g., is it technology or language? global or community issues?) do not only differentiate activities in demonstration schools but also how this space may be conceived. In other words, demonstration schools aptly illustrate the constitutive role of spatialisation in the realisation of systematic observation and production of new knowledge (Grbin 2015).

Conclusion

Analysing these institutions in terms of funding, governance and the relationship between space and learning, the aspirations to critically mediate learning theory and practice can be sustained through demonstration schools. How these schools are configured in terms of architecture, technology, and learning and research innovations, reflect both the impact of funding structure and notion of autonomy as well as the educational philosophy of the site. This requires a critical focus on how the spatial practices engage questions of power and its relationship to transformation. We feel the study further reveals how demonstration schools may become sites and products not only of external powers (the exosystems or mesosystems) but also through the evolving influence of research imperatives.

We also draw attention to how demonstration schools are reflective spaces of inquiry where educators are examining best practice often in reference to various research imperatives. The manner by which demonstration schools are utilised indicates clear intention to link learning with experience and practice, which is at the heart of Dewey's philosophy. Paradoxically, however, Dewey's emphasis that the application of the scientific method being democratic and the demonstration school's overreliance on external powers makes the system imbalanced. Therefore, the notion of democracy is challenged due to demonstration schools' vulnerability to external influences. Nonetheless, the aspiration to structure practice from

experience is unmistakable in at least three pieces of evidences; first in the strategic use of "experiential" terms like 'watering hole', 'cave', 'campfire' in naming specific spaces within the demonstration schools, second by various community extension activities for pre-service teachers allowing them to square theories with real situations and third by making these spaces accessible to other schools in the area allowing further evaluation of learning practices and research outputs. Far from being authentically autonomous, demonstration schools potentially serve as modern educational spaces where the state and other stakeholders exert a rarefied influence on the constructed identity and practices of both teachers and learners.

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Part II
Transformation 2: The Governmentality of Education

Selling New Learning Spaces: Flexibly Anything for the Twenty-First Century

Adam Wood

Abstract Insecurity about the knowledge and skills required for a world that appears to be rapidly changing, and confusion over how designed space can best support students' learning have given rise to innovative educational and architectural responses including the 'flexible learning space'. Whilst the language used to describe learning spaces is developing quickly, conceptual clarity lags far behind. It is unclear what flexibility of a space really means, what (or whether) it demands of its users nor what constraints or contexts might limit the nominal flexibility of a learning space. This chapter calls attention to shortcomings in the theorising behind the terms of the debate and points the finger at the ambiguity of the language used. The risks are great—for designers as for users—because unless we can gain some common control over what is meant by flexible space and its implications for those who work in schools, we risk overestimating the powers of designed space and underestimating what is asked of people in their work. The chapter provides a first attempt at clarifying some of these issues of language and concepts.

Introduction

So-called flexible learning spaces or environments increasingly form part of the repertoire of school architecture and are assumed to be *good things* even though under-defined and rarely qualified, critiqued or contextualised. This chapter reflects on the linguistic and conceptual ambiguity of 'space' and 'flexibility' in relation to schools and suggests that their lack of specification can facilitate thinking about learning and human agency in ways that are deterministic and asocial. This ambiguity also makes it harder to explore what the space under discussion consists of. How a space per se might be flexible or what might be involved in using a space flexibly are questions frequently obscured by spatial fetishism—where space is abstracted from the times and contexts of its use and assigned its own causal

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powers. Set within, and as a response to, discourses invoking the need for constant innovation and threats of uncertain futures, the multiple ambiguities of flexible learning spaces confer a real advantage of appearing to hedge all eventualities but, the chapter argues, this comes at the expense of discussing and attempting to define a shared purpose of education.

As governments aim to make teaching and learning more effective and are egged on by international comparisons of educational performance (Grek 2009), architecture has been reconceived as a potential lever of educational improvement [see, for example, the Royal Institute of British Architects' *Better Spaces for Learning: #TopMarkSchools* (Plotka 2016)]. Much-needed evidence as to whether learning spaces do affect learning outcomes—and how—is, however, missing (Blackmore et al. 2011). Yet innovative designs continue to be proposed as means of making learning in the twenty-first century more effective, so narrowing the terms of an educational project and debate that for Gert Biesta has been 'learnified', that is, the "translation of everything there is to say about education in terms of learning and learners" (2009, p. 38). I suggest that school architectural discourses are both subject and contributors to learnification. The example of flexible learning spaces and their 'operationalising' (Fairclough 2005) limited and functional ways of thinking about school spaces and education are therefore oriented towards mitigating the risks associated with uncertainty of educational change.

In this way, flexibility serves as a hedging strategy. The word 'flexibility', for Torin Monahan, "finds widespread use in architecture literature because it embodies the plasticity that it seeks to describe" (2002). A potential result, however, is that we end up talking past each other: being everything can also mean being nothing and flexibility can therefore facilitate a "remarkable absence in many contemporary discussions about education of explicit attention for what is educationally desirable" (Biesta 2009, p. 36). This is not only an architectural problem. Jessop, Brenner and Jones lament that socio-spatial theory more broadly has suffered from "an unreflexive 'churning' of spatial turns" (2008, p. 389) so that its concepts are now limited in terms of "opportunities for learning through theoretical debate, empirical analysis, and critical evaluation" (p. 389). I therefore use the chapter to do some 'clearing of the undergrowth' whilst recognising a disturbing irony: though ambiguities of flexibility and space hinder a common discussion of educational purpose, they are simultaneously saleable qualities—options—driving their own profusion through the linguistic and architectural market. They sell a hope of permanent adaptability and deferral of obsolescence even whilst it is unclear what they actually are.

I draw on two years of ethnographic fieldwork in a newly built school in England where I observed and spoke to people about their work in nominally flexible learning spaces. This chapter draws on the theoretical work and literature used in that study to pose some timely questions about current conceptions of educational spaces in schools.

Clarifying the Language of Learning Spaces

Reappraising the language and concepts used to mobilise ways of thinking about school space is a valuable first step in understanding what space does and how it might be changed. As Markus and Cameron note, "the language used to speak and write about the built environment plays a significant role in shaping that environment, and our responses to it" (2002, p. 2). How that shaping happens can be explained by what Fairclough calls 'operationalisation' (2005), a term he uses to describe how a particular culture gets on with its work, how it legitimates or 'fixes' things, ideas and roles in place. For any new strategy to be successful, social agents must *operationalise* "new representations and imaginaries (new discourses and narratives) in new ways of acting and being and new material arrangements" (p. 931). Language and the built environment are both means of operationalising discourses and both are therefore relevant to this discussion.

Remaining with language for the moment, however, it may be useful to remind ourselves that 'learning space' offers a *particular* way of speaking, writing and thinking about designed, educational spaces and one that is new and different with respect to 'classroom'. Before considering 'flexible learning spaces', it is therefore worth briefly exploring the significance of moving from 'classroom' to 'learning spaces' or indeed 'environments'.

This change in terminology offers new semantic possibilities and shuts down others. 'Classroom' is a noun based on the possession of a space by a social group, a *class*. The space is theirs, they are defined collectively, and it is clear there is a 'they': people are at the centre of the construction. In contrast, 'learning space/environment' describes (optimistically, since ascertaining learning is complex) a site's *assumed* activity—a potentially individual, internalised and more psychologically framed one. Neither term is neutral, but they operationalise different discourses in a similar way that 'restaurant' connotes a different type of experience and social relations than an 'eating space'.

Further, whereas rooms tend to be physically bounded, spaces need not be. Rooms are indoors; spaces can be indoors, outside and online. Rooms tend to be constructed by building professionals at some time in the past and cost money; anyone can create a space for free whenever and wherever they want. Spaces are 'on demand' and ad hoc in ways that rooms are not. Rooms also suggest greater permanence than spaces and perhaps, therefore, a greater investment of time, money and other resources.

Flexibility is therefore invoked in 'space' before featuring explicitly. A classroom's characteristics of being bounded, indoors, pre-existing and needing to be built by professionals impose constraints in terms of time, location, financing, spontaneity, durability and personnel. In contrast, a space is (potentially) freed from these limitations and so already more flexible in some senses of the term. And even when a space is in fact a room, it might still be able to leverage the impression of having attributes of apparent freedom; some flexible learning spaces are indeed just *big* rooms.

It is worth considering one last ambiguity with the construction 'flexible learning space'. This regards uncertainty over what the adjective 'flexible' modifies and is another example of the word's remarkable but unhelpful 'plasticity'-in-use. 'Flexible learning space' is a noun phrase with three possible meanings:

1. A learning space that is flexible: flexible learning-space
2. A space of or for flexible learning: flexible-learning space
3. A space that is for or of learning and that is flexible: flexible, learning space.

My interest is not in policing the usage of hyphens and commas but to make two points relevant for this chapter. Firstly, we lack a common point of reference when we speak of 'flexible learning spaces' because it can mean (1), (2) or (3). Before we even take part in a discussion, it is difficult to know what the discussion is about. Secondly, 'flexible learning space' without any hyphens or commas to discriminate senses perhaps grants it the ability to connote all three without having to commit to a single meaning. This ambiguity can act as a form of hedging strategy: it defers the need to specify the terms of the debate, granting 'flexible learning space' and similar constructions the *appearance* of validity in any context, whilst rendering discussion more superficial in the process.

So What is Flexibility?

I have said that 'space' provides, in contrast to 'room', a more elastic set of applications. When it lacks ontological specification, further ambiguity can result and help to widen this range of connotations even more. The nature of the space we are dealing with in a flexible learning space, that is, its ontology, will affect what kind of powers and properties it can have. Ontologies of space in writings about educational spaces are often implicit and so harder to critique or qualify. They prejudice discussion, since how we see a space and the properties we understand it to have, affect how we can theorise interactions between space and people. For Elder-Vass, this is a common problem across the social sciences where they:

> consistently lack plausible, well-defined and locally consistent scientific ontologies. One of the pitfalls of the social sciences is that we may assume that they *do* have such ontologies and accept unthinkingly the sorts of ontological categorisations that appear implicit in social theories, or even in our everyday language about the social world. (2010, p. 70. Original emphasis.)

What flexibility is and what kinds of things can have flexibility or the property of being flexible is not a metaphysical problem only. If flexibility is seen to belong to a space, *just* a space, as the name 'flexible learning space' suggests in senses (1) and (3) above, then it can obscure the work that teachers do and the other resources, besides space, that they need in order to use a space flexibly. A lack of ontological clarity can quickly become a political and ethical problem when, for example, we re-frame the results of people's effort as something that inheres in a space.

To explain further: I think it more likely that in most cases, commentators mean that the *use* of space is flexible rather than a space itself. These are different things. Using space (flexibly or not) is predicated on a relationship to time and process and a dependency on people. A flexible *space* per se, however, is removed from these concerns at least as far as its name suggests. It is an example of abstraction as Sayer has it:

> …regarding the abstraction of space from process, there is the danger of attributing powers to space (whether in terms of geometry, distance, location or movement) regardless of the causal powers of the objects constituting it. This has been termed spatial fetishism or separatism. (2000, p. 112)

To be clear, Sayer is critiquing the ways in which space is so often treated as a fetishised *given* in some areas of geography and social theory but the same problem, I argue, exists in architecture and particularly in discussion of learning spaces. What are the objects that constitute the space of a flexible learning space? What are their causal powers such that they can make a space flexible and, most importantly, how are those properties capable of causing flexibility without, seemingly, people? The first step towards an answer, at least for a powers-based ontology, is simple: people are part of what it means for a space to be flexible and therefore process, time and people have to be brought in not just to the ontological understanding of what a space is but how, empirically, we treat it. How can that happen, philosophically?

Brian Ellis (and others working on properties and powers) provides some insight. The first step is to see flexibility, yes, as a property of a space but where the most helpful way to think of it is as a particular kind of property: as a liability or disposition. To be flexible and so to have the capacity to flex or, more metaphorically, to be adapted—these are not events that can happen spontaneously, independently of people. Nor are they regularities, produced by some natural law of flexibility. A disposition to flex or to be adapted, requires process and people:

> It is plausible, therefore, to think of a dispositional property as a relationship (of potential instantiation) between an object (its bearer) [e.g. a flexible learning space] and a natural kind of process (the kind of causal process involved in its display) [e.g. the process of use by teachers]. (2008, p. 82)

It is therefore the relationship between space and people to which we should pay attention. Clearly this involves consideration of what properties the space has just as we need to consider whether teachers have sufficient time, for example, to enact the latent flexibility of the spaces they are in. Thinking in this way leads us from a spatial fetishisation of the learning space as the necessary and sufficient source of all flexibility towards a more complex but closer-to-real-life understanding of what happens in schools. For those of us who have worked in nominally flexible learning spaces and, at times, found them extremely inflexible, we know what intervenes to hinder their flexible use. For others, who design spaces, however, it may also be helpful to think in these terms that privilege the relationship formed through use between a space and its inhabitants.

Whilst such a clarification of the powers of spaces vis-à-vis those who may be able to instantiate those powers is useful to understand who or what is responsible

for enabling flexibility, it is not a necessary condition. My point is not that discussions of learning spaces always rely on conceptions of space abstracted from time and process, but that they often do. The following comment by the architect and development researcher specialising in African educational architecture, Ola Uduku, for example, shows an unusually sensitive understanding of process and time:

> Flexible, open-plan classroom design has had many Scandinavian (and more recently American) historical precedents. The practical problems of teaching in non-enclosed spaces are less crucial in the African or Asian climatic and cultural context where teaching in non-structured, unenclosed space is often both appropriate and is a re-appropriation of pre-colonial educational practice. Large class sizes, which are the rule in most post-colonial schools, also work better in open-plan spaces. (2000, p. 60)

Uduku's description is, on analysis, a surprisingly dense one, pointing to the economic, demographic, cultural, climatic, historical, political and racial contexts of learning spaces. Such a perspective and the real world-ness it reveals can be achieved only by dispensing with an idealised, fetishised view of such spaces (for a discussion on the differences between flexibility in theory and in practice see, for example, Saint 1987, in relation to open plan and Schneider and Till 2005, in relation to housing). Reductive, abstracted language is not conducive to making sure flexible learning spaces are not merely flexible in name but in practice too. A more critical and philosophical approach might help to provide richer accounts of *how* space makes a difference. It would also give us more to work with as practitioners, managers or researchers in contrast to glib statements such as, "[s]paces are themselves agents for change. Changed spaces will change practice" (JISC 2006, p. 30). In this example, time and process are deleted and causal powers are assigned directly to an independently powerful space. How are spaces agents? From who or what does that agency derive and on what does it depend? Presented independently of process and time—that is, fetishised—we are given to understanding that the agency of space so expressed is one independent of context: 'changed spaces will change practice'.

A similar problem appears when the differences between design, space and use are elided. For example, in a list of ten points for a well-designed school, the UK's Commission for Architecture and the Built Environment (or CABE) has at number 7: "Flexible design to allow for short-term changes of layout and use, and for long-term expansion or contraction" (2007, p. 7). The distinction between the first form of flexibility, i.e. 'short-term changes of layout and use' and the second hints that different actors are involved and that flexibility is not, in fact, one thing that can be granted to a space. Time is important here since the resources required for more immediate flexibility are very different from those needed over longer periods. Long-term flexibility where architects and engineers, for example, might be needed to change the siting of services such as water, waste or electricity is a very different thing from the flexibility that is valuable for teachers in the immediate context of a lesson. The work that CABE does in the above quotation begins to separate these differences and elsewhere (e.g. Wood 2016) I have suggested how more detailed

disaggregation of the concept of flexibility in terms of time would be helpful. Further and more critical work is, however, necessary if we are to understand who and what is involved in the daily use of spaces that are flexible in name.

To anchor the discussion of flexible learning spaces in the everyday and to highlight the importance of context for what 'flexible' can mean, I suggest the following questions as means of challenging a fetishised account of space:

- Does the flexibility of a learning space refer to the space alone, wherever it is and whenever it is used?
- Does a flexible learning space remain equally flexible for wheelchair users and non-?
- Does time affect a space's flexibility and if so, how? For example, if teachers don't have time to move furniture and so make a space more appropriate for one group vis-à-vis another, does the flexible learning space remain equally flexible? Does an adjacent space being used simultaneously affect the amount or quality of flexibility?
- Is a small flexible learning space as flexible as a large one?
- Does a particular curriculum affect the amount or quality of flexibility?
- Does assessment and how it is used affect flexibility? Would, for example, a flexible learning space in Finland be equally flexible in England where its "long-term investment in high stakes testing" (Grek 2009: 34) and punitive school performance measures limit what teachers can do in lessons? In short, are flexible learning spaces context-blind and therefore portable?
- Is a flexible learning space equally flexible when a teacher and students using it have only ever worked together in a 'traditional' space?
- Does a teacher's relationship with a group of students affect the quality or extent to which a flexible learning space is flexible?
- Does the amount of slack in the timetable affect a given space's flexibility?

Rather than requiring specific answers, I suggest these questions may be helpful to think about what flexibility really involves (and who, when, where and so forth). It may make less sense to speak of *whether* a space is flexible therefore but rather *how* it might be flexible, when and for whom.

In this section, I have argued that discussions on flexible learning spaces should discriminate further between a space's *notional* potential to be flexibly used and *actual* flexibility—how changes to spaces are lived out. I showed how an attentiveness to the properties of space may help to understand the relationship between space and users and that considering the contexts they are located in is vital. The agency of people vis à vis how a space can help and/or limit them in their work and study is a question not simply of effectiveness but an ethical and political question too. By assigning agency to space, it perhaps makes it easier to think of flexibility as something that the space itself, alone, can provide rather than recognising it for what it is—partly the result of people's work. And yet, despite these efforts to get a conceptual grasp on what space means for people, I realise that leaving spaces

under-specified can serve some purposes. Understanding these is key to getting a grip on why it is in some interests to promote space as powerful and context-independent and I turn to these questions now.

Ambiguity Serves a Purpose: Flexibility, Learnification and Hedging an Uncertain Future

Here I link discussions on flexible learning spaces to the ways in which definitions and practices of education are being transformed: Biesta's 'learnification' (2009) mentioned earlier. I argue that this link is supported by (and materialised in) the promotion of flexibility as an architectural goal. At some level, being flexible makes sense in times of rapid social and pedagogical change. Indeed, flexibility's very lack of commitment to a specific activity can be a virtue given that the scholastic present is marked by existential issues regarding "the question of school futures, where learning has shifted beyond traditional sites and where the nature of knowledge is uncertain" (Grosvenor and Burke 2008, pp. 15–16). Given that buildings are long-term investments, making them flexible seems sensible.

Theoretically at least, flexibility increases the number of options available at any particular moment in time so broadening the range of possible 'moves' or choices and helping to mitigate obsolescence. This adds monetary and use value to an architectural project in a similar way to options in financial investments. It can also be seen as a denial of responsibility, however, to define a purpose or aim in both architectural and educational projects (See Hertzberger 1962 cited in Forty 2004).

In some forms, flexibility therefore presents a conflict. It makes things easier to change but also easier to avoid questions of educational purpose. In offering to be many things rather than just one, flexibility can provide a form of future proofing that renders the present more problematic. Flexibility can serve the interests of those responsible for capital investment since it mitigates risk and satisfies clients' and funders' risk aversion by insuring against obsolete design but can increase risk for users when designs are optimised for a range of activities but sub-optimal for any particular one. Flexibility sets out a responsiveness towards the future but without offering a substantive response as the schools' architect, David Medd, explains in a discussion of his and his wife, Mary Beaumont Medd's work:

> The aim [of our work] has been to design not for an unidentified future, but for the present. Designing for the present doesn't mean designing for yesterday, but for what percipient people can now identify as the growing points … This is nothing to do with designing for the Future. This is what led to the menace of the *open plan*. The argument was that the future of education is unknown therefore remove any obstructions the building may impose. Designing for the unknown means designing for nothing. (2009, p. 43)

This statement recognises that *something* needs to be said architecturally and educationally and that that 'something' be based on an educational desire, purpose

or direction—a 'growing point'. At least in England, this appears to be lacking. The National Curriculum, previously obligatory for all schools, is now not compulsory for the majority—national high stakes assessment seems instead to do the job of authorising and promoting desirable knowledge.

During the Building Schools for the Future (BSF) programme (2003–2010), this educational aimlessness was criticised by the House of Commons Education and Skills Committee responsible for monitoring government: "The crucial question here, and one that the Department [for Children, Schools and Families] has not fully answered, is what do we want education to be in the twenty first century?" (2007, p. 4). In light of this, it is arguable whether flexibility really does provide the means towards a *solution* of the difficulties inherent in defining twenty-first century knowledge and skills. Might it instead merely offer a deferral of educational intention and responsibility and perhaps a retreat from discussion of 'ends' altogether?

If what education is and is for is unclear, it may become more susceptible to de facto definition by external pressures such as standardised, summative assessment. Gert Biesta, for example, argues that "PISA and similar systems … feed into a whole tradition that sees education through the metaphor of production and control" (2015, p. 356). Where assessment systems are used as tools of (or excuses for) education reform, i.e. the PISA 'effect' (Grek 2009), the domain of education (activities, values, skills, knowledge and so forth) will shift too and likely wash back and influence what is taught and how. Ultimately, this raises the question of whether we are "[m]easuring what we value or valuing what we measure" (Biesta 2015, p. 350). Architectural flexibility helps to operationalise discourses that emphasise temporary-ness, adaptability and variation and that play down commitment, definition and purpose. This makes it harder to orient education towards a discussed, negotiated agreement on courses of actions that are based on and that seek to develop values. It may also make a shared and democratic vision of education harder to achieve since flexibility encourages the perspective that what is important is decided over shorter time spans, more locally. Being flexible and having 'flexible space' are ways of valorising the here and now specific to a particular group of people.

Flexibility, Educational Transformation and Ethics

Education always involves ethics. When architectural forms are tied to changes in educational aims, this can raise new ethical questions as Alterator and Deed point out: "Open plan learning environments alter the learning landscape and culture to the extent that [teacher] adaptability is not simply preferred; it is necessary" (2013, p. 327). Here the flexibility aimed for in open plan appears to compel an inflexible response of necessary adaptability: people *have to* adapt. If classroom design is used to lever changes in people's practice, ethical concerns should be raised. What if I am a good, hard working and effective teacher but not highly adaptable? Should

architecture necessitate certain kinds of behaviours? Or should we instead invest in an architecture that resources people's ability to make their own meanings and actions, an "architecture that must make space for education … and even incite such space-making" (Hertzberger 2008, p. 21)?

The idea that architecture can transform education either directly or indirectly is problematic therefore. Accompanying the ambiguity of the language of flexible learning spaces, the current theoretical poverty of how transformation might happen —and who might be involved (or not)—we also lack empirical knowledge as shown by Blackmore et al. (2011) and confirmed in the case of BSF by the school designer Mark Dudek:

> …while it is obvious that a good environment benefits some students, it was not possible [with BSF] to prove the accountable value of architecture (as opposed to building) on the educative process. In education there were simply too many variables in play to authenticate the transformational claim [of BSF]. (2015, p. 27)

Finally, we are also lacking an ethical framework for thinking about how architecture might be used. Beyond the 'accountable value' of particular spaces' ability to transform and improve learning there is an ethical issue. If certain learning space designs were proved to increase learning, the question of whether we *ought* to use architecture in this way, at the exclusion of contextual and social considerations, remains unanswered.

Conclusion: Disappearing People and Education

The words we use to describe architecture cannot be neutral. I followed Markus and Cameron's approach to language and applied it to just one, small area of current educational architecture: flexible learning spaces. Their perspective could help to bring clarity to other discussions: architectural and educational innovation often lead to new words that lack conceptual detail and coherence. Ultimately, "linguistic choices … are ideologically significant, implicitly presupposing certain values and social relations … we regard buildings as primarily social objects (i.e. not just aesthetic or technical ones) which can and should be subjected to social critique" (2002, p. 3). A social critique of educational architecture is especially important because its mandatory presence in the lives of young people and those who work in schools is marked by so many hours in the day and across so many years.

The critique that I made could be perceived as an attack on or simple dislike for flexibility. That was not my intention. I wanted instead to show how it could be understood in ways that are not usually articulated. Understanding it requires linguistic and conceptual work since both contribute to real effects in the world in terms of how we see people (or do not see them). For example, if we delegate flexibility to a space when in fact it is more akin to a relationship between space, a coalition of actors and resources, we assist in deleting people from the conceptual model of learning space and ignoring their role in making flexibility happen.

Linguistic developments have out-paced developments in conceptual elaboration: clarity suffers and so does our ability to have a genuinely shared discussion about new learning spaces. To the extent that our knowledge of these spaces, their uses and users is not being advanced but fragmented, it must be time to have an informed debate, open to a critical focus on the language and concepts used in architecture and education.

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MLE as Non-place

Andrew Thompson

Abstract The modern learning environment (MLE) is a particular technology that serves to create an environment that will best cultivate a moral self in line with state bureaucratic needs. This chapter uncovers the genealogy of the MLE and interprets its meaning from the perspective of the classroom teacher. The emergence of the MLE demands critical inspection. This chapter compares the new school architecture and new teacher for twenty-first-century learning with their antecedents. This process of analysis will critically analyse subjectivity and bureaucracy in the changing educational landscape. Theorists who work in the tradition of genealogical study established by Foucault: Jan Masschelein, Maarten Simons, and architectural critic, Kenneth Frampton who share Foucault's understanding of the fusion of knowledge and power, are considered. Of particular interest is the scholarship of Ian Hunter who studied the twin origins of the compulsory school in bureaucratic technologies and in pastoral technologies of the self. In this context, attention is drawn to the MLE's perpetuation of pastoral technologies in a contemporary context. A focus in this study will be the role of the OECD in these changes of the educational landscape and the implications thereof. The history of school architecture as representative of schools' fusion of subjectivity and bureaucracy is analysed in concert with the work of Marc Augé, to determine the extent to which the MLE with its emphasis on connections, change, and flexibility is, in fact, a non-place.

Introduction

In the first volume of *Global Danish Architecture* there is a photograph of the architect's rendering of the plan for Ørestad College in Denmark (Ibler 2006, p. 48). Depicted are three levels of open space connected by a wide spiral staircase. In the

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foreground on the lowermost floor are what appear to be a set of café tables and chairs. In one of them sits a young man leaning forward engaged in a phone call. The sight of a student on his phone is unfortunately common in the twenty-first-century high school. It may very well be the teacher's greatest behavioural concern. The phone is, however, more commonly hidden under a desk, sending a Snapchat message surreptitiously, rather than openly to the ear of the student as in the Ørestad College scene. Despite the somewhat off-putting inclusion of a decidedly non-studious act in a school's promotional photograph, Ørestad College is considered a model for twenty-first-century learning. It is constructed in the 'block type'—one of four types of school designs the OECD has defined as general design patterns for educational facilities. The OECD writes in its overview of *European design types for twenty-first-century schools* (2010, p. 4), "the effectiveness of this type is based on the condition that the main socialising space is truly inhabited by students: if this space did not offer multiple and flexible possibilities for activities to take place, it would simply be a circulation area, and become a 'serving space'". Presumably, for Ørestad College's architecture to overcome the potential to devolve into mere 'serving space', students would need to actively engage in its dynamism. The school "which is almost a classroom-free building, is, [however], shaped around a central void" (OECD 2010, p. 4)—the staircase. Unlike Herbert Hertzberger's design of the Apollo School in Amsterdam (1998), the stairs in Ørestad College can only serve the purpose of circulation. In Hertzberger's school, the oversized staircase serves the traditional purpose of simply joining two levels, but also invites students to sit and use the stairs as desks.

The point here is not that all schools should have inviting staircases on which students can work. Rather, the point is that creating a massive design feature as a void with a singular purpose is perhaps undesirable. Yet, Ørestad College is touted for its innovation and basis in current research on "how children learn" (Young et al. 2012, p. 160). There are no bells and no timetables. In place of the traditional classroom are circular pods with beanbags and the aforementioned café area. There are laptops everywhere. In fact, because of its incorporation of media and technology, it has earned the nickname of the "virtual school" (Care et al. 2015, p. 44). "Virtual" is an apt description not only because of its digital infrastructure, but also for the reason that it is not what one commonly recognises as a school, per se, but possesses various virtues of a school—students occupy its space, they appear to be doing work (although there was that one boy on his phone), and it is identified as a college. Notably, there are no teachers documented in any of its promotional materials.

Ørestad College is representative of the school as circulation space in the same sense that airports or supermarkets are circulation spaces. The purpose of this study is to examine how we have arrived at this point. Not every modern learning environment will resemble Ørestad College, but it is clear from the OECD's catalogue of school design types, that the school serves as a model for other schools globally. As stated above, the OECD does not endorse schools as circulation

spaces, but I will argue that their encroachment on educational policy has generated this outcome. The MLE is a particular technology that serves the same purpose of previous architectural technologies of the school—namely to create an environment that will best cultivate a moral self in line with state bureaucratic needs. I will assert that modern learning environments such as Ørestad College are the ideal technology to facilitate the cultivation of the lifelong learner as a particular moral subject *because* they are circulation spaces. In the course of my argument I hope to demonstrate that the school as circulation space is essentially a non-place—that is, a place unconcerned with identity and one that can be defined neither as relational or historical (Augé 2008).

My approach will be both philosophical and historical. I aim to uncover the genealogy of the modern learning environment and interpret its meaning from the perspective of the classroom teacher. I have been a high school teacher for over ten years working in New York City and Auckland and have been told that the MLE is arriving at my workplace in the near future. I see among my colleagues a mixture of enthusiasm, relief, dread, and mistrust over this impending development and so will fuse this subjective lens with the genealogical examination. As a high school teacher, I am expected to embrace these new classrooms and the transformative pedagogical implications they issue. Questioning their efficacy and merit could brand me a Luddite or worse—a relic of the industrial school model. I am, however, neither. I merely assert that their emergence demands critical inspection. It is my hope that this study will help other teachers engage in this criticism and to do more than say what schools should not be.

An essential component of this task will be to compare the new school architecture and new teacher for twenty-first-century learning with their antecedents. This process of analysis will critically analyse subjectivity and bureaucracy in the changing educational landscape. For this purpose, I will examine the work of theorists who work in the tradition of genealogical study established by Foucault: Jan Masschelein, Maarten Simons, and architectural critic, Kenneth Frampton who share Foucault's understanding of the fusion of knowledge and power. Of particular interest is the scholarship of Ian Hunter who studied the twin origins of the compulsory school in bureaucratic technologies and in pastoral technologies of the self. I hope to extend Hunter's thesis that schools have always been the locus of a state-mandated shepherd-flock game by drawing attention to the MLE's perpetuation of pastoral technologies in a contemporary context. A focus in this study will be the role of the OECD in these changes of the educational landscape and the implications thereof. I will analyse the history of school architecture as representative of schools' fusion of subjectivity and bureaucracy in concert with the work of Marc Augé as I seek to determine the extent to which the modern learning environment with its emphasis on connections, change, and flexibility is, in fact, a non-place.

Bureaucracy and the Self

Ian Hunter wrote that James Kay-Shuttleworth, the nineteenth-century advocate of state schooling in England, desired to develop an educational system based upon the 'sympathetic schooling' apparent in David Stow's model school in Glasgow. Kay-Shuttleworth regarded the monitorial system and catechismal instruction common in his day as outmoded and ineffective. Rather, he advanced a moral pedagogy that "consisted in a new form of school architecture and a new kind of teacher" (Hunter 1994, p. 72). He proposed the formation of a teacher-centred school wherein the gallery and the playground were the foci. In the gallery were rows of desks bolted to the floor. This was the early industrial model towards which Dewey felt such disdain. It was a room for rote learning. The playground, on the other hand, was a more vibrant environment central to the new pedagogy. "All is free as air, and subject only to a moral observation of any particular delinquency, the review of which is reserved for the school gallery, and taken up on the children's return there, and pictured out as a training moral lesson" (Stow 1850, p. 149). As Hunter notes, the "new pedagogical *habitus* was to replace coercion with conscience" (1994, p. 73).

The thesis of Ian Hunter's book, *Rethinking the School*, is that contemporary school systems have inherited the legacy of James Kay-Shuttleworth and David Stow. On the one hand, schools are designed by a technical bureaucracy that is staffed by experts in statistics and social science such as Kay-Shuttleworth. On the other hand, schools are managed by a moral pastoralism exemplified in Stow's work. Teachers have historically acted as shepherds who guide students by means of a moral pedagogy in the training of self-determination and self-reflection towards a socially disciplined citizenry. Hunter convincingly argues that this is an unavoidable fact of school life.

Today, states continue to demand of schools what England did during the Victorian Era—namely that the education system develop a self-determined and self-reflected individual in harmony with state needs. The difference is that in the twenty-first century, the needs of state are not merely national—they are supranational. Thus, the OECD plays a vital influence in the development of educational policy in a globalised world. Its encroachment has become totalising and the implications are widespread. This reality demands inspection, which will be taken up below.

The new school architecture that James Kay-Shuttleworth advocated was realised in the work of E.R. Robson whose board schools "inadvertently adopted a model based around the form of the eighteenth century house, with individual (class) rooms, clearly articulated circulation routes and a large assembly hall at its heart" (Dudek 2000, p. 10). The school evoked the hearth. As Elizabeth Garagano observes, "In *School Architecture*, E.R. Robson notes approvingly the homely and domestic connotations of the school hearth" (2008, p. 53). The school embodies a teacher-centric design, where the surveillance of behaviour and the transference of knowledge are paramount. By mimicking the home, the school, in a sense, sought

to replace it. The wayward youth of industrial cities such as Manchester needed to be plucked from their parents' amoral influence. The school would inculcate an 'appropriate' moral curriculum. The teacher, as shepherd, would guide these students towards a particular moral self that suited the needs of state.

A necessary satellite of the 'school as house' model was the playground. Here was the moral space in which to cultivate the determined and reflective individual—what James Tully called, "the penalised self" (Tully 1988, p. 70). In Samuel Wilderspin's nineteenth-century infant schools he planted his playgrounds with fruit trees in order to monitor the student's conduct in the face of temptation:

> …and the next time he stops and looks at a fine cherry he looks about to see whether there is anybody within view. Doubtless he is restrained from taking the cherry by fear, but in process of time, by moving among restrained playfellows, he has that command over himself which enables him to resist temptation (Report from the Select Committees on the Education of the Poorer Classes 1834, p. 298)

It is clear from this example that the school's primary purpose was one of discipline. Bureaucrats such as Kay-Shuttleworth felt compelled to reorient the children of the urban poor away from mischief and towards 'healthier' recreation. In this model, school represents a locus of separation. For Jan Masschelein and Maarten Simons separation is the mark of a school's strength. Here "'democratic' moments can arise", but they are contingent on a belief in equality "where teachers and students are exposed to each other as equals in relation to a book, a text, a thing" (Masschelein and Simons 2011, p. 163). In my experience these equalising moments and their unexpected outcomes are the most thrilling. In the Victorian Era, however, the teacher as guardian of knowledge was by no means expected to approach a text on equal terms as the student. It is important to note, however, that in Kay-Shuttleworth's design, there exists a seed of democracy as shown through Masschelein and Simon's reading of Rancière. Below I hope to illustrate that throughout the history of the public school, there were optimistic institutional and architectural designs for democracy that were thwarted by state efforts to tame it in the name of economic growth. Yet 'democratic moments' of the type Masschelein and Simons describe are indeed able to arise in this context because of what the student and teacher 'bring to the table'—namely the shared experience of examining *something* on equal terms (2011). I further hope to demonstrate that the MLE, as non-place, causes these moments to disappear, thereby taming the student and relegating her experience to that of a tourist.

Excursus on the Development of School Design

Over time, educators and architects re-evaluated school design with the hope of creating a more principled education. In particular, philosophers such as John Dewey envisioned a school modelled on the project of democracy. In the progressive era, Dewey began to question the traditional pedagogy of the gallery.

Dewey's democratic ethos was embodied in a reimagined classroom in which the experience of the students was prioritised over the teacher-centric model. Dewey equated outmoded educational methods with its architecture. He believed that nineteenth-century architecture favoured stylistic rather than social concerns (Dewey 1934; Dudek 2000). For Dewey, embracing modernism was a civic virtue. He wanted to do away with any legacy of the *ancien régime* and felt that the classroom held genuine democratic potential. He asserted that children learn through experience, and while the experience of problem-solving democratically was Dewey's chief concern, so too was the tangible experience of learning science through nature. Frank Lloyd Wright synthesised Dewey's thought with his own architectural flair in the creation of the Hillside Home School in Spring Green, Wisconsin.

> The Prairie House formula applied Dewey's views on flexible multi-functional spaces and harmony with the natural environment for the first time. It demonstrated the suitability of such thinking in education and, in 1902, was widely recognized as the most advanced school form of its type. Built at a time when most school design was essentially based on historicism, Wright's interpretation of the Dewey philosophy illustrated a flowering of architecture for schools in its integration of two radical new philosophies, one educational, the other spatial. Subsequently it was much copied, but never with such architectural dexterity (Dudek 2000, p. 20).

The wedding of experience and democracy in education continued through the work of Giancarlo de Carlo among others. Like Dewey, de Carlo contended that "education is the result of experience" (1969, p. 13). These educators and school architects advanced political ideals, whether overtly or implicitly, that were socially democratic in orientation. De Carlo's work echoed that of fellow Team X member, Aldo van Eyck, who wrote that

> Architects nowadays are pathologically addicted to change, regarding it as something one either hinders, runs after, or at best keeps up with. This, I suggest, is why they tend to sever the past from the future with the result that the present is rendered emotionally inaccessible, without temporal dimension. I dislike a sentimental antiquarian attitude toward the past as much as I dislike a sentimental technocratic one toward the future. Both are founded on a static, clockwork notion of time (what antiquarians and technocrats have in common), so let's start with the past for a change and discover the unchanging condition of man (van Eyck 1970, p. 171).

The architectural and educational forces that hoped to unshackle the present from the past were "exemplified by the move towards lightweight building technologies away from traditional masonry construction" (Dudek 2000, p. 25). The work of Frank Lloyd Wright, de Carlo, and van Eyck represented a class of design that conscientiously and critically fused educational philosophy and architectural craft that was unfortunately rare. More commonly, school architecture mimicked aspects of a Taylorist industrialism in which classrooms were fashioned for specific use. These modern school designs distanced themselves from Robson's vision of the school as home. Gone are the gallery and the hearth. In their place emerges the school as city (Dudek 2000). Classrooms became standardised in the same manner as modernist public housing and the office cubicle. The corridor in Robson's model

was a quaint neighbourhood road. In the modernist scheme, it reflected the rational urban planning of an idealised city block. The prefabrication movement spearheaded by Le Corbusier (among others) became more prevalent in school design for matters of architectural taste and cost alike.

These shifts in school architecture from the early industrial to the late industrial ages reflect changes in the needs of states. The civic architectural spirit in the work of Frank Lloyd Wright and John Dewey represent ideals in an age of democratisation. The extension of the franchise expanded from the age of Robson to the age of Wright, culminating in the emphatic dissolution of the *ancien régime* in the aftermath of World War I. The economic instability and growth of totalitarianism that typified the interwar period quieted the spirit of democracy globally as its cancellation spread throughout Europe. School architecture's commitment to the project of democracy was never widespread, but became even more dispirited following the conclusion of the Second World War. The development of secondary schools in England and America during this time contributed to the loss of these ideals as economic growth became the dominant paradigm, which articulated its demands as demands of democracy.

Education and Economic Growth as a Supranational Ideal

Beginning in the 1950s in America and soon thereafter in Europe and the rest of the world, state needs became fixated on economic growth (Schemlzer 2016). Meanwhile, the archetype of the sympathetic, pastoral teacher of the Victorian Era changed very little. From the perspective of the teachers' college, where ideals of civic humanism were retained, schools appeared to grow less and less principled over time. However, Ian Hunter has shown that schools were never principled to begin with—instead, they were concerned with the cultivation of moral subjects. Teachers hoped to shepherd students towards self-realisation. The only trouble was that state bureaucratic technologies continually restricted the student by tethering their pursuits to state needs.

The comprehensive high school failed in this pursuit. Of course, there were exceptions, but for decades it has been regarded as having fallen short (Cox 1969; U.S. National Commission on Excellence in Education 1983). The school as city appeared more like the school as factory with its bells, timetables, and specialisation. The science and maths scores vital for the defence industry and for the design of innovative consumer technological were uninspiring. The pedagogical shift towards twenty-first-century learning is really the culmination in a half-century of the school's failure to realise the needs of the growth paradigm. As early as 1961, U.S. Assistant Secretary of Education and Culture, Philip Coombs, observed that education must cease to be viewed as a consumption good, but rather as an "essential investment in national economic and (social) development in every nation, rich or poor" (Coombs 1992, pp. 50–51). Schools were not designed to meet the demands of this investment.

My experience as a teacher has been entirely shaped by the growth paradigm and its call for investment in human capital. My first-year teaching took place during the passing of George W. Bush's No Child Left Behind Act, which was essentially the culmination of a 20-year push to respond to America's lagging global position. The legislation ushered in an era of standardised testing unprecedented in American history. The eventual development of Common Core standards and the emphasis on skill-based pedagogy were unavoidable demands of my professional life. One might think that in a different context, the demands would be different. My move to New Zealand has, however, proven otherwise.

New Zealand and the United States function quite differently on a policy and management level, yet the aims of education in both countries are nearly identical. Lifelong learning, the cultivation of the knowledge society, student-centred pedagogy, and learning to learn are all hallmarks of a global educational system in which PISA scores are treated as part of the GDP. Although part of my job has been to shepherd students towards these growth-centred ideals, so long as my students reach desired learning outcomes, I am able to learn for learning's sake with my classes and experience the type of 'democratic moments' Masschelein and Simons celebrate. I am, however, concerned that the MLE will strip me of this freedom and this joy.

The shifts in pedagogy during my career and the more recent developments in architecture in twenty-first-century schools are striking, but still retain the pastoral need for the sympathetic teacher. The classroom in the current model is, however, decidedly child-centred. On the one hand, the teacher is expected to be a leader. On the other hand, the teacher is expected to be invisible. Learner-centred activities are cooperative and structured to provide peripheral, guided, and full engagement. For example, at the Central Park East 2 School in Manhattan, "students are encouraged to find meaning through their formal engagements, both independently and cooperatively" (Lipmann 2010, p. 160).

But what of meaning-making? The book, *Theoretical Foundations of Learning Environments* (Jonassen and Land 2012) asserts that meaning-creation is an integral element of teaching today. Architectural critic Kenneth Frampton writes that "today civilization tends to be increasingly embroiled in a never-ending chain of 'means and ends' wherein … utility established as meaning generates meaninglessness" (Frampton 1998, p. 19). Meaning derives from educational standards which in turn derive from the OECD's growth paradigm. As a teacher, I am asked to embrace this growth unequivocally as moral good: Growth becomes synonymous with progress. Paul Virilio contends that we are all expected to 'love' progress with religious intensity (Virilio 2001, p. 149). For Virilio, love is a choice dependent on critical taste rather than some unquestioning obligation. It is the totalising view of growth that encroaches the classroom and distorts the potential for meaningful teaching.

In a sense, the role of the teacher in the MLE retains its historical thrust. Barriers between the classroom and the OECD-driven growth paradigm have, however, diminished. This has been the intention of OECD policy-makers for decades (Schemlzer 2016). Hunter writes that the school system is "simultaneously statist and personal, bureaucratic and pastoral" (1994, p. 63).

> The administrative state and Christian pastoralism are founded not in rival principles but in something else. Christian pastoralism is founded not in principles but in the practices of a spiritual discipline whose object is to create a kind of person capable of acting on principle. Similarly, the administrative state is founded not in the principle of *raison d'état* but in arts of government that problematize political reality as a domain open to technical administration. (Hunter 1994, p. 67)

The MLE is the product of supra-state administrative problematisation. It is not principled, but it is justified as ethically superior on the grounds that it is educationally superior to the industrial classroom. This assumes that skill-based education is educationally superior to content-based education (Abbiss 2011), which will be disastrous for the social sciences. The MLE has the potential to wipe clean van Eyck's call to "discover the unchanging condition of man" (1970, p. 171). As a teacher of Classical Studies, I view this project as vital. Although my role as a pastoral teacher is to shepherd students according to state goals in term of curriculum and, to a degree, moral selfhood, I believe that my role is also one of historical responsibility. As Hannah Arendt has written, "educators here stand in relation to the young as representatives of a world for which they must assume responsibility although they themselves did not make it, and even though they may, secretly or openly, wish it were other than it is" (2006, p. 186). Unfortunately, this is not the role envisioned by the twenty-first-century teachers' college. I suppose I cling to what Jane Gilbert calls "the traditional view of knowledge" as "a body of truths that express the truths of the world" (2013, p. 109). The discovery of our unchanging nature is replaced by the incessant reminder that things have really changed a great deal, will continue to change at a rapid clip, and we will always struggle to keep pace.

The MLE calls for a reoriented pastoralism towards this view of change. It is billed as a shift in pedagogy, but in reality it is a new type of moral surveillance. Teachers were formerly equipped to monitor a student's work and moral progress based on nineteenth-century modes of personal development. The twenty-first century demands a similar outcome—namely the realisation of individual human capital for state purposes, but must now consist of another 'new form of school architecture and a new kind of teacher'. Kay-Shuttleworth appealed to the state that this wedding of pastoralism and bureaucracy was precisely what was needed in England in order to improve the educational system (Stow 1850, p. 7). He suggested applying nationally what David Stow instated in Scotland—the gallery and the playground.

The Classroom as Non-place

Today the walls between the gallery and playground are blurred. The teacher, as twenty-first-century shepherd, changes drastically in this setting. Recently, sheep farmers have experimented with using drones to guide their flock by remote control. This is regarded as a pioneering advance in the ancient arts of shepherding. I am

concerned that guiding students to meet OECD-generated standards in a modern learning environment will reduce me to the role of mere facilitator, or drone. David Stow's vision of the playground as moral panopticon is now transferred into the interior. Snapchat replaces the cherry tree—remember the Ørestad student on the phone?

Furthermore, the MLE transcends criticism. In his book, *Morality and Architecture*, David Watkin suggests that critics such as Pugin, an advocate of Gothic style in 1836, and Pevsner, an advocate of International Modern style a century later, employ "the same kind of argument to champion the cause of their chosen type: that it is not just a style but a rational way of building evolved inevitably in response to the needs of what society really is or ought to be, and to question its forms is certainly anti-social and probably immoral" (2001, p. 1). The same could be said in relation to the MLE. To question its legitimacy and efficacy appears monstrous. It is as though the teacher who challenges its emergence is one who fears what is rational and good (not to mention what is coming, whether we like it or not). Watkin later asserts that we assume a "familiar historicist, Hegelian belief that each age in history must have its own totally consistent pattern which in turn will be replaced by the pattern of the next age moving forwards in a great plan of development" (2001, p. 114). This development invites the obligatory love of progress that Virilio challenges. Taste and criticism are replaced by preference. School boards can merely choose from the OECD's catalogue of acceptable school designs as antiseptic symbols of techno-science's inevitable triumph.

Marc Augé writes: "Supermodernity (which stems simultaneously from the three figures of excess: overabundance of events, spatial overabundance and the individualization of references) naturally finds its full expression in non-places" (2008, p. 88). It would appear the MLE is Supermodern. In a space full of void in which anything can happen, it is very possible that nothing will happen. The MLE can look an awful lot like a waiting room, an airport terminal, or a hotel lobby—all antiseptic and omnipresent circulation spaces in the globalised world. Students will race through an overabundance of skill-based tasks in an overabundance of circulation space the references of which will be entirely individualised. The supermodernity of the MLE is appropriate for a growth-centred, globalised pedagogy. Its concern is not renewal, but accumulation (of skills and self-justification).

Thus the MLE, as non-place has a certain taming effect. Masschelein and Simons (2013) have asserted that today's student-centred learning environments disorient students and minimise the potential for 'democratic moments' in education to arise. Instead they emphasise skills and learning to learn, which effectively "put nothing on the table" and expect students to simply perform according to their own individual needs and values. "The result is the taming of the student: he becomes a tourist in his own life-world" (p. 92) and the teacher his tour guide. In the MLE, the students may not share experiences beyond the pursuit of individual goals and pastoral coaching. What is likely to follow is both homogenising and isolating. Augé suggests that "the space of non-place creates neither singular identity nor relations; only solitude and similitude" (2008, p. 83)—characteristics that truly tame democracy.

Dewey (1934) contended that architecture shapes and reshapes our experiences directly and extensively. "The ugliness, for example, of most factory buildings and the hideousness of the ordinary bank building, while it depends upon structural defects on the technically physical side, reflects as well a distortion of human values, one incorporated in the experience connected with the buildings" (p. 232). The experience of the student in the twenty-first-century school is one of connectivity, which must be constant and thus frequently fleeting. The emphasis is not on content, but on skills necessary for the interpretation of media. School life becomes a series of messages. As Augé observes: "The hearth has been replaced by the computer and the TV. Hermes and Hestia shared governance of the hearth. Now it's only Hermes" (2008, p. viii). The inundation of messages emphasises the demands of twenty-first-century skills, which require acquiescence as much as 'collaboration' and 'innovation'.

Conclusion

In the work of Kenneth Frampton there may be hope. Frampton offers an *arriere-garde*[1] position of resistance grounded in a critical ontology. He writes that

> the so-called postmodern architects are merely feeding the media-society with gratuitous, quietistic images rather than proffering, as they claim, a creative *rappel a l'ordre* after the supposedly proven bankruptcy of the liberative modern project. In this regard, as Andreas Huyssens has written, "The American postmodernist avant-garde, therefore, is not only the end game of avant-gardism. It also represents the fragmentation and decline of critical adversary culture" (Huyssens 1981, p. 34, cited by Frampton 1998, p. 21)

We cannot afford further fragmentation nor decline of a critical adversary culture. "If a place can be defined as relational, historical, and concerned with identity, then a space which cannot be defined as relational, or historical, or concerned with identity will be a non-place" (Augé 2008, p. 63). Thus, we must advance a position that is relational, historical, and concerned with identity. Frampton contends that "only an *arriere-garde* has the capacity to cultivate a resistant, identity-giving culture while at the same time having discreet recourse to universal technique" (1998, p. 22). Otherwise we are left "with the ubiquitous placelessness of our modern environment" (p. 27). I fear that the MLE is placeless and boundless in the sense that its open, glassy design will feel placeless—that is, as a non-place. Only "the place-form has the potential to withstand the relentless onslaught of global modernisation" (p. 33).

The globalised world dissolves barriers. The workplace, the home, the waiting room are mirrors of each other. Selgas Cano's London office space reflects

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[1]Translated literally as 'rear guard', Frampton's stance in his critical regionalism at once attempts to distance architecture's trajectory away from an unwavering embrace of Enlightenment progress while at the same time discouraging a reactionary return to a simpler, pre-industrial past.

twenty-first-century design tastes that can be found in the MLE with its pod spaces, café, and glass walls. Grimly, it has been branded as 'Second Home' and celebrated as a marvel of innovation (Hunter 2015). It does not, however, complement the environment, but rather boldly sits as piece of architectural Supermodernity on an otherwise historic block. Perhaps Frampton's concept of the *arriere-garde* can be fused with a foundation in the local without which identity is meaningless. This is essential as designers disregard context. Architect Rem Koolhaas brazenly dismisses the concern for the local in his terse dictum, "fuck context" (1998, p. 502). This stance undermines democracy and distances local—especially indigenous—cultures from political agency. Schools should be particular and the personalities of the individuals who fill its walls will only find distinction if a critical adversary culture can persist. Should not the open plan schoolhouse of the twenty-first century in New Zealand resemble more the *wharenui*[2] than the offices of Google? The OECD suggest implementing one of four basic school building design types (2008). Unfortunately, it is likely that schools will pluck from this global catalogue, further homogenising the educational landscape while taming both teachers and students alike. I cannot say that I would look forward to working in a circulation space like Ørestad College, policing students on their phones, teaching skills in a breakout room, then checking student work in a sea of bean bags. Should I find myself in one these schools, digitally shepherding a flock in a glass house, I will perform the job that is asked of me, but try my very best to put *something* on the table to experience with my students. Additionally, I will assert my experience as a liminal figure who has occupied the moral masonry of the industrial age and stepped into an uncertain, open century the humanity of which differs little from our ancient forebears. This is all I can do: take responsibility for my role in history and expect the same of my students.

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[2]Māori meeting house.

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From Progressivism to Instrumentalism: Innovative Learning Environments According to New Zealand's Ministry of Education

Daniel Couch

Abstract The imaginary of the modern learning environment projected by the New Zealand Ministry of Education marks a subtle yet significant departure from a previously progressivist hegemony in pedagogy formation towards an instrumentalist pedagogy. The chapter interrogates this imaginary and its projected pedagogical implications for teachers. Analysed is a recently relaunched website specifically dedicated to MLEs, ile.education.govt.nz. Lefebvre's concept of mental space is key to this analysis. Document analysis is used to argue that a critical reading exposes an underlying advocacy for placing the emphasis of pedagogic formation onto the physical environment and new technologies available to the practitioner. This amounts to de-centring the child in pedagogy formation. An instrumentalist education agenda, seated within a neoliberal philosophical approach, underpins the process of this shift to MLEs. Instrumentalism in education is sharply distinct from progressivism, which understands education as an end-in-itself. This shift occurs as a result of the apparent similarity in the meanings of certain key terms which actually operate from markedly distinct philosophical bases. By retaining much of the progressive discourse, instrumentalist pedagogic approaches are gradually altering the meaning beneath these signifiers. The de-centring of the child develops symbiotically with the adoption of an instrumentalist pedagogic identity. This chapter promotes critical debate around the fundamental drivers of pedagogic formation in an innovative and modern learning environment, and what implications this presents for a national education system.

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Introduction

As a Deputy Principal of a New Zealand school which was experiencing significant roll growth in 2014, I vividly remember sitting in a meeting with the architect appointed by New Zealand's Ministry of Education (hereafter MOE). It was an early planning meeting for a new build[1] aimed at boosting the school's capacity. He explained that the Ministry was only building modern learning environments (MLEs[2]) when it came to new school buildings, before remarking that he found it interesting that architects rather than educators were driving pedagogy to be future-focused. In early 2015, a concerned parent asked me where the evidence was that pointed to benefits for children in MLEs. She explained that she could clearly see the benefits for teachers, but was struggling to find evidence of the benefits for students. She was sorry to bother me, but had visited the Ministry's website and was no better informed. These interactions are but two of many that have piqued my interest in what the terms 'Modern' or 'Innovative Learning Environment' actually signify, and what this subsequently means for teaching professionals, parents, and most importantly, for students.

The chapter is written in two parts. Firstly, it explores a recently relaunched MOE website (ile.education.govt.nz) to interrogate and critique its imaginary of an MLE and its projected pedagogical implications for teachers. I use the term *imaginary* here to refer to the Ministry's representation of an MLE-based approach to education, and the philosophical base which it reflects. Throughout, I argue that this imaginary marks a subtle yet significant departure from a previously progressivist hegemony in pedagogy formation towards an instrumentalist pedagogy. This site is the only such MOE site which deals exclusively with ILEs. Therefore, I contend that this website acts as a primary source for constructing an ILE mental space, as it projects the ILE imaginary of the MOE, and that a critical exploration of what this website communicates about MLEs is highly informative in understanding the intent of the MOE for New Zealand classrooms. In this first part, I draw on Lefebvre's (2009) concept of mental space, a term which indicates the intersection of the State and citizen imaginary of a particular construct (in this instance, MLEs). Using document analysis as a method of inquiry, I argue that a critical reading exposes an underlying advocacy for placing the emphasis of pedagogic formation onto the physical environment and new technologies available to the practitioner. I contend that this amounts to *de-centring* the child in pedagogy formation, meaning that where once a child's individual learning needs might be central to the framing of pedagogic and curricular learning sequences and selection

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[1] An addition to an existing school building.

[2] The term MLE has become standard teacher jargon in many countries and is highly prevalent in New Zealand. The MOE has recently renamed the concept to Innovative Learning Environment (ILE). This included rebranding their website from mle.education.govt.nz to ile.education.govt.nz, although much of the original content remains in the updated 2016 website. Both terms will be used interchangeably throughout this chapter, as indeed they are by the MOE.

by a teacher, pedagogic formation within the MLE imaginary of the MOE has been recast with a primacy placed upon the learner's physical and digital environments.

Secondly, I offer an explanation of this phenomenon by suggesting that New Zealand's progressivist tradition in education (Beeby 1986, 1992; Couch 2012) has cloaked an instrumentalist education agenda in the process of this shift to MLEs. Instrumentalism in education is seated within a neoliberal philosophical base, which "asserts that all behaviour is dominated by self-interest … [in] this view individuals are rational utility-maximizers" (Peters 2011, p. 103). Within this philosophical approach, education is seen as a means to an end, thus instrumental. It represents a sharp distinction from the progressive tradition's humanist philosophical base to education, which understands education as an end-in-itself. I argue that this shift occurs as a result of the apparent similarity in the meanings of certain key terms which actually operate from markedly distinct philosophical bases. By retaining much of the progressive discourse, instrumentalist pedagogic approaches are gradually altering the meaning beneath these signifiers. Here, Bernstein's (2000) theory of pedagogic identities is particularly helpful. Pedagogic identities represent a philosophical grounding which informs the regulation and management of change. In exploring how pedagogic identities construct a mental space, these concepts are used to argue that the de-centring of the child by MOE policy develops symbiotically with the adoption of an instrumentalist pedagogic identity. Rather than offering a singular explanation of these events, it is hoped that this chapter will promote further critical debate around the fundamental drivers of pedagogic formation in an innovative and modern learning environment, and what implications this presents for a national education system.

Mental Space and Pedagogic Identities: A Conceptual Framework

Two theoretical constructs described above are critical for their explanatory power within this context: Lefebvre's notion of mental spaces, and Bernstein's discourse of pedagogic identities. According to Lefebvre,

> the State occupies a *mental space* that includes the representations of the State that people construct – confused or clear, directly lived or conceptually elaborated. This mental space must not be confused with physical or social space; nor can it be fully separated from the latter. For it is here that we may discern the space of representations and the representations of space. (2009, p. 225, emphasis in original)

Teasing this concept out further, Middleton writes that mental spaces "occupy the interstices (the cracks) between representational spaces (*lived*, experiential, emotive) of its citizens and its official representations of space (the *conceived* or policy discourse)" (2014, p. 144, emphasis in original). This category in Lefebvre's discussion of various spaces deals explicitly with the intersection between the lived experience and the abstracted projections of citizen and State. For instance, when

considering MLEs, teachers, students, and so on *experience* a reality that interacts with the MOE *conception* of what an MLE ought to be. In this sense, I will argue that the mental space resulting from this ILE imaginary, or the manner in which this imaginary is *experienced* by its users and *conceived* by the MOE, represents a shift in pedagogic identities.

A "pedagogic identity is the result of embedding a career in a collective base … [Each collective base represents] different approaches to regulating and managing change, moral, cultural, and economic" (Bernstein 2000, p. 66). Of the four pedagogic identities in Bernstein's model, those of most explanatory value for this chapter are embedded (see Middleton's explanation of representational spaces above) through Prospective, and De-Centred Market bases. Explored further below, Prospective pedagogic identities "are formed by recontextualising *selective* features from the past to stabilise the future through *engaging with contemporary change*" (p. 68, emphasis in original). In New Zealand, education is largely funded by the State, and therefore, the State retains oversight and regulatory duties of education. De-Centred Market pedagogic identities are constructed by the absolute devolvement of oversight and regulatory duties to individual schools and educational institutions. These schools have "autonomy over [their] own position in the market: that is to optimise [their] position with respect to the exchange value of its products, namely students" (Bernstein 2000, p. 69).

Bernstein's notion of pedagogic identities is not explicitly linked to Lefebvre's concept of mental spaces. Rather, mental space is used here to encapsulate the interactions of the citizens' experiences of an MLE and the MLE imaginary of the MOE. Pedagogic identities are used to determine what the citizens' part of this interaction is, and conversely the part of the Ministry. In this way, mental spaces are constituted by the interactions of pedagogic identities. Key distinctions between the collective bases of Prospective and De-Centred Market pedagogic identities are offered shortly as an explanation to how this mental space is being redrawn by the new MOE ILE website. I argue below that this emerging mental space presents an underlying advocacy for the de-centring of the child in pedagogic formation.

A Web(Site) of Meanings

There are several websites which can be accessed for teachers and parents in New Zealand that help communicate not only what is meant by the term ILE, but also discussing their constituent parts and the subsequent implications for teachers and school leaders. For the scope of this chapter, I have selected the primary such website administered by the MOE and focus here on its homepage. Document analysis was especially useful for this inquiry. Considered by some as "the sedimentations of social practices" (May 2011, p. 191), documents play an integral part in knowledge construction and meaning making (Bowen 2009). When projecting a State imaginary, documents such as this website are highly formative in constructing a mental space. As Bryman (2004) illustrates through his purposeful

avoidance of the word 'text' when explaining document analysis, documents are deeper than a sum of their physical elements. Document analysis enabled consideration of the MOE representations and communications (May 2011) of an ILE, consisting of images and video in addition to what might be traditionally considered as "text", within the website's homepage. Rather than an atomising examination of sentence structure and so on, these data are considered here in order to present an overall understanding of an ILE according to the MOE.

Two explanatory notes concerning these data are important to make at the outset. Firstly, whilst I am critically engaging with the MOE imaginary of ILE, it is not my intent to critique individual teachers and principals whose interviews appear on the website. Therefore, quotes have been attributed to the MOE throughout, as the interviews have been used to construct its vision and interpretation of an ILE. The exception is in the case of a public news broadcast embedded in the homepage, where attribution is made to the original content producer. Secondly, the website contains four subpages. Due to the limitations of space, these subpages are not examined here. The reader is invited to visit the website and explore it in depth. With these provisos in place, it is time to turn attention to the layout of the website itself, before exploring its content in detail.

The homepage of the website is divided into four sections. The first, entitled 'What's it all about?', provides a brief definition and description of an ILE, stating that "[i]nnovative learning environments are learner-focussed and emphasise valued learner outcomes. They encourage collaboration and inquiry, both for learners and teachers, and allow teachers to teach in the style that best suits the needs of diverse learners" (MoE, n.d.-a, Section 1, para 3). The second section encompasses four short video clips under the heading 'School Perspectives'. One video explores an ILE that has been built within an existing school, with a second looking at an ILE as a new build. The third video looks into considerations one school made for digital technologies when building, and the final video in this section is a news article from a current affairs programme entitled 'Bringing the Kiwi classroom into the digital age'. The third and fourth sections are explicitly labelled in terms of property. Called 'The property component' and 'Core elements for property', they detail the manner in which the material construction of an ILE differs from what is considered 'traditional' school buildings. 'The property component' consists of four videos. Two of these videos share before and after photos and plans in several existing schools. These show how either a set of classrooms or the whole school space has been updated into an ILE. The other two videos tour three recently built schools to demonstrate ILEs as new builds. The section headed 'Core elements for property' is a set of images which fall under eight subheadings. These core elements are listed as

- Accessibility,
- Air quality,
- Heating,
- Healthy and safe,
- Lighting,

- Insulation,
- Sustainability, and
- Acoustics.

Each is briefly described in relation to their role in an ILE.

The Child, the ILE, and the Technology

The MOE claims its holistic purpose and intent shares "the OECD's holistic view of learning environments as an ecosystem that includes learners, educators, families/whānau,[3] communities, *content,* and *resources* like property and technology" (MoE, n.d.-a, Section 1, paras 1, emphasis added). ILEs are explained further: they are ecosystems which holistically embody a significant number of constituent parts; they are collaborative and extend beyond traditional school boundaries; they are future focused; they enable the *intended* expression of the National Curriculum; they are not solely about the content and resources such as physical space and new technologies (MoE, n.d.-a, Section 1, paras 1–3). Whilst some of these statements are vague, a link to the Organisation for Economic Cooperation and Development's (OECD) publication, *Innovative Learning Environments* (OECD 2013), provides the reader with the full theoretical backbone and justification for the development and implementation of the MOE ILE imaginary. What becomes clear within this definition is the fact that ILEs should encompass more than their physical and technological elements.

The emphasis of each subsequent section of the page, however, is on the physical environment and technologies which constitute an ILE. These sections of the homepage appear to be in tension with the initial and holistic definition of an ILE in section one. Interviews with various school leaders in section two provide significant statements about the manner in which the physical and technological resources of an ILE directly influence pedagogical shifts:

> For us as a school it was always about the pedagogy that came out of property, and the opportunities property offered for learning … Everybody [has been] doing some serious learning about space, and what space has got to do with children's learning … How can you use that little rectangle in ways that allow children to have some sort of sense of agency in their own learning?… Physically, the space has done something at a deeper level in the school culture. I see an acceleration in the way teachers think about space as a result of this development. (MOE, n.d.-a, Section 2, video 1)

Further, interviews centre on the relationships between architects and school leaders in the process of building a new school:

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[3]Whānau is the Māori language term encompassing a broader definition of family, including extended family.

> Really early on we got our architects involved in the consultation process, where they facilitated sessions with our parents, students, and our teachers … They were heavily involved … and really challenged our thinking with what they presented back. So it was really great to have educationalists and architects to work to look for the best outcomes for kids. (MOE, n.d.-a, Section 2, video 2)

Technological considerations also feature heavily in this section. One video is solely concerned with the technological considerations made by one school leadership team when undertaking a new school build:

> We spent a lot of time looking at what type of environment we wanted to create digitally for the children: where the ports would be, how accessible they would be, where we would have floor boxes, how much wiring would go in, how we could future-proof it as much as possible … And that in turn informed the types of furniture we would put into those rooms that would facilitate that type of learning. (MOE, n.d.-a, Section 2, video 3)

This section of the homepage includes a current-events news item broadcast in 2013 which briefly visited several MLEs around New Zealand. Entitled *Bringing the Kiwi Classroom into the Digital Age* (Sellwood 2013). Several significant claims are made regarding the advent of MLEs in New Zealand's education system. The narrator begins by describing MLEs as a "mix of the latest in student-focused architectural design, new technology, and collaborative teaching" (2013). In a later part of the short film, Professor Stephen Heppel highlights the relevance of MLEs by stating that they are "absolutely about [the students'] world, their life, their century, their technology. We need to let them get on with it" (Sellwood 2013). The upshot of all this, explained by another school leader, explicitly implicates MLEs in the formation of pedagogy. "Modern learning environments are going to be stunning. They are going to be an amazing opportunity. But to make them effective, our teachers, our great teachers, are going to have to teach in different ways" (Sellwood 2013). Each video clip in section two represents undeniably critical considerations and discussions when building a new school, or modernising an existing space. What is particularly striking is that, in each clip, the association between physical space and technologies, and pedagogy formation pervades. Coupled with the overall imaginary of the ILE projection by this website, the narrative constructs an ILE mental space which emphasises the recasting of pedagogy relative to these new spaces and technologies, reinforced further as we scroll down the page.

Sections three and four of the homepage are expressly concerned with the physical elements which make up an ILE. From videos taking viewers on a tour of newly built schools, to the 'before and after' images and floor plans of school buildings which have been modernised to ILEs, and the list of eight property elements which contribute to an ILE, the bulk of the content conveys messages about property and technology. This creates a significant tension between the opening holistic definition of an ILE in section one, and its subsequent elaboration. Throughout these sections, learning is framed as future-focused and innovative when it takes place in digital or non-traditional spaces. The opportunity for students to exercise their agency as learners is afforded by these very same spaces in ways hitherto unavailable to these learners. Pedagogy is centred *on* these spaces, and the learner is conceptualised *from* these spaces. This shifting location of pedagogy

formation, from student to space/new technologies, underscores this chapter's initial argument—that ILEs, according to the MOE, advocate for a redrawing of pedagogy relative to physical and technological developments, de-centring the child in pedagogy formation in the process.

As a first encounter with this imaginary, the homepage conveys several significant messages that explicitly associates space and new technologies with pedagogic formation. The advocacy within this ILE imaginary for pedagogy formation relative to new physical environments and digital learning tools marks a distinct and significant departure from New Zealand education's long-term de facto relationship with a progressive and child-centred pedagogy (Couch 2012; McPhail 2016; Mutch 2013), to an instrumentalist pedagogy formed from physical and digital spaces. The following section offers an explanation of this phenomenon, by suggesting that it represents a subtle assimilation of New Zealand education's progressive heritage into an instrumental future.

Instrumentalism in Progressivism's Clothing? The Schizoid Pedagogue

MLE emergence and accession into mainstream MOE mind-sets has been promoted by the rising "rhetoric of 'twenty-first-century learning' … [which calls for schools to prepare learners for] the fluidity, unpredictability and complexity of a complex and dynamic world deeply influenced by globalisation and the revolution in digital technology" (Benade 2015, p. 10). Theoretical justification for the introduction of MLEs as set out by the MOE on its ILE website rests upon an OECD report published in 2013. Heavily informed by a preoccupation with the unpredictability of future markets and industries for which we prepare our students, the report "is focused on innovative ways of organising learning for young people with the view to positively influence the contemporary education reform agenda[4] with forward-looking insights about learning and *innovation*" (OECD 2013, p. 3, emphasis added). Has this report radically altered the hegemonic conceptualisation of the child, as was experienced in New Zealand education during the 1930s and 1940s? Has it radically altered the hegemonic conceptualisation of pedagogy? In attempting to explain this de-centring of the child in pedagogy formation, I suggest here that New Zealand's traditionally progressivist tendencies in education have cloaked a neoliberalist undercurrent at work within this ILE imaginary, altering both the conceptualisation of the child and a pedagogy to match.

New Zealand education has a well-documented progressive heritage which emerged in its mainstream during the 1930s and early 1940s (Abbiss 1998; Beeby

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[4]A critical exploration of this agenda, including a critique of the OECD's role in this space, can be found in a recent article by Lingard et al. (2013) entitled *Testing regimes, accountabilities and education policy: commensurate global and national developments*.

1992; Couch 2012; O'Connor 2014). Progressive education in New Zealand has long been characterised by "child-centredness, experiential learning, an emergent curriculum, a holistic pedagogy and the fostering of creativity" (Mutch 2013, p. 99). The neoliberal turn in New Zealand education is equally well documented (Mutch 2013; Peters 2001; Roberts 2009), and was ushered in during the 1980s through wide-reaching education reforms entitled *Tomorrow's Schools* [reviewed in-depth after a 10-year period by Wylie (1999)]. These reforms saw responsibility for schools devolved to locally elected boards of trustees. Whilst this presented a radically different education structure and introduced quasi-markets into primary and secondary education nationally, pedagogy formation remained progressive and holistic, if restricted by the introduction of market-based principles (Mutch 2013; Peters 2011). Gradually, an increasing emphasis was placed on students themselves to mirror the self-managing, enterprising, innovative traits expected of their schools and teachers (Peters 2001; Robertson 2016). Education informed by neoliberalism conceptualises the child as self-managing, emphasises entrepreneurialism and innovation, and firmly considers the child relative to future enterprise and industries. "In essence, this is suggestive of emerging and increasingly pervasive *neoliberal pedagogy* where the ethos of state education is arguably being transformed to one of free market fundamentalism" (Mccafferty 2010, p. 542, emphasis added). These developments point towards a shifting pedagogic identity within the New Zealand education space.

Prospective and De-Centred Market pedagogic identities (Bernstein 2000) are both evident within New Zealand education. "The management of prospective identities, because of the emphasis on performances which have an exchange value, requires the state to control both *inputs* to education and *outputs*" (Bernstein 2000, p. 68, emphasis in original). Within New Zealand's context, the Prospective pedagogic identity was embedded during education reforms in the 1980s. As a result of these reforms, "governance and management was decentralised to individual schools through elected boards of trustees. Whilst schools could make day-to-day decisions, the Ministry retained control over curriculum and assessment" (Mutch 2013, p. 106). A significant difference between Prospective and De-Centred Market collective bases lies in the role of the State in resourcing education. Whilst both neoliberal by degree, the De-Centred Market collective base seeks to resource education from the private sphere. "Whereas the centring resources of … prospective identities recontextualises the past … de-centring resources construct the present" (Bernstein 2000, p. 68). Education reforms in the 1980s were highly neoliberal in the *organisation* of education; however, the State retained its resourcing role. Recent developments have seen a neoliberal philosophy further permeate funding structures nationally, with the advent of Public Private Partnerships; including the funding and building of ILEs [for instance, Hobsonville Point Schools (MOE, n.d.-c)], opening professional development to private providers (MOE, n.d.-b), and 2013 legislation enabling the introduction of Charter Schools. This is a clear response to neoliberalism's call for a reduced role of the State, and where "markets do not exist (in areas such as … education …) then they must be created, by state action if necessary" (Harvey 2005, p. 2). Whilst

New Zealand's traditionally progressive child-centred pedagogy was somewhat restricted within a Prospective pedagogic identity (Mutch 2013), they were still within the primary control of the teacher. A teacher's selection of pedagogic practice is located externally to the teacher within a De-Centred Market pedagogic identity. "[P]edagogic practice will be contingent on the market in which the identity is to be enacted" (Bernstein 2000, p. 69).

Pedagogic identities, then, construct or embed the MOE's mental space for ILEs. Tracing educational reform in the UK during the 1980s and 1990s, Bernstein (2000, p. 71) employs these categories to illustrate the emergence of a "pedagogic schizoid"; operating from a Prospective pedagogic identity within an institution accountable to a De-Centred Market pedagogic identity. When an instrumentalist conceptualisation of the child—self-managing, entrepreneurial, and innovative—is set against the previous hegemony of progressive educational tenets—holistic teaching, contextual, and relevant—one can see that the concepts and language espoused by the instrumentalist pedagogue can be conflated with those espoused by the progressive pedagogue. For instance, child-centred pedagogy and curriculum are embodied in the self-managing student. Acknowledging the child's context and existence outside of school walls is conflated with an advocacy, and in some instances urgency (MOE, n.d.-a), to fixate on the child's future economic self through a preoccupation with potential industries and enterprise. This apparent similarity of language used to indicate two markedly different philosophical bases has been instrumental in the reorientation of pedagogic identities within the Ministry's imagination of ILEs in New Zealand, and when tensions go unacknowledged and unresolved, can present a schizoid pedagogue.

Conclusion

This volume makes a significant contribution to the discourse which this global shift in education demands. Due to limitations of space, this chapter can only begin to acknowledge the complexities represented by New Zealand's MOE ILE imaginary, and these complexities are by no means confined to New Zealand.[5] ILEs, the aspirational gold-standard for learner-centred education, constitute and are constituted by a complex and dynamic set of agendas influencing education reforms globally. The meaning behind terms such as 'learner-centred', 'self-managing', and 'innovative' are all being continuously redrawn and repurposed, and the subsequent education mental space is an ever more overwhelming space to try to understand. New Zealand's national education system is increasingly being opened to new forms of private intervention, steering educators' pedagogic formation towards the

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[5]Highlighting some of this complexity in Australia, for instance, is a news story concerning walls being reinstalled into ILEs, or open-plan classrooms. A firm which sells mobile room dividers had reportedly installed partitions in over 200 open-plan classrooms across the country by late 2015 (Cook 2015).

neoliberal child and instrumentalist pedagogy, necessarily reducing the space for a holistic progressivist pedagogy. Whilst an ILE is being presented as child centred, a critical exploration in the MOE imaginary of an ILE exposes a deeper undercurrent of instrumentalism at play which dramatically reorients the term from its humanist foundations towards a neoliberal philosophical anchor. The construction of New Zealand's children to be flexible, adaptable, self-managing, and innovative is justified through the rhetoric of having to prepare learners today for an uncertain global economy tomorrow.

My observation here that education is afloat upon the ever-rising tide of neoliberalism is nothing new. What is important to consider, however, as Bernstein (2000, p. 71) pointed out within British education reforms, "is the official institutionalising of the [De-Centred Market] and the legitimising of the identity it projects". This chapter has set out to call for a careful and critical response to the projection of neoliberal pedagogic identities into the New Zealand teacher mental space, hitherto a final frontier of a progressive hegemony. Bernstein's theory of pedagogic identity has been used to offer an explanation for the shifting collective base projected by the ILE imaginary of the New Zealand MOE. That neoliberal pedagogy should be taking hold in New Zealand is perhaps unsurprising, given its embrace of a neoliberal education system in 1989. "Based on a relatively pure neo-liberal model of structural adjustment … the 'New Zealand experiment' has been touted by the World Bank and the OECD as an example for the rest of the world" (Peters 2001, pp. 212–213). Grinding away at curriculum reform and school leadership (Robertson 2016), and teacher pedagogy (Mccafferty 2010), neoliberal creep into the classroom is underpinning what was once a predominantly progressivist mental space. As Robertson cautions, "neoliberalism has transformed, albeit in both predictable and unpredictable ways, *how* we think and *what we do* as teachers and learners, and it is therefore important we make these things evident to ourselves" (2008, p. 12, emphasis in original). The implications of this transformation are profound and necessitate further and critical inquiry into both fundamental drivers of pedagogy in our schools, and the mechanisms by which they spread. Too much is at stake for such critique to be absent.

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An Art of Orientation: The Possibilities of Learning Spaces

Sean Sturm

> *If I were to wish for something, I would wish not for wealth or power but for the passion of possibility, for the eye [...] that sees possibility ever.*
>
> Kierkegaard 1987, p. 41

Abstract Most research on learning spaces in universities considers the influence that spaces have on learners (Boys 2010; Markus 1993; Temple 2008). As such, it can contribute to the pervasive 'probabilism' of strategic planning in universities that is dominated by 'learning management'. But what about the influence that learners can have on spaces: how spaces can learn from them and they can shape spaces? In this chapter, I traverse a range of concepts of learning spaces in universities, all of which construct different 'solutions' to the 'problem' of how best to construct learning spaces, given the way in which learners relate to the spaces in which they learn. Ultimately, I aim to map critical-creative practices that generate new intensities in, and relations between, bodies, that is to say, new possibilities for learning. From these practices can emerge the contours of a participatory pedagogy that enables teachers and learners to see the university as a place given over to the free play of possibilities, a place of 'possibilism' (Hirschman 2003).

Prologue

To enter a learning space, find our place and go to work as a teacher or learner is to orient ourselves in a network of invisible ties more often than not taken in at once and as a whole, although that network might reconfigure itself more or less subtly in the course of the class. When I imagine myself stepping into a class, it is Deleuze's (1992)

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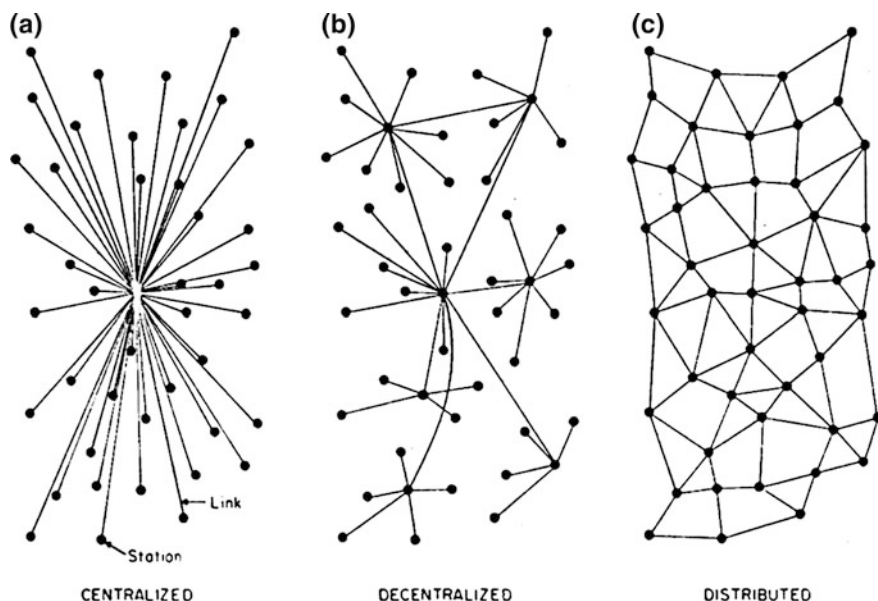e-mail: s.sturm@auckland.ac.nz

Fig. 1 Networks (Baran 1962, p. 4)

'lines of force' and 'flight' that I see, *Matrix*-like about me.[1] I see the classroom as a *dispositif* (French, 'apparatus'), a matrix in which the learners and I as teacher are nodes, disposed to learn in various ways.[2] (I can also imagine the classroom as a node in the network of spaces that is the university, or myself as a node in a network of learners that extends beyond the classroom.) Paul Baran's (1962) epoch-making diagram of cybernetic networks springs to mind (see Fig. 1).

So, is the classroom a centralised network: a string puzzle (see Fig. 2) with us as teachers (or, indeed, our puppeteers) in control?[3] And not fixed, but working towards an end, towards a 'solution' to the puzzle—with the potential, of course, for us to get tangled (or for our hands to be tied)? With the aim, perhaps, to create a

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[1]In 'What Is a Dispositif?', Deleuze (1992) describes two types of 'line'. The first is the line of 'force', of which there are four kinds: lines of 'visibility' (or 'light'), 'enunciation', 'force' and 'subjectification' (p. 160); they tend to 'stratification or sedimentation', that is, to stability or (*re*) *territorialisation* (p. 165). The second is the line of 'flight', of which there are two kinds: lines of 'flight' (or 'escape') and 'fracture' (p. 161); they 'lead … to the present day or creativity', that is, to change or *deterritorialisation* (p. 165).

[2]Compare Rancière (2006) on the 'distribution [*partage*] of the sensible'.

[3]More formally speaking, as Lim et al. (2012) put it, by default we occupy the 'authoritative space' of the classroom (p. 237), which centres on 'classroom front centre' (CFC). The secondary 'centres' we can occupy include the 'supervision space' ('classroom side' and 'classroom back'), which includes the 'surveillance space' ('classroom back centre'), and, less commonly, the 'interactional space' (what I would call the heart of the classroom, beside and between the students' desks).

Fig. 2 Cat's cradle
(Squareman 1916, p. 82)
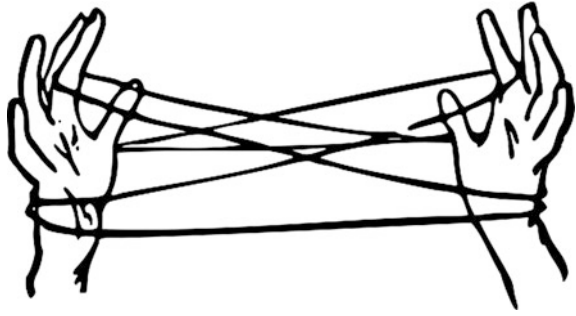
Fig. 3 String art (Agota
2007)
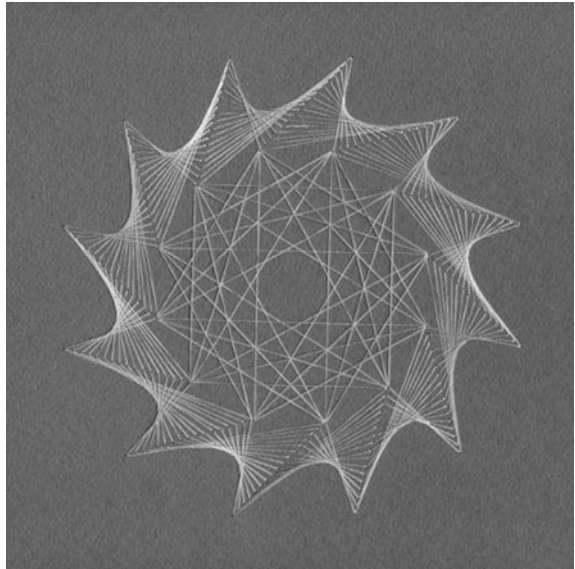
symmetrical piece of string art, in other words, a perfectly 'aligned' class (see Fig. 3)?

Or, rather, is the classroom a decentralised network: a harp with us teachers as players? (see Fig. 4). With the aim perhaps to have the harp play itself—or be played by our breath, our words—alone (see Fig. 5)? Or, third, is the classroom a distributed network? If so, it is more like a labyrinth (see Fig. 6). (Who the Minotaur might be, I dare not think.)

If so, what is the Ariadne's thread that can lead us through this labyrinth? In short, it is the concept of education as *orientation*. I trace this concept to Plato's (1993) vision of education (Greek *paideia*) as 'the art of orientation' (p. 245, 518d).[4]

[4]Plato describes education as a spatial transformation, 'the art [of] turning minds around' (*tekhne ... periagoge holes tes psyches*) (see Heidegger 1998, p. 166).

Fig. 4 Playing the harp
(Guillié 1817/1894, pl. 7,
opp. p. 121)

Fig. 5 Aeolian harp (Kircher
1673)
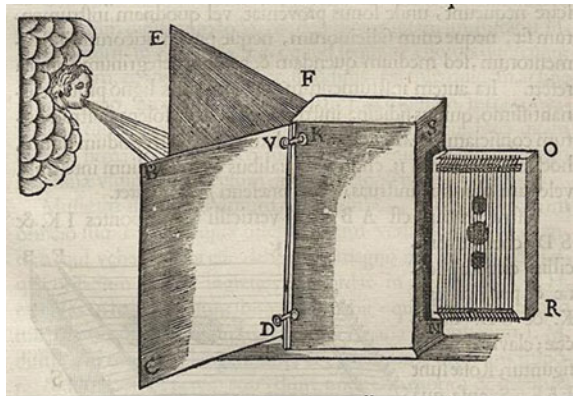
Education is 'orientation': orienting ourselves (as learners)—and/or enabling others
to orient themselves (as teachers). To enable learners to orient themselves is to
enable them to locate and position themselves in a learning space: to locate them-
selves relative to the place in which and peoples among whom they find themselves,
and to position themselves relative to the discourse of the tradition, and their teachers
and fellow learners. (Teachers, of course, have to orient themselves likewise.)

How, then, can we orient ourselves to the landscape of learning spaces?

Fig. 6 Labyrinth (Maffei 1709, pl. 3)

Learning Spaces: Probabilism

Field theory (Lewin 1936) offers some landmarks that can orient us. It argues that behaviour can be understood as a function of the interaction of the person (the learner) and their environment (the learning space): B = f(P, E).[5] The comma between the two variables suggests that there are multiple ways in which they can interact, in which learners relate to the spaces in which they learn. Here are three, for example, that assume that the learning space conditions learning (Tiesdell and Oc 1993): the space might determine learning (determinism), make it probable (probabilism), or make it possible (possibilism). Taking for granted that learners have at least a degree of agency, if only to allow their learning to be shaped in certain ways, I am most interested in probabilism and possibilism. In what follows, I traverse a range of concepts of learning spaces in universities, all of which construct different solutions to the problem of how learners relate to the spaces in which they learn:

- I. disciplinary space,
- II. creative space,
- III. cybernetic space,
- IV. critical space, and
- V. playful space.

The first two probabilise the university space; the other three possibilise it.

What is probabilism, then? When we think of the university today, it can often seem like anything but a place of possibilities. Instead, it seems like a place where

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[5]More accurately, in field theory, behaviour can be understood as a function of the life space (LS): B = f(LS), the life space being produced by the interaction of the person (P) and their environment (E): B = f(LS) = f(P, E).

what is probable, or 'prove-able', rules. This is because the probabilism of strategic programming in universities projects demonstrable and measureable objectives and outcomes in the service of outputs'—or rather, of an efficient, and thus manageable, relationship between inputs and outputs. What results from such 'closing the loop' is a teleology of teaching and learning, according to which everything must be seen as if in hindsight, as is the case with strategic planning (strategic objectives and KPIs), constructive alignment (learning outcomes and graduate profiles), and even research management and academic writing ('tell me what you're going to do/say; do/say it; tell me what you have done/said'). The probabilistic university thus turns out to be a 'future anterior' world, a world of "(always already) will have been" (Derrida 1997, p. 5).

The first two concepts of learning spaces, the disciplinary and the creative, are probabilist. They assume that learning spaces shape—and thus probabilise— teaching and learning … and, in turn, learners.

I. *Disciplinary space*

The disciplinary concept of learning spaces, as the name suggests, principally draws on Michel Foucault's *Discipline and Punish* (1977), best known for its analysis of Bentham's Panopticon as a model of power acting through visibility, of "a certain concerted distribution of bodies, surfaces, lights, gazes, in an arrangement whose internal mechanisms produce the relation in which individuals are caught up" (p. 202).

The concept is taken up by Thomas Markus, the leading exponent of this school of thinking, in *Buildings and Power* (1993).[6] Elsewhere, he defines disciplinary space as serving explicit and implicit classificatory functions:

> There is no building type in which a division of people, objects, and machines, and their spaces, into classes and categories, as the first step towards their organised and purposeful interface, is not of primary importance. (Markus 1987, p. 468)

Buildings thus function through their form, function and space to classify: "to define and reproduce social structures, and to elaborate the meanings of relationships" (p. 468). In *Buildings and Power*, Markus gives as an example of a learning space the modern lecture theatre, which he sees as an outgrowth of the anatomy theatre (see Fig. 7), with its design based on the classical amphitheatre. He defines lecture spaces by their relationship to other spaces (they are set apart); their means of access for 'performers' and audience (they offer a separate entrance for each); and their layout, which defines the relationships between performers and audience (they separate the two, centring the space on the performers) (1993, p. 240). He argues that they are designed to reveal "a small fragment of a corpus [!] of knowledge at a time, a corpus to which the performer has access. And the fragment is presented as a dramatic spectacle" (p. 229). The lecture space *as space* thus dramatises, and thereby bodies forth, the invisible power/knowledge relationships

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[6]For a more recent example of the disciplinary concept of learning spaces, see Spencer (2016, pp. 128–137) on neoliberal architecture in education.
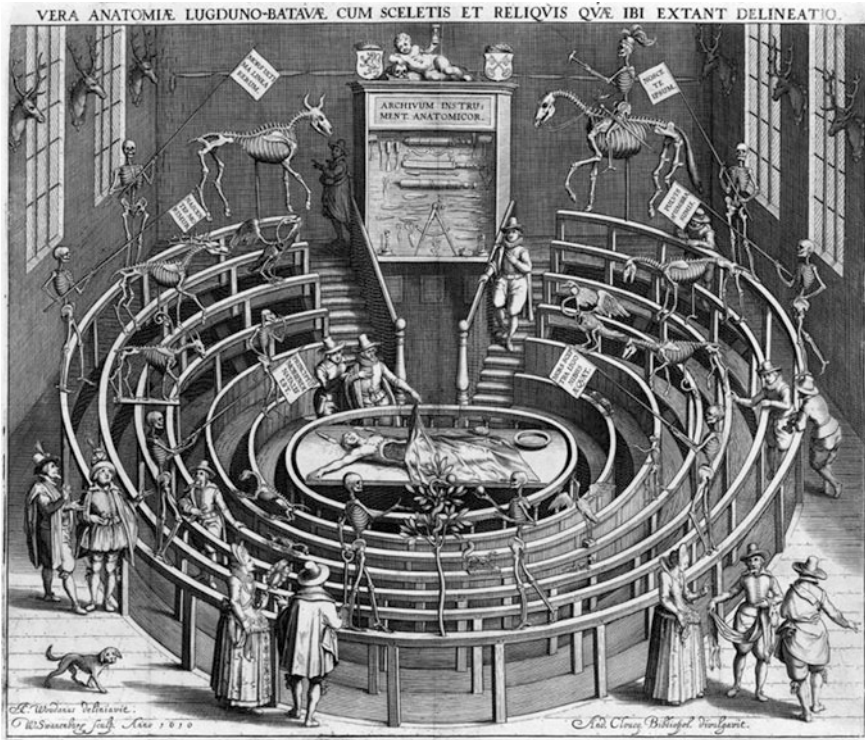
Fig. 7 Anatomy theatre at Leiden University, early seventeenth century (Swanenburgh c. 1610)

that define the discipline. Whereas the teacher talks and demonstrates their learning from the stage, the learner listens—and ideally learns.

The disciplinary concept of learning spaces dominates their design in universities, whatever the default learning space in a particular university might be (in mine, for example, it is still the raked lecture theatre). It encourages university planners like architects and administrators to solve the problem of how best to construct learning spaces by designing them to engineer certain learning experiences, for example, by setting up flexible informal spaces to allow for social or personalised learning (Boys [2009] calls this 'beanbag' design.) But although the design of spaces can constrain teaching and learning (teachers at my university, for example, tend to assume that groupwork is difficult in our raked lecture theatres because of the fixed, tiered seating), the empirical research on learning spaces would suggest that *where* we learn has only minimal impact on *what* we learn (Temple 2008). All that matters is that the temperature, humidity, noise level and lighting of a space are such that learning is not impeded (Temple 2007).[7]

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[7]The empirical research on learning spaces mostly focusses on the compulsory education sector; for example, see Tanner (2000) and Higgins et al. (2005).

II. *Creative space*

Nonetheless, the creative concept of learning spaces aims to change how we conceive of spaces by alerting us to a different way to understand space. It is taken up by Jos Boys in *Towards Creative Learning Spaces* (2010; see Boddington and Boys 2011; Boys 2014). She uses "art, design and media education … as the paradigm for new'—or, rather, *better*—'types of learning" (Boys 2010, p. 8) because these disciplines explore creativity, learning by doing, and a range of non-traditional learning spaces, including "vocational, academic, community-oriented, practice-based and professional spaces" (p. 9). She thus focusses on the spatial practices of these disciplines, not on the spaces in which they are practised:

> this means shifting from viewing (physical or virtual) space as a container or setting for learning activities where the hope is that 'changing the scenery' will affect behaviour. Instead, in line with much contemporary architectural thinking, space and its occupation are interrogated through their dynamic intersection as social and spatial practices. Space is not a thing but a process. (Boys 2009, p. 18)

Thinking about space as a process, or 'spacing' (Beyes and Steyeart 2011, after Derrida 1981), moves beyond the concept of disciplinary space ('changing the scenery') to expand what counts as a learning space to include all the aspects of Lefebvre's (1991, p. 39) triad of conceived, perceived and lived spaces ('representational spaces' like the idea of a city, 'representations of space' like maps, and 'spatial practices' like walking a route, respectively). To this end, Boys wants us to focus on the non-verbal and embodied aspects of teaching and learning encounters, especially those that signal 'stuck places' (Ellsworth 1997, p. 71) in learning.[8] However, the creative concept of learning spaces is still probabilist because it assumes that we need to re-design the learning space—or the spacing of learning— to make certain learning experiences more probable. This brings me to the question: What would a *possibilistic* understanding of learning spaces look like?

Learning Spaces: Possibilism

One version of possibilism was developed by Albert Hirschman to analyse and realise social change. Possibilism is

> an approach to the social world that would stress the unique rather than the general, the unexpected rather than the expected, and the possible rather than the probable … to widen the limits of what is or is perceived to be possible, be it at the cost of lowering our ability, real or imaginary, to discern the probable. (2003, p. 22)

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[8]For 'stuck places' in education, see Lather (1998), and Meyer and Land (2005).

In other words, it furthers "the discovery of paths, however narrow, leading to an outcome that appears to be foreclosed on the basis of probabilistic reasoning alone" (Hirschman 1992, p. 173). It works through three main 'devices', or heuristics:

- seeing obstacles or constraints as productive;
- changing beliefs, attitudes and values through actions (rather than vice versa); or
- exploiting the unintended consequences of actions (Hirschman 2003, pp. 23–25).

Such heuristics can help us to resist probabilism in universities from within—and open up learning spaces to possibilities.[9] In line with Hirschman's three heuristics, we might

- use the open space at the front of the lecture theatre for participatory activities (for example, sociograms, where students role-play social or environmental phenomena or vote with their feet on issues, or carousels, where students move around a range of learning stations brainstorming topics);
- have students sit down in university thoroughfares and draw the patterns of movement through them to explore their sense of what is appropriate behaviour in a certain space (which kind of psychogeography[10] can elicit the 'lines of force' and 'flight' in a space [Deleuze 1992, pp. 160–161]); or
- explore the response of university security personnel and other administrators to the drawing activity, for example, as indicative of the role not only of spatial design, but also of surveillance and risk management, in the administration of universities (which occupation reveals for real how the disciplinary concept of learning spaces dominates spatial design in universities).

All three examples come from my teaching; I will return to their conceptual possibilities.

The other three concepts of learning spaces, the cybernetic, the critical and the playful, are possibilist. They assume that learners can influence learning spaces: that spaces can learn from them and they can shape spaces. (Interestingly, field theory moved in this direction, arguing that the environment, or learning space, should be understood as a function of the behaviour of the persons, or learners, in it: $E = f(P, B)$ [Schneider 1987]).

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[9]Hirschman's possibilism has much in common with Deleuze's 'counteractualization' (see Deleuze 1990, pp. 150–152), sometimes translated as 'vice-diction' (see Deleuze 1994, pp. 189–191). Counteractualization is 'the process whereby one identifies and engages the virtual events immanent within one's present world, whereby one "counter-actualizes" the virtual' (Bogue 2007, p. 9), the virtual consisting in possibilities that continue to exist even once actualised.

[10]Psychogeography was defined by the founder of the Situationist International, Guy Debord, as 'the study of the precise laws and specific effects of the geographical environment, consciously organized or not, on the emotions and behavior of individuals' (Debord 2006, p. 5). The classic psychogeographical procedure was the *dérive* (French, 'drift'), a more or less random walk through an urban space, by means of which an individual 'drop[s] their usual motives for movement and action, their relations, their work and leisure activities, and let[s] themselves be drawn by the attractions of the terrain and the encounters they find there' (p. 50).

III. *Cybernetic space*

The cybernetic concept of learning spaces assumes that learning spaces respond to learners such that spaces can 'learn'. The concept of buildings learning was popularised by Stewart Brand in *How Buildings Learn* (1994). He argues that

> The word 'building' contains [a] double reality. It means both 'the action of the verb BUILD' and 'that which is built'—both verb and noun, both the action and the result. Whereas 'architecture' may strive to be permanent, a 'building' is always building and rebuilding. (p. 2)

In short, "[f]irst we shape our buildings, then they shape us, then we shape them again—ad infinitum" (p. 3). The same is true of learning spaces. They continually make themselves over in a process of un-making and remaking, or 'deterritorialization' and 'reterritorialisation' (Deleuze and Guattari 1977). As "[a] building 'learns' only through people learning" (Brand 1994, p. 189), so too does a learning space: occupancy, or better, 'occupation' (Colebrook 2015), is the key. Recall the drawing in thoroughfares exercise from above: as the students will learn by occupying a space about what is appropriate behaviour in certain spaces and why, so the space will 'learn' through the security response about what behaviour is probable and not probable in the space (because some places will prove themselves to be for walking, others for sitting; some for learning, others for socialising). As a result, it will no doubt become more 'efficient' in its security response.

The critical and playful concepts of learning spaces offer us a glimpse of a further possibility: that learners can and do shape learning spaces. It is to them that I now turn.

IV. *Critical space*

The critical concept of learning spaces aims to change learners' relationship with the learning space in two ways: to put it plainly, learners must free their mind and their body will follow (critical pedagogy), or they must free their body and their mind will follow (critical theory). Thus far, neither way has turned out as well as it might have.

Critical pedagogy, as Morgan (2000, p. 273) argues, "has been rich in spatial references and metaphors" like borders, margins; in- and outsider knowledge; dominance and subalternity; and, latterly, intersectionality (Collins 1990) and the undercommons (Harney and Moten 2013). But little has been written about how critical pedagogy plays out 'in' space, including learning spaces, in part because the pedagogy of critical pedagogy is nearly always conceptual and dialogic in nature (see Hooks 2014)—which can be problematic for those without access to such a conversation by dint of their positionality (Ellsworth 1989). Ellsworth does advocate classroom practices that facilitate 'moving about', a critical mobility that entails "multiplying and making more complex the subject positions possible, visible, and legitimate at any given historical moment" (p. 322, after Minh-ha 1986, p. 9). But this mobility is of the mind, not the body—except, it might be said,

insofar as positionality is bodily determined. (In Lefebvre's [1991, p. 39] terms, critical mobility mainly occupies a 'representational space', although it might have effects in 'lived space'.)

Critical theory in the Deleuzoguattarian tradition has brought us back to the body, however, back to the learning space *as space*—though not always without missteps. For example, a naïve Deleuzoguattarian pedagogy would have us simply affirm deterritorialization in the name of desire, of the 'Body without Organs' (Deleuze and Guattari 1977), that takes the form of experimentation and intensification that works against the status quo of the organisation—the flipside of the kind of corporatising 'disruptive' practices that fixate higher educationalists today (Christensen and Eyring 2011). But to what end—simply to disrupt learning spaces? A more circumspect Deleuzian 'pedagogy of affect' (Albrecht-Crane and Slack 2003) that maps bodily 'intra-action' (Barad 2007, p. 33) in space offers a way forward and points us towards a fifth concept of space: playful space.

V. *Playful space*

A pedagogy of affect could play with the generation of new intensities in, and relations between, bodies, that is, the generation of new modes of intra-action. Such intra-action orients us in space, virtual and actual; it serves as the basis of education (Greek *paideia*) as "the art of orientation" (Plato 1993, p. 245). In such a pedagogy, our role as teachers is to enable learners to orient themselves in a learning space: to locate themselves relative to the place in which and peoples among whom they find themselves, and to position themselves relative to the discourse of the tradition, and their teachers and fellow learners.[11] To understand how learners orient themselves in a learning space, I draw on Deleuze on *Spinoza* (1988). He suggests that we can map bodies of any sort, like learners, in terms of their 'longitude' (E–W) and 'latitude' (N–S): "the set of relations of speed and slowness, of motion and rest, between particles that compose [a body]" and "the set of affects that occupy a body at each moment" (Deleuze 1988, p. 127), respectively.[12] Teachers can enable learners to orient themselves in a learning space by cultivating new relations and intensities, or new possibilities, for example, by valuing 'just talking'—in seminar rooms, corridors or cafés—in the learning space of a university that is dominated by probabilistic discourse like research and learning management (in this case, the novelty lies not in innovation but in renovation, but it is no less 'new' for that).

More broadly speaking, the playful concept of learning spaces is oriented to critical-creative practices. To this end, we can explore a range of 'playful' tactics already in play in the university like invention, idleness and sharing … and just talking and walking, as Harney and Moten rightly say (Shukaitis 2012). But such tactics also echo the techniques of "ontological reframing (to produce the ground of possibility), rereading (to uncover or excavate the possible), and creativity (to

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[11]Compare Kant (1991) and Deleuze (1995, pp. 147–149) on learning as orientation in thought.

[12]For the semiotics of the mapping of bodies, see Deleuze (1997).

generate actual possibilities where none formerly existed)" (Gibson-Graham 2006, p. xxx) that inform J. K. Gibson-Graham's 'politics of possibility' (p. xiv). For ontological reframing, we might embrace psychogeography; for rereading, mapping; for creativity, games. Through such serious play (*spoudaiôs paidia*), we can attend to practices in the university as models for worlds and ways of being other than 'probable' ones; we can generate 'possibility spaces' (Delanda 2014) that we can collectively explore as teachers and learners. In this way, the university can become a place that allows for the free play of possibilities, a place where it is possible to "see possibility ever" (Kierkegaard 1987, p. 41).

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Questions Concerning Innovative Learning Environments: Intersections in Disciplined Resistance

Stuart Deerness, Andrew Gibbons, Mary-Jo Gilligan, Gregory Breen, Andrew Denton and Richard Heraud

Abstract This chapter presents a series of critiques focused on the principles and practices associated with the discourse of innovative learning environments. These critiques represent intersections in disciplinary thinking about the design of new teaching and learning spaces. The authors have backgrounds in arts, design, architecture and education. They question the drivers of twenty-first-century school design and the impact of these drivers on wider school communities. The authors argue that the sharing of different perspectives must be a central expectation for any designs for school, for the classroom, for the curriculum and for learning and teaching communities.

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Sharing Views and Amplifying Voices

This chapter explores principles and practices of innovative learning environments (ILEs) at the intersections of interdisciplinary thinking. The idea of thinking of intersections connects the authors through a shared concern for the ways in which apparently new educational ideas are introduced to, with, and/or for educational communities. The authors argue that the sharing of different perspectives must be a central expectation for any designs for school, for the classroom, for the curriculum and for learning and teaching communities.

Our intersecting concerns are evidence of resistance to certain somewhat predictable, but not inevitable, trends in educational reform. We are interested here in the idea of how discourses can operate to create an apparent consensus in, in this instance, views regarding the benefits of innovative learning environments. We are also concerned about the contexts that make some aspects and purposes of ILEs possible and desirable while marginalising or overlooking other elements and forms of innovations in school design (including curriculum and pedagogy as well as school building and material innovations). Hence, we are interested in putting the brakes on design processes, and addressing the principles more carefully. This takes time, and so what we are trying to do at the same time is to address the apparent tendency to accelerate change in education, because of the dangerous and often absurd tendency to want to see the world as rapidly changing and to then work out forms of rapid responses.

Structurally, this chapter shares the different voices of the authors as discrete sections; however, each section, each approach to questioning the idea of innovative learning environments, is also full of intersections with the other voices. The chapter does not attempt to create a coherent whole voice, because this is not what is required in the design of new classrooms or pedagogies or curriculum documents. Following the writing of Jacques Rancière (2010) on *dissensus*, the focus here is making clear the differences so that these differences can be welcome to work together. This approach recognises education as always 'complex' and, in the words of Biesta (2016), 'risky'.

A Critical Overview of Space and Education

Educational designers of the nineteenth-century industrial schools in Britain, from which the modern template of many of the world's educational system and schools developed, identified the design and use of space to be as important in schooling as the curriculum or timetable. In nineteenth-century industrial schools, space was organised to produce hierarchical relations based on strong ideologies of religion, order, surveillance, discipline, hierarchy and competition. They reflected, in microcosm, the new socio-economic relations emerging in the rapidly industrialising wider society (Massey 2005; McGregor 2004; Paetcher 2000).

Structures created in this way have been substantially reproduced without question in our schools over the last century, keeping asymmetric power relations intact. Indeed, public schools in New Zealand, past and present, were designed by state architects and built according to norms and standards determined by the authorities, to effect schooling as given in social policy. For instance, the development of school buildings in New Zealand was closely allied to the growth and expansion of the education system, and changes in the political economy of the times have been directly reflected in the type of buildings provided for the purpose. In the early days of the colonisation of New Zealand, education rested almost entirely in the hands of the churches (Garnock-Jones 1966). To oversee the design and construction of public buildings throughout the country, the colonial government set up the office of Superintendent of Public Works in 1840, and the responsibility for primary education and the provision of school buildings was transferred to Provincial Governments in 1853. A Colonial Architect's office followed in 1869, before the creation of Government Architect, within the Public Works Department, in 1909. During this period, schools were often the most prominent buildings in many localities and were often social and community hubs.

The period immediately following the Second World War saw an increase in school population, which led to a shortage of new buildings. Garnock-Jones (1966) explained how The Auckland Education Board sought to overcome this problem by adopting a standard type of primary school plan. The standard model was taken up at a national level, and primary schools throughout the country adhered to the Dominion Basic Plan. Likewise, standard post-primary school plans were prepared to meet the great increase in school population following the war. The first of these standard plans, known as 'the Naenae type school', was a two-storey building, of reinforced concrete construction up to the first floor level and timber frames above. Classrooms were laid out in long rows, with corridors providing access at both levels. According to Garnock-Jones (1966), this was the first school fully planned as a complete entity with the incorporation of specialist facilities for the full range of subjects in the present-day curriculum.

Despite considerable changes in society and policy, the classroom remains peculiarly static. This may be due to organisational and political inertia, notions of what constitutes education and school, and/or the separation of designer and user. Yet whatever the cause, the outcome remains the same—the physical form of produced spaces expresses antecedent social arrangements and also predisposes current practices to emulate them.

The box-like structures of individual classrooms are a persistent spatial form, as they are in most developed nations. In fact, so ubiquitous are these orderings that their taken-for-granted quality obscures the way in which the setting is active in the production and reproduction of practices that maintain persistent and unequal power relations. The dominant metaphor of classroom-as-container can be traced back to the late nineteenth century. The emergence of the classroom during this period is particularly revealing of the normalising and socialising functions of the school. In the early nineteenth-century pre-monitorial schools, held in large spaces, students related directly to the teacher (Markus 1993). This interface between

teacher and student was changed with the advent of the monitorial school system, with large numbers of students subdivided into groups and instructed by pupil monitors, still in the large open space of the schoolroom. The method was premised on 'more able' students being used as helpers to the teacher, passing on information they had learned to other students (1993). Students' position in the hierarchy of achievement was reflected in their physical location in the schoolroom, which according to Paetcher (2000) explicitly spatialised their performance. The development of the teaching gallery allowed the surveillance and control of a large group of students through eye contact.

Along with being credited for inventing the playground (De Giustino 2016; McCann and Young 2016) Samuel Wilderspin pioneered the idea of separating the entire school into classes, which were taught simultaneously by teachers in separate rooms. This separation in space conferred to teachers the status of independence and relative freedom from the surveillance of colleagues (Markus 1993), while students were more homogenised (Paetcher 2000). Thus, teachers gained private space, while for students it was more public, exposed to the gaze of peers and the geometries of competition as they were compared and ranked both within their own class, and between other classes (Markus 1993; McGregor 2004).

This classroom form has been substantially reproduced by design over the last two centuries, presenting classrooms as universally recognised images across nations and cultures. Markus argues that, "asymmetries of power in society … were kept intact in such buildings" (1993, p. 317), and McGregor suggests that it is the familiarity and continuity of traditional design principles that presents them "unproblematically as free from ideological contestation and struggle, somehow pre-existing and even immutable" (2004, p. 15). Similarly, McLaren claims that, "classroom reality is rarely presented as socially constructed, historically determined and mediated through institutionalised relationships of class, gender, race and power" (1995, p. 35).

Understanding these spaces as socially produced helps to reveal current social arrangements which maintain and solidify such power relations, but which can then be contested and changed. The architecture of schools and classrooms embodies particular ideologies of education and pedagogy through their physical arrangement and the interaction with the social, employed through timetabling and classroom allocation, explicit and unspoken rules of use, and other habitual organisational practices. The dominant metaphor of classroom-as-container constructs not only particular ways of viewing and speaking of teaching and learning, but also creates a practical logic of the 'rules of the game' (Bourdieu and Passeron 1990), a sense of sensible practices and a practical sense of how 'the game' of schooling is played.

Though many disciplines have been informed by *the spatial turn* (Massey 1993), there has been little sustained discussion of the spatial dimensions of education (Edwards and Usher 2003). While Edwards and Usher note that some work has considered the use of space in school classrooms (for instance, Comber and Wall 2001), students' experiences in higher education (Nespor 1994), and the spatial representations of educational change (Paulston 2000), much of this discussion has remained at the level of technical implementation. There have been few attempts to provide a wider framing that explicitly highlights the spatial ordering of curriculum,

pedagogy, professional practice and student experience (Edwards and Usher 2003). Thus, Peters (1996, p. 106) has pleaded for "educational theorists to take seriously questions of space" and to develop a politics of space.

Educational studies have been arguably slow to mine the insights of critical geographers despite the fact, as Robertson (2010) suggests that within the sociology of education we can observe a rich set of spatial references.[1] The absence of a critical spatial lens in the conceptual grammar of educational sociology has meant that our theoretical understanding of the work that space is doing is underdeveloped (Robertson 2010).

A number of theorists have demonstrated that social spaces are culturally produced by the history, economic systems, social relationships and mores that define day-to-day life (Bourdieu, Harvey, Lefebvre, Massey, Soja, Tuan). More than just understanding space as a transmitter of meaning, these scholars have begun to map the ways space is continually redefined through social practices. More specifically, daily life in schools is informed by critical studies of schooling that recognise that teachers' and students' identities and lives are made and remade through the sites of everyday life. Like playgrounds (Gagen 2000), and urban and suburban spaces (Davis 1990; de Certeau 1984; Haymes 1995; Lefebvre 1991), the spaces inside schools are shaped by the discourses of those who use them and who are also, in turn, shaped by these spaces.

The role of the physical environment in teachers' work has received little attention, despite surveys of workplace conditions suggesting its importance. Studies rarely go beyond suggesting the need for more decent space in order to improve motivation and job satisfaction, and to enhance teachers' ability to work effectively. The occasional empirical study has, however, suggested a relationship between architecture and collaboration. For instance, Siegel (1999) has shown that the arrangements of space have immediate and far-reaching consequences for teachers' ability to effectively and efficiently accomplish daily activities, the formation of professional relationships and the sharing of information and knowledge.

Other scholars have raised critical questions about spatial formation in schools, particularly probing the ways certain discourses prevail in school spaces and why. For example, Fine et al. (1997) trace how schools informed student discourses on race and racism through policies implementing racial integration. In one high school, school officials tacitly supported the reproduction of White supremacy and the racist assumptions of White, working-class, male students, while in another high school teachers disrupted the reproduction of racist hierarchies by creating spaces

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[1]For example, social stratification; social classes; open, distance and distributed learning; student-centeredness; communities of practice; unfolding political projects which depend upon space as both medium and resource in the (re)structuring of existing world orders, states and education spaces (e.g. processes of globalisation, the construction of new regional territories, state governance strategies such as decentralisation); the lived spatial nature of education practices on social beings (e.g. the consequences of "tracking" or "streaming"); and the spatial nature of the social production of subjectivities (territorial/place based, e.g. a New Zealand citizen, or a working-class girl).

for students to reflect on the meaning of race, class and culture. The study of Fine et al. (1997) offers an example of the ways school spaces are culturally produced, as school practices and pedagogies reflected the values and power struggles within communities and informed prevailing discourses.

Time and space represent fundamental aspects of social life, the importance of which is evident in a number of diverse theoretical perspectives. For example, Harvey (1990) and Lefebvre (1991) have shown that social change often occurs and is frequently contested in the arenas of spatial and temporal organisation. Time and space are also at the core of Giddens's (1984) social theory of structuration, where he argues that they are essential to understanding how social reality is constituted as a relationship between human agency and social structure. In this view of the duality of structure, the structural (objective) dimensions of space cannot be detached from the actions of people (agency).

Harvey (1990) also employs an analysis of time and space to connect the material aspects of culture with issues of political economy. For example, he equates the rise of modernity with a new organisation of time based on the workday and the time clock. In this analysis, he demonstrates that to a great extent class struggle within the processes of capital accumulation coincided with the societal reordering of time.

While these analyses shed light on the importance of temporal and spatial organisation in periods of capitalism and societal-level change, others have demonstrated the importance of time and space in the organisation and practice of everyday life. For instance, de Certeau (1984) illustrates how spatial organisation is affected by the choices that people make. De Certeau asserts that dominant social patterns exist in the city, generated by the strategies of governments, corporations and other institutional bodies who determine such things as the location of streets and footpaths, and produce documents like maps that describe the city as a unified whole. Yet individuals contribute to the spatial structure of the city by making choices to adhere to known routes or making their own shortcuts, in spite of the strategic grid layout of streets. Such choices challenge familiar social patterns by using the existing rules and products in a manner that is influenced, but never wholly determined, by those rules and products.

To apply a critical spatial lens to the sociology of education means seeing the difference that space makes to our understanding of contemporary knowledge formation, social reproduction and the constitution of subjectivities (Massey 2005; Soja 1996). Such a view is not divorced from time and sociality, but does recognise that these have been privileged angles of view in modernity.

Ideology and Imagination

The built environment embodies the values of society: ideology, conscious or not, is the invisible hand shaping our built environment and the built structures, in turn, structuring our ways of moving within and relating to the world. Embedded in our

daily engagement with visible architecture is an engagement with invisible systems of values. Ideology is internalised and reinforced through mundane activities within the constructed world, inevitably influencing us as individuals and as a social body. As Bourdieu notes, "the most successful ideological effects are those that have no words, and ask no more than complicitous silence" (1977, p. 188).

In the ILE concept we have a proposition to move beyond particular, and predominating, traditions in the architectural formation of school. It is crucial to understand that architectural forms are shaped by ideology and it is this question that is most significant to mull when considering the design of ILEs. The authors of this chapter share a concern for framing up school as a space and time to shape learners, and teachers, to fit into twenty-first-century workplaces. Given the tendency to talk about innovative learning spaces as networked to and with the wider community, this framing does not end with the classroom or school, and so this idea of the school class being a simulation of the twenty-first-century workplace is also shaping how communities are shaped to fit with contemporary and future demands of work.

The development of school buildings, for instance in New Zealand and Ireland, has been closely allied to the growth and expansion of the education system, and changes in the political economy of the times have been directly reflected in the type of buildings provided for the purpose. The built educational environment, along with its visible and material school structures, can be read as texts that espouse public symbols of knowledge and the presence of communal (even if contradictory) practices. Burke and Grosvenor (2008, p. 53) argue that "schools are the products of social behaviour" and "project a system of values" (p. 8) in their materiality. School architecture is a "class discourse" that includes "the appropriation of educational culture and a complete semiology which exhibits different aesthetic social and ideological symbols" (Benito 2003, p. 53). Hence, the material space is a manifestation of ideology, reflecting the varied discourses and ideologies that have shaped the school over time. The choice of a given architectural and aesthetic design reflects educational philosophy and politico-economic policy, practice and priorities, which strongly influence the design, spatial layout, materials/construction and use of the buildings.

That the demands of nineteenth- and twentieth-century capitalist industry shaped the industrial school model seems to be taken as a legitimation for addressing new designs based on new models of industry. In other words, ILEs should correspond to twenty-first-century workplace demands (Nair 2011). This view continues the precedent of shaping learning environments to shape workers. As such, an ILE would remain entrenched in the capitalist paradigm, instilling capitalist values of human species dominance, authority, profit baseline, ownership and so on—values that arguably inhibit innovations in pedagogy, learner agency, knowledge construction and citizenship (Lyotard 1999). While the *appearance* of education, the surface ideology, may have changed, the underlying ideology has not, and so in such claims for the development of new learning spaces we have an ideological entrenchment hiding behind bold claims of reform—claims that justify a top-down approach to ILE policy development and implementation.

Baker (2016) and Nair (2011) suggest that pedagogies that depart from the capitalist ideology—in other words, that depart from the workforce preparation mode of schooling—are doomed to fail. From this perspective school, and education more generally, is trapped in the superstructure of capitalist values. In a time when much thought is given to the direction of creative flow, should the workplace inform the classroom or classroom inform the workplace? Perhaps a more useful mode would be the adaptation of a closed loop system. If ILEs stop producing such workers the superstructure could be transformed by the momentum of re-imagination.

If school communities resist particular agendas for school design they are at the same time suggesting that something new is required for education. In the growth of ILE agendas, we have not seen anything particularly innovative, anything radical, anything that resembles the small-scale radical precedents that actively redress hierarchical structures, such as Beuys and Böll's (1973) idea for a 'Free School for Interdisciplinary Creativity' or Freire's (2000) 'Pedagogy of the Oppressed'. Baker's (2016) doubts regarding the scope for challenging the influence of capitalist and in particular human capital thinking in education reflect a lack of imagination in the possible growth and application of innovative thinking. In contrast to this position, we think it is a very exciting situation to now be contemplating a scaled up, interconnected, widespread, mainstream redesign of where and how we learn so potent is the potential for ILEs to be a site for social transformation. Instead of our learning environments further entrenching social inequalities we could break the cycle through the effect of ILEs.

Breaking capitalistic cycles requires a turn to the E of ILE—a turn that we acknowledge is recognised in OECD thinking (see, for instance, OECD 2013) but that requires significant critical amplification. 'Environment' conjures up the immersive nature of a place, and the term lends itself to an ecology of learners and place of learning. Rather than engaging with a buzzword, we understand this to signify an acknowledgement of the major principle of both ecology and learning: that *everything is in relationship*. In this ecological emphasis, ILEs can draw from ongoing strategies that forefront relationships through place. Critical place-based pedagogies are already engendering ways of being in relation to the contemporary world and positioning learners as people of capacity to engage with ecological and social crises (see, for instance, Penetito 2009).

ILEs by definition and design should be agile embodiments of the web of relationships where bodies and space interrelate to develop people and place. We understand the world through our bodies, through our senses, "we are in the world through our body, and … we perceive the world through our body" (Merleau-Ponty 1981, p. 206). Architects such as Pallasmaa (2012, p. 44) recognise that sensory experiences "become integrated through the body, or rather, in the very constitution of the body and the human mode of being … bodies and movements are in constant interaction with the environment; the world and the self-redefine each other constantly". Hence, the physical presence of the learner should be of foremost concern when imagining ILEs.

Rather than continuing to echo the stasis of modern workplace environments and social structures, ILEs could offer omnidirectional situations that envelop our sensing bodies to better absorb information. As physicist J. Robert Oppenheimer realised, there "are children playing in the streets who could solve some of my top problems in physics, because they have modes of sensory perception that I lost long ago" (McLuhan et al. 2008, p. 93). Such architecture would acknowledge the relevance of humanity's relationship with environments, the human need for this relationship to be reinforced rather than denied. ILEs could embed and welcome multi-sensory aspects into the built environment.

Imagination is also a crucial modality of place-making and place-based pedagogy. Imagination empowers innovations in social transformation (Sacks 2011). Imagination enables us to reflect and repair.

> Imagination can rightly be named our most human and important faculty. Neurological and philosophical investigations have established that our imagination is crucial even for our processes of perception, thinking and memorising. Altogether we create the world in which we live through our imaginative capacity (Pallasmaa 2014, p. 84).

An environment that fosters imagination can expand possibilities for both the form of the environment and the creative scope of the situations they elicit in people. If the design of an ILE can be a catalyst for imagination it would include not just a world surrounding the students, but recognise the connections and flows between outer and inner worlds. Connections between dreams and reality will position teachers and learners as both capable of change within themselves and change in the world they inhabit.

Architectural Memories and Simple Design Challenges

At this point of re-calibration within educational systems, it could be easy, from and architectural stance at least, to simply take a *rip-it-up-and-start-again* approach. Many adults, having long left school, remember the oppressive modular units of learning that were necessarily traversed. Making up the dull rows of indifference, each child sat squarely, uniformly, sharpening their inquisitiveness on a stone of stagnation. Now, however, from a perch neat in the lofty tree of hindsight, critics of school design can examine the shortcomings of these spaces and structures while perhaps recognising some of their minor victories as places of learning and engagement.

School buildings were generally modular, rigid and linear, all helping towards, if not guided by, a short-term cost-effective building model. Natural light and ventilation were usually overlooked as design drivers. In the modernist architectural tradition, the structure and form of schooling environments were arguably not considered as material for students to contemplate the space and materiality of things. That said, sometimes either consciously or subconsciously, elements of the simple fabricated structure did allow an inquisitive mind to mull the principal forces

that were keeping their building from falling down. Maybe it was the ubiquitous fair-faced block wall, supporting an exposed timber flat roof overhead, with gangs of snaking services diligently journeying through their three-dimensionality, or perhaps an exposed lattice steel beam holding some ancient fibre glass roof, caught at each end by a quiet and confident concrete bearing pad.

The point here is not to advocate for these materials or design choices, but rather to highlight the advantageous nature of a *simple design left available to comprehension*. As we look to design educational spaces in the adaptation of flexible ILEs, it is important to instil simplicity of design and physical make-up that can be intuitively read, or at least understood, if taught to the learner. The point here is to warn design outcomes of the foreignness of the ILE. The 'progressive' and 'modern' ILE runs the risk of disempowering the learner through further layers of alienation. This is not to say that everything should be familiar, but rather that in the design process it is important to understand the ways in which ILEs will appear, and to consider approaches to making simple connections between the design and the learner. Biomimicry (Pawlyn 2011) provides a possible approach to this task. When discussing the employment of an ecological, educative, flexible and multifaceted environment within which to teach and learn—and an environment that at the same time teaches and learns—perhaps none more so than that of the field of biomimicry is applicable. Here, much like the thought of ILEs, biomimicry seeks to address multiple challenges with the employment of an interconnected approach. Biomimetics in architecture seeks to employ, or mimic, natural organic principles found in nature to inform a building's functionality and structure, both within and of itself and in its pluralistic complex integration within its surrounding environment. This could be by incorporating self-cleaning glazing inspired by lotus leaves, self-healing concrete or looking to the termite mounds of Western Australia and their ingenious use of wind and the steady ground temperatures to maintain and regulate a desired temperate within 1 degree, regardless of outside temperate fluctuation.

Recognising the geographic micro-climate and its ultimate affiliation with the greater biosphere is key to understanding biomimicry and its application in ILE design. For instance, a school design team might begin with innovations in 'green' design through exploring the temperate fluctuation throughout the day or year; or, a study of local wind, rain and air pollution within our larger urban environment; or studying the micro-climates of a canyon of cliff vegetation. These are examples of how architects might collaborate with school communities, with horticulturalists, with engineers, to devise a green intervention to help regulate heat and ventilation of a given school. The introduction of a living wall or vertical garden, either internal or external, would greatly assist in tackling these very problems while providing a living and active source of curriculum.

Another design initiative would be to explore the relationship between space and play in learning. Considered architectural interventions might deliberately provoke a student's mind to think about the space and time in which they participate in school. In temporal terms, much like the day-to-day circulation considerations architects might give to a place, they might consider the circulating traffic any given student might transverse over the five to eight years they spend attending their place

of learning on a daily basis. Perhaps the sizes of steel supports in a given area could be more applicable to the size of a student's hand thought to be using the space. Alternatively, maybe the material finishes used throughout the building are a considered choice to better reflect the people they serve in providing a scenery of opportunity.

Biomimicry embraces the concept of flexibility of design and stability in lieu of the ubiquitous rigidity found in industrial buildings:

> …strength lies in their ability to transmit loading through deflection – something that characterises many natural structures and a stark contrast with much of the structural engineering of the twentieth century, during which we confused strength with rigidity. In nature, strength is usually achieved not by forming completely rigid structures but by accommodating movement (Pawlyn 2011, p. 36)

Furthermore, recognition should be paid to incorporate flexibility of design to cater for future adaptation or rethinking. Architects can no longer afford the luxury of designing with a singular dogma. Children today are asked questions that were not considered in previous times and places. In the future, children will be asked questions that nobody alive today can truly consider. Our best approach is to learn from nature's 3.8-billion-year period of research and development and ally ourselves within this wisdom.

The Application of the Politics of Work in Contemporary Education

The application of education policy involving the replacement of the traditional classroom with the ILE would seem to be so simple that it should be regarded as a *fait accompli*—in other words, that it is a logical response to an over-attachment to an obsolete model and, as such, an overdue development. The apparent logic of this development can also be thought of as a charade for an old and well-worn politics of education: the application of this policy involves an administration of power and the exclusion of participation of those who educate and are educated. This is to say, while the ILE space supposes a new level of student autonomy and participation in learning, it is also designed to mark out the parameters for what learning means. As noted above, the supposition operating here is that twenty-first-century learning should be a form of action synonymous with the action of twenty-first-century work. While ILEs suppose an openness, flexibility and access to resources (OECD 2013; Osborne 2013), they also suppose that the attributes constituted in these environments can only be such that they are focused on the purpose of learning being *a form of work*. To this effect, the ILE becomes a place in which students (the proxy for their parents) pay to learn to work. This statement begs the question: What kinds of political subject does the state intend to form by this means of learning—*homo economicus*? What can be said in the first instance is that despite the rhetoric, ILEs will not bring education, as a sector, closer to understanding how

the entrepreneurial spirit is formed if learning becomes a form of knowing how by merely learning to work (see, for instance, Biesta 2016, on the limitations of educational thinking in the learning society rhetoric of neoliberal governmentality).

The key accomplishment of this *fait accompli* is that this change in the design of the learning space is implemented as an application: the policy is *applied to* schools. It should be noted that this *application* of policy has less to do with politics, in the sense that politics implies democratic participation and has more to do with the idea that change should be realised according to economic rules. The idea that management of change, which is to say *innovation*, is, in essence, an application, is nothing new. Drucker (1959) defined innovation in this way in the 1950s. The application of the policy that implements ILEs in schools is best understood as an innovation and, as such, it becomes important to think of what it means to say that the ILE is an innovation.

The ILE is neither a product, nor a service, nor a new marketing strategy. Yet the ILE is a mechanism that will supposedly create economic growth through better preparing students for work. Arguably, it only helps to think of ILEs as an innovation if the inquiry is taken beyond the artefact, such that its role is understood as having a more complex purpose than mere economic growth.

Drucker (1959) predicted innovation would be about the embedding of society into a new universal vision, a process he thought would lead to the development of a neoconservatism. This predication has come to pass in relation to the economic drivers of innovation. What has not come to pass, where history has deviated from Drucker's thinking, is the nature of technological innovation. Drucker states:

> We need social innovation more than we need technological innovation. The new frontiers of this post-modern world of ours … are all frontiers of innovation. Neither reform nor revolution can solve these great problems; only genuine social innovation can (1959, p. 33).

The idea that we need social innovation more than we need technological innovation has not yet established itself in collective consciousness—the self-contradiction implicit in technological development having still not yet been elucidated. To understand the latter statement in simple terms, ILEs cannot, as a technological advancement in classroom design, guarantee improved learning, increased knowledge and understanding. Ultimately, ILEs will need to be philosophically scrutinised for the political role they play in not only the formation of ideas, but the formation of political subjects. Just as it took over 200 years for the disciplinary functions of the traditional classroom to be subjected to a critical educational deconstruction (Foucault 1977; Shor 1999),[2] it may take another

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[2]The World Economic Forum is now speaking of industrial development since the mid-eighteenth century as being marked by four revolutions, each involving a new orientation in production: "acceleration", "mass production", "automation" and "cyber-physical systems" (Bloem et al. 2014, pp. 11–12). If we are to think of the ILE as producing the industrial work of "cyber-physical systems", then we should be transparent about the pretence that it is this sort of subject that is required in relation to cyber-physical systems, and how this form of conditioning governs the effects of simultaneously constituting oneself, in relation to the effects of these other revolutions.

100 years to accept that challenge to analyse contemporary academic spatial designs for their capacity to constitute in students particular political dispositions. In the meantime, this analysis seems to be on hold as application is privileged over understanding what it is that is being applied.

Returning to innovation as the metaphysical mechanism of change and novelty,[3] one might wonder how such an oversight in analysis of what it is we do might be accomplished today. When discussing the engineering of society through the use of economic mechanisms, Godin (2015) makes the poignant statement that "[o]ne need not enquire … [into] society's problems. Innovation is the a priori solution" (p. 15).[4] As such, solutions are applied independently of whether they are relevant to the problem they supposedly address: in fact, according to Godin, there need be no real relationship. Most importantly, this application of an a priori solution establishes a separation of social categories, between those who apply and those who are subjected to this application. Following the work of Jacques Rancière this is where apparent innovations become a maintenance of the status quo.

For Rancière politics and police are two "ways of counting the parts of the community" (2010, p. 36). "The first counts real parts only—actual groups defined by differences in birth, and by the different functions, places and interests that make up the social body to the exclusion of every supplement. The second, 'in addition' to this, counts a part of those without part. I call the first the police and the second politics" (2010, p. 36).

The point here is then to explore the ways in which educational solutions such as the ILE operate in these two ways. As argued above, ILEs run the risk of being prescriptive and standardised if driven by a narrow neoliberal and economic thinking. The ways in which any ILE project is implemented can be understood in relation to the function of policing in terms of who has a say, and who can be seen. In terms of politics, our interest is in the role of the very design process as the seeing and hearing of teachers and students. This is an exciting, activating and ultimately political learning environment.

> Politics invents new forms of collective enunciation; it re-frames the given by inventing new ways of making sense of the sensible, new configurations between the visible and the invisible, and between the audible and the inaudible, new distributions of space and time - in short, new bodily capacities. (Rancière 2010, p. 139)

When students and teachers are separated through the application of an ILE solution that bears no relation to their educational questions and problems, the

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[3]While the garments of courtiers in preindustrial times provided the distraction that ambiguated the politics applied to their subjects, likewise novelty in the market place provides the same distraction today.

[4]Godin's original words are: "One need not enquire the (sic) society's problems. Innovation is the a priori solution" (2015, p. 15). This typographical error has been confirmed by the author.

students and teachers lose their power to speak in relation to the nature of the problem and they lose their power to act upon themselves to affect change.

How then should this contrived disguise of innovation, as a solution that does not need a problem,[5] impact upon the notion that speech and action towards ends is an alternative to speech and action that might be focused towards beginnings (see Arendt 1998)? Over time the activities that comprise an action have been categorised according to distinctive roles: there are those who 'initiate' the action or begin the action and there are those who 'execute' or achieve the action (Arendt 1998). This separation of roles in education makes it possible to delineate the actions that make up the process of innovation such that commercial and administrative management are always in charge of what counts as innovation, while those that execute and achieve—teachers and students—are forced to accept that they are black boxed as innovative subjects. This is to say when executive initiates the development of an innovation, the process from that point on is premeditated and, as such, cannot be questioned. In others words, all actions and speech that comprise this process must already be oriented to realising its preconceived end. The issue for student learning is that the ethos that makes commercial innovation possible in education makes learning premeditated and predictable.

This is an odd conclusion to draw, if education is thought about as a space in which new ideas are developed, new knowledge is constructed, and new understandings are realised. As long as student learning is dominated by the need to orient thinking towards explicit ends and fixed outcomes, then new ideas, new knowledge and new understandings remain part of a problem that goes unrecognised by the solution that is rolled over the top. The veracity of this statement could be tested by posing the possible value of students contributing to the design of learning environments. To what extent would new initiatives taken by students that transform this space to the benefit of their learning be permitted? This question not only challenges the traditional divisions of roles with respect to the realisation of new speech and actions, but it also challenges the incumbent understanding of the nature of problems innovation addresses.

Asking such questions is not altogether foreign to state interest in how ILEs, as an innovation, are rolled out in schools. The architect of national systems of innovation, Lundvall (2007) describes their value as one of being both an analytic and diagnostic tool. To this effect, the ILE can be thought of not as a domain where new ideas are developed, new knowledge is constructed, and new understandings are realised, but as a field of inquiry.

Lastly, it is important to highlight how students are asked to endure this politics of education. It is possible to say that ILEs are being done to students: students do not participate in policy development and arguably have little opportunity to have a meaningful contribution to the design process. Students are not formally conceptualised as innovative subjects in their own processes of learning (see Osborne

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[5]This is most easily understood when novelty succeeds in the market place without contributing anything that adds to the value of life.

2016). Here something ironic occurs: the application of ILEs will hasten the demise of human capital theory and the learning that requires all learning activity to be oriented uniquely towards macro-evaluations of student performance.

We can also find leverage for potential social change in new design through conscious awareness of the power of school architecture to reinforce the divisions and social structure of wider society. We can choose to consciously design environments that are empowering for students, test out alternative governance strategies, invite interdisciplinary collaboration and root the environment in relationship to local and global ecologies. Now is the time to design learning environments as distinct situations in themselves: as formative places for people of capacity.

This process calls for deep engagement with all intergenerational stakeholders in the expansive act of learning, rather than consultation with the people who most benefit from the capitalist paradigm, (politicians, industry chiefs, bankers), who are inherently biased to produce better fits for the job market. What do we, the whole spectrum of society, imagine that new learning environments could embody?

We now have the opportunity to re-identify and advocate for what is most valuable in education. The values that collectively emerge about learning will be the material to embody ILE design. Collective, shared, design strategies can enhance the continued identification of values that intimately fit each school community at ILE inception and throughout its permutations (Day and Parnell 2003; Ewald 2016). Long after a structure has been built the interweaving flows of people, encounters and use of space can either have scope to develop new patterns of conscious relationships, or be restricted to limited choices engendering repetition and habit. Encountering an ILE designed with an ideology that supports the agency of all people would be experienced as entering a field of potential and could be a continuing live collaborative process of making sense of the world.

Conclusion

> At the same time as it forms a part of a movement of liberalism … modernity also involves the transference of everything which had to do with the imagination, dreams, the ideal and utopia into a technical, operational reality: the materialization of all desires, the realization of all possibilities. (Baudrillard 2001, p. 51)

Research on ILE design and pedagogy is frequently presented as so startlingly self-evident and beneficial so as to ensure that teacher concerns will be unheard. Where resistance is observed, advocates for twenty-first-century learning appear somewhat startled and attempt to fix the problem by coming up with arguments for more professional learning and development programmes. Such programmes are expected to entice the teacher into a new digital hegemony that comes with a "certain logic, and therefore a certain set of prescriptions determining which statements are accepted as 'knowledge' statements" (Lyotard 1999, p. 4).

In this chapter, we have engaged with a range of positions in order to provide analysis of how power relations are inscribed into the design of ILEs. At the same time, we are exploring the possibilities for social actors to transform these spaces and processes. People interact with each other and objects in space and in so doing construct, disrupt and resist meanings and understandings. Everybody involved schooling has a vested interest in the complex web of practices that constitute schools, sharing language and thinking, relationships and a logic of practice. The grammar of schooling shapes us all. It is quite difficult to escape from the logic, dispositions and customs that result from our own years of immersion in schooling practices. Thus, it takes a major leap—a change in conditions—before we can think differently about schools.

Changes to the spatial arrangements and practices, as represented by ILEs, might represent such a leap. Alternatively, they may represent the entrenchment and manifestation of neoliberal discourses, or whatever other ideologies and discursive practices that might be presently shaping educational politics. Either way, they provide a good opportunity to examine the ideologies that underpin such leaps, especially leaps that gain traction, overcome inertia and have longevity.

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Part III
Transformation 3: Global Perspectives on Education

Crossing or Erasing Territorial Borders: Towards Openness Within the School Space

Lilija Duobliene

Abstract This chapter addresses the problem of a new school culture and school space, the formation and perception of which have changed markedly in the modern globalised world. Drawing on the theories of Lefebvre, Deleuze, Guattari and Stiegler as well as those of their interpreters, I attempt to show how space is formatted in educational practice, with theoretical insights bolstered by empirical research. The findings of that research suggest that regardless of what situation is analysed, be it virtual or actual, immanent or real, new ways of crossing borders and new styles of exploration of school space and place are presupposed, all without the necessary division of space into the Lefebvrean planned, popular or lived spaces. The Deleuzeo-Guattarian view of the holey space and Buchanan's concepts of the neither here nor there space or the non-place seem more fitting for the interpretation of students' ways of living at school and probing of the success of the open space which all the community must join. With the development of new technologies, the appearance of the smooth and pharmacological space transforms the meaning of openness, thereby questioning the future of school as a controlled space.

Introduction

Social spaces as well as school spaces serve as powerful tools for thinking and action, for reproduction and production of the society.

> The school is no longer a place where society puts itself at a distance of itself. It becomes a (public) service delivered to individuals and to society, the community or the economy itself in order to reproduce itself, to strengthen, grow or expand. (Masschelein and Simons 2015, p. 10)

Consequently, school spaces reflect social changes and are planned by professionals and administrators of culture and education who navigate between social

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and educational needs. At the same time, the space is formatted authentically by communities as a *lived* space appropriate for their needs, imagination and free movement (Lefebvre 2014). Professionals, administrators and communities emphasise their open-mindedness; however, their understanding of *openness* differs. On the one hand, the line between the open and closed spaces becomes blurred, and on the other hand, it is even more diligently, albeit covertly, controlled by the administrative apparatus with the help of the media and ideology, as noted by Masschelein and Simons (2015), who follow Stiegler (2010). While Foucault named society as disciplinary and Deleuze saw it as controlled, Stiegler claimed that society today can be described as uncontrolled. The controlling human power is replaced by technologies which act automatically and powerfully in producing certain consequences—a smooth space, which consists of different heterogeneous elements and their mixture, and a pharmacological space. From Greek, *pharmakon* means both poison and remedy. So the space steers social development in two directions—that of liberalisation and of repression, both inseparable. Hence, in the words of Stiegler, who develops the concept of pharmacology in the context of youth education, the current time requires that decisions are made towards linking together human values and technologies and finding ways to use technologies properly, to return to values such as responsibility, care and attention. This presupposes revision of polarities in education which are treated rather positively by Stiegler as well as Masschelein and Simons, including perhaps the polarities of the open and closed.

In *Spatial Theories of Education* (2007), Gulson and Symes discuss the concepts of space and place and their use in education. Although the concept of place is usually treated as a concrete space with a stable position of matter, while 'space' refers to the change of positions of matters and mobility (de Certeau 1984), implicitly the former is more limited, while the latter is open. Space and place are treated in *Spatial Theories of Education* as integral entities which could be examined and theorised about, especially within the framework of education policy. As Buchanan and Lambert see it, the problem lies not in the recognition of differences between space and place but in their replacement by non-space and non-place. In their introduction to *Deleuze and Space* (2005), they analyse the modern logic of multiple space and note that the conception of non-place or non-space "has been challenged in recent years by writers trying to come to grips with a new generation of spaces that do not confer the sense or feeling of being in a place" (p. 7). Hence, it is intriguing to analyse young peoples' perception of school space, which, according to Buchanan and Lambert, is detached from any real place or space and is probably not tied to the concepts of the open and closed, and, secondly, to look at the formation of school space by adults who try to open spaces for a more productive communication with the youth, which unavoidably entails revision of the concepts of place, space, non-place and non-space as well as those of openness and closedness in education. All these concepts are in correspondence with real transformations at school and become highly relevant in view of a new trend of Modern Learning Environment, which is the underlying philosophy of the State implemented by the Ministry of Education, in, for example, New Zealand, and

increasingly in other countries, too. MLE emphasises flexibility and openness, changes for the sake of the student, though it also reflects the official position and represents regulations of the State apparatus based on power and control. Lastly, the situation raises questions about the feasibility of novelty and progress.

In light of the foregoing, the current chapter addresses the following questions: What is the contemporary approach to space formation at school? What is the meaning of openness in today's school? How do students perceive and form their space? And, finally, is openness of spaces important at all when school communication partly moves to the digital space? My exploration will start with a theoretical analysis of spaces and places as well as openness and closedness in relation to new architectural designs, especially of school buildings; next, I will present findings from empirical research conducted in Lithuania and analyse them in view of relevant theoretical concepts. The findings of this study show that space formation at school stands on its own already and reflects the Deleuzean concepts of the *holey space* or *any-space-whateve*r, or in the words of Augé (1995) and Buchanan (2005), the *non-place*, which means the place of transition. Furthermore, a crucial role in the formation of the real space is played by digital technologies as they transform the meaning of space and that of openness, thereby bringing educational strategists into an unsolvable situation of *pharmakon.*

From the Lived Space to the Non-space and Non-place

Lefebvre paid special attention to the understanding of space formation in modern times. He distinguishes three aspects of space: popular—*perceived (le perçu)*, meaning how the society accepts it, official—*conceived (le conçu),* meaning how it is planned by strategists, and natural—*lived (le veçu)* (Lefebvre 2014). This raised the interest of other investigators who followed Lefebvre and attempted to explore the formation of lived or live space at school or to create other conceptions pertinent to the formation of school space, e.g., Deleuze and Guattari, Soja or de Certeau, whose ideas are not very distant from those of Lefebvre, but are also slightly different and fresh. We agree with Buchanan in that Deleuze and Guattari found direct links between space and the everyday, while earlier authors such as Lefebvre, de Certeau and others saw such connections as considerably more complex (Buchanan 2005) and that the Deleuzeo-Guattarian views on the usage of the concept of space could be seen as relating to Dewey's pragmatism and experiential education (Semetsky 2006). Semetsky describes the Deleuzean affinity to pragmatism as based on empirical knowledge and semiotics, though when it comes to space formation in education, she finds a much stronger Deleuzean emphasis on nomadic and rhizomatic moves and argues that they help to cross borders and allow not only to escape the official order but also to seek novelty and a new quality. Much like Deleuze, however, Semetsky focuses her interest at the conceptual rather than the practical level. One could look at Semetsky's investigation of *nomad* and *rhizome*, the concepts used by postmodernists. Nomad is a traveller, and rhizome is

a spread of ideas and actions (much like a stem of a plant which sends out roots and shoots as it spreads); both mark a new way of living—travelling (physical and mental) in different directions, not being tied to any place. Both emphasise the process, fluctuation and becoming in the field of education.

What does space in today's school look like in relation to the new approach? Although the understanding of space borders has changed markedly as a result of integration of digital and virtual communication and learning into the contemporary school, the ordinary school continues to be seen as a physically existing territory positioned in a concrete location surrounded by a fence. The architecture of school buildings designed in the past with a very clear logic was based on subordination (Palladio 2002) and changed gradually. Starting from the nineteenth century, the style of schools often resembled a factory, later, a castle and "more recently, architects have worked closely with educators and have constructed schools that communicate a more personal, intimate learning environment with strong ties to the community" (Deal and Peterson 2009, p. 37). In most recent projects, especially in Scandinavia, school buildings are without inside doors and only have the entrance. Lefebvre in his theory on place formation and the meaning of doors states: "Perception of the entrance to a monument, or even to a building or a simple cabin, constitutes a chain of actions that is no less complex than a linguistic act, utterance, proposition or series of sentences" (1991, p. 226).

The entrance door is very important and usually directs one to the central and most respectable places. As a rule, these places are "lived" by authorities and people in power, and in the case of a school, administrators. Other doors are not as important and are used for extra purposes, less important persons or hidden deals. If the centre of the building is under very strong control and there are any tensions inside, the power of the centre decreases. "Thus the centre cannot but be dispersed into partial, mobile centralities (multi-centrality) whose specific relationships are to be determined in context" (Lefebvre 2003, p. 146). School administrators can control it by assigning more persons on duty, putting up more signs for walking trajectories and more regulations and cameras for observation of spaces. Drawing on theoretical investigations (de Certeau 1997; Masschelein and Simons 2015; Stiegler 2010; Usher and Edwards 1994) and surveys in countries which actively create open spaces at school (Henebery 2015; Sanders and Wren 1977) we can suppose that school administrations in many cases are not interested in the creation of natural *lived* spaces to meet the students' needs, being concerned with open, but not necessarily *lived*, spaces.

When we think about tensions in school, it may be advisable to use Deleuze and Guattari's concept of deterritorialisation as an inevitable process:

> One opens the circle a crack, opens it all the way, lets someone in, calls someone, or else goes out oneself, launches forth. One opens the circle not on the side where the old forces of chaos press against it, but in another region, one created by the circle itself. (1987, p. 311)

The crack can be a door which has been opened unexpectedly to let people, school-related matters or the atmosphere and ideas stream in, or a metaphorical

door which can break borders of territory in any place other than doors. This can decentralise the power of administrators for the benefit of others (students in the case of school) at least for a short time, or it can continually serve the central power's purposes of structuring the intervention of chaos into space as proposed by Lefebvre. In Deleuze and Guattari's words, that is the problem of reterritorialisation after the onrush of new forces from outside during deterritorialisation. The restructuring of spaces can be done by teachers and administrators from one side and students from another, and space can remain divided to meet the needs of different groups, yet space can also continue to exist as a combination of smooth (consisting of heterogeneous elements) and striated (consisting of homogeneous elements) spaces, or as *holey space* as described by Deleuze and Guattari (1987). In this space, there are no doors and no windows, only holes.

Deleuze describes the architecture of a house and the flow of forces in it. For this purpose, he uses Leibniz's philosophy of *monads* and Baroque architecture. He says:

> The monad is a cell. It resembles a sacristy more than an atom: a room with neither doors nor windows, where all activity takes place on the inside. The monad is the autonomy of the inside, an inside without an outside. [If the facade has doors, the] "…doors and windows of that matter open or even close only from the outside and onto the outside". (1993, p. 31)

Recently, schools have often seen the opening of spaces inside and closing of spaces from the outside, which is rather different from what Dewey suggested for schools (1997). It seems that modern school is formatted in a new style, albeit still as a monad with open spaces inside, without any doors. Life therein is closed from the outside and transparent inside; hence, it is separate from the world.

Fortunately, Deleuze changes monadology into nomadology and emphasises travelling of forces through the main floor upwards—to the second floor, which is without doors and windows. The forces flow and change the position of matter despite its being in a closed space. Space can be opened or, as Deleuze puts it, deterritorialised by cracks and the flow of forces outside/inside; space can also be changed by the intensity and consistency of forces flowing inside. Stairs are the space of transition and intensity. According to Deleuze, who draws not only on ideas suggested by Leibniz but also on the more modern examples of non-place proposed by Augé, the space of transition is the space named any-space-whatever (Deleuze 1986), or, in the words of Deleuze's interpreter Buchanan, the neither here nor there space or non-place and non-space (Buchanan 2005). It is something in-between one station and another. It can be real and virtual. It is like being at the airport, or being and not being in town at the same time.

This frightens Stiegler, who thinks of youth and criticises their loss of identities, while the teaching content splits into a smooth "that" (2010, p. 3) and eventually creates a smooth space without borders, thereby eliminating the ability to pay attention and develop values such as responsibility and care and promulgating only one position of students, that of "I don't give a damn" (p. 165). In Stiegler's view, the unpredictable intensities outlined by Deleuze, which probably would manifest themselves with the growth of the automation of technologies, would be ruinous without human intervention.

Space Opened for What?

How do students move in today's school, which is closed from the outside and open inside? Do students need and find any cracks for escape into alternative spaces, lived spaces, or do they live in already opened spaces and do not need alternatives? Are they still in places and spaces or does their life move into the virtual space and become life in any-space whatever or in non-space and non-place?

My empirical research will exemplify how the space is formatted in the educational practice in one European country, Lithuania, which is now undergoing the newest global trends in education. The study was conducted in 2014–2015 by a research group headed by the author of this chapter and included observations of spaces and interviews with students, teachers and administrators from different Lithuanian schools. Its aims were to delineate the perception of space at school and to identify any territorial cracks opening for live cultures. Special attention was paid to the functions of doors—do they unify or separate? Open or close? How does this change communication in the virtual environment? The study rests on the post-structural perspective with ethnographic sensibility and uses some tools of post-critical ethnography (Noblit et al. 2004). Participants included 42 administrators, teachers and students in six Lithuanian schools (three in main cities and three in the suburbs) who were interviewed. On the second and third days of official visits by the research group to each school, one administrator, two teachers and four students were chosen randomly. They participated in semi-structured interviews, during walks around the schools, and coupled with observations of open spaces at schools. Only some interview excerpts will be presented here, to illustrate empirically the theoretical investigation of the questions earlier posed.

All participant schools were state secondary schools and slightly diverse in their ethnical composition, though all Lithuanian. Their architectural styles varied from buildings constructed at the beginning of the twentieth century to the beginning of the twenty-first century, including the Soviet era. Two of them were very modern, full of light and open spaces, while others were trying to renovate at least some spaces in a more open style. It is important to note that Lithuania is a small country (with the population of 3 million) and schools are rather different from those in European Union states, or the USA. In comparison with many other countries, Lithuanian schools are safe; often the biggest concerns here are related to values and improper behaviour such as lies, and remnants of the Soviet past, rather than external dangers. This is different from America or other multicultural countries, where, as Lewis (2006) says, students can be isolated for safety in special camps. In his words, they are "held in suspension, neither inside nor outside the polis, neither fully alive nor dead" (p. 161). The situation in Lithuania does not pose risk in this sense; nevertheless, there are some problems in space planning, formation and perception. The space in Lithuanian schools is formatted hierarchically as politicians try to hide the consequences of neoliberal policies mixed with post-Soviet relics. The empirical research considered here tried to look at the modern formation of space in Lithuanian schools not only top down, but also bottom up.

The findings show that most of the researched schools still follow an old-fashioned tradition of dividing teaching and learning spaces into separate rooms, achieved with ordinary walls. In most cases, they have big windows and abundant daylight. Common spaces (for relaxation, communication, non-formal learning or meetings) are mostly formatted in accordance with the policy of openness. Doors are still very important for space formation and are required to ensure proper movement of students. In some schools, the entrance door is on the façade side (central street, building or yard), and in others, it faces the inner yard or is around the corner of the main building. Teachers can control the movement of students by opening different (not central) entrance doors and opening or closing doors for various occasions and situations. In many cases, the central doors are opened only on celebration days. Students do not worry about the doors very much and seem indifferent, but at the same time they need open school doors or some alternative ways to enter the school to feel free, while administrators try to control the entrances for many reasons, e.g., to keep students from skipping lessons, smoking round the school's corner or to close the doors to strangers who do not belong to the community, like peddlers, and in rare cases, drug dealers. Students are sure they will find ways to walk in/out anyway:

> Yes, yes, they wanted to lock the school but everyone can go out through windows. I'm sure pupils won't accept it and will escape through windows. In the locker room there are those small windows and everyone can use them. I mean, they will escape no matter what. They will find a way. (Student)

Students' expectation is to have an open and live school. The energy of students in some cases is unlimited; they are ready to expand their school territory, or, according to Deleuze and Guattari, break the closed circle. Students will readily find territorial cracks if the school administration uses its dominance rigidly and limits community movement without negotiation. For example, students have confessed playing what to them looks like games, when they mark school spaces with stickers illegitimately, always in different places (on the walls, ceilings, furniture) and silently create a message about their power of structuring spaces. Meanwhile, the administration and teachers maintain the *perception* and *conception* viewpoints towards the formation of spaces as described by Lefebvre, or striated space as described by Deleuze. Students look not only for cracks, but also for alternative ways of living and using space for their needs, at least temporarily. This resembles the Deleuze and Guattari's *holey space*. It is understood on the plane of immanence as being *underground*, trying to escape the eye of the State, which clearly sees and controls.

School life is controlled by administrators and teachers in much the same way as everybody is controlled by the State, so students in this case are nomads and inhabitants of the overground and the underground who cannot live independently, ignore the conditions created by administrators and at the same time find ways to return to the alternative space. The State manifests power. And power is always authoritarian. "State apparatus constitutes the form of interiority we habitually take as a model, or according to which we are in the habit of thinking" (Deleuze and

Guattari 1987, p. 354), and "one of the fundamental tasks of the State is to striate the space over which it reigns, or to utilise smooth spaces as a means of communication in the service of striated space" (p. 385). Power seeks not to abolish nomads and smooth spaces, but rather to control them. On the other hand, nomads or inhabitants of the underground often try to find new "holes", "caves" or "channels". That is the inevitable situation of the modern holey space and, consequently, the holey school space, which frightens school administrators with the everyday risk of facing the unexpected in the main space. Teachers in the research study outlined a few spaces which they feel are controlling students during breaks, especially the hallway and the stairs: "I go downstairs, where I meet my colleagues and pupils [say], "Hello, hello"…" (Teacher). Thus, teachers are happy to see students somewhere in open spaces, especially in concrete places. Nevertheless, while some students like the open spaces (such as the lobby and the central corridor), others are not tied to those places. They move unpredictably, sometimes with a silent protest, sometimes distancing or resorting to alternative behaviours (hiding in Deleuzean "holes" such as dark corners of long corridors or basements). The students from different schools state similarly that:

> There are zones where you can relax – in the annex, in the old building…
>
> I like to run away into this little calm corridor…
>
> …to go round the corner of the IT room, where the space is small and calm… [and]
>
> …if you want to concentrate before the lesson, open spaces are not good for that.

Teachers understand this need of students saying: "Students like to spend their time in the old building" and think that these places are used by students who have problems: "Not much is going on in there, but… you have to watch them all the time. Sometimes a student is sad, so you speak with him. Everyone has something to tell or ask". On the other hand, students accept the official policy and the regulation of their behaviour, even if it is not convenient and does not meet their needs. There is no one clearly recognisable mode of behaviour. It is expressed in multiple ways. But most commonly, students are neither passive nor active. They have their alternative holes in the event of disagreeable situations.

Despite the existence of separate rooms and different comfort zones, teachers seem open for communication with students and very friendly and hopeful, especially when they stress the openness of all the school room doors:

> Hope you noticed…we have a lot of doors here. We don't need that many. No one even closes them for reasons of heating or saving. Doors are always open and unconsciously it's like a signal to 'open your mind'. (Teacher)

Open doors are treated metaphorically, as a sign of openness for the entire community. Many teachers emphasise that their doors are open for students, though the way we see it, students do not think like that. They comment ironically that teachers use their rooms for coffee breaks between lessons, rest there or have chats with their colleagues and they lock the room doors: "…we, pupils, make them nervous enough. So I think they want to get some rest from us…to have a coffee"

(Student). What teachers see as openness of their zones, students see as alien territories. In many cases, students are not motivated to step into an alien territory and demonstrate separation, a kind of disciplinarity and passive attitudes, or hide in alternative places. Interviews with students suggest, however, that deterritorialisation happens unpredictably for the administration and even for students, when students use school doors or other cracks in the control apparatus at unplanned times and with unknown purposes as cracks for explosion of their forces and creation of their live zone.

Creation of one's comfort zone can easily be done in virtual (digital) space, e.g., in social networking sites. Interviews and conversations with students led us to think that virtual space becomes more comfortable as it gives them more power. In social networks (usually they use Facebook), they can accept or not accept teachers as their friends, decide to communicate or not, join into groups and at the same time communicate in another regime with other, more official groups, including the school staff:

Interviewer: Do you have teachers as friends on Facebook?

Student 1: No.

Student 2: I do.

Interviewer: Do you?

Student 2: The art teacher. (*Other students laughing*)

Interviewer: Do teachers have their profiles on Facebook?

Students: Yes, they do.

Interviewer: How do you know?

Students (*laughing*): We check, we look.

Interviewer: So others don't accept teachers?

Students: No, they don't.

Likewise, teachers do not accept students as Facebook friends, though students' activity in sites is more pronounced: they are younger and more eager to accept the changing communication technologies, they use their own language and slang, and social networks are more easily understandable to their friends than to their teachers (Masschelein and Simons 2015; Postman 1996). These tendencies were also revealed in the current study.

School-sanctioned Facebook is a common space, though different from other social networks; it is more official, or, in the words of students and only one administrator, "not for communication". Nevertheless, adults try to deny the existence of differences in the digital communication between students and teachers and claim that "We don't have any problems relating in the digital space, we're trying to create and nourish that culture" (Administrator). Adults also say that it helps to find out more about their students: "don't want to stop this process of virtualisation and

expect to get students' trust, so download photos and communicate" (Teacher). Thus, while students feel rather comfortable and powerful using the digital space, teachers (except for young teachers) feel like newcomers, still developing their abilities and not yet sufficiently competent to recognise the organisation of this new space, the main characteristics of which are a specific order, an unpredictable flow of information, a rhizomatic development and nomadic moves across spaces.

Can we call this digital space "neither here nor there" as Buchanan suggests? Or perhaps the space in-between, without a fixed place, in other words, a non-place? Definitely so. That is the space of flow. The configuration of space on the virtual plane (youth social nets) is perfect for nonlinear communication as its feature is easy crossing and redrawing of borders, or deterritorialisation in Deleuzean words, even when territories are marked by virtual signs, not by real borders and doors. What poses a problem is reterritorialisation as stated by education philosopher Ringrose (2011), who follows Deleuze. The question of reterritorialisation is always related to deterritorialisation, its predecessor, which opens the territory to forces of chaos and to transition. Such a space of intensity and transition is called a non-place, and it is much more intense in the digital field. The flow of information creates an open and uncontrolled space of new technologies, which some investigators treat as perfect spaces for teaching creativity through affectation, though Stiegler warns about the danger of this process and tries to explain it as a consequence of irresponsible moves of adults and the media towards youth.

The Pharmacological Meaning of Openness

Located in the position of transition, somewhere on the Deleuzean "stairs" between different places one can find what is called being without a place, in other words, a non-place. Also a non-space, because such a transitional position in deterritorialisation refers not to space but to a matter of expression without the reflection of "awareness of this mobility" (Buchanan 2005, p. 26). The findings of the empirical research study considered here suggest that regardless of which type of situation is analysed, be it virtual or actual, immanent or real, new ways of crossing borders and new styles of exploration of school space appear, and they do not necessarily presuppose the division of space into the Lefebvrean planned and lived space. The space becomes a mixture of different spaces. It seems that the process of space reconfiguration into transitional "the neither here nor there" space or a holey space stands on its own and loses connection with any place or an identifiable space.

The phenomenon of modern school space is that it becomes transformed immanently without any radical physical changes and implementation of new documents towards creation of modern open environment. For students, school space becomes a non-place or space neither here nor there. Students practice

multiple ways of moving, are able to be and not to be in the space that is common to them and their teachers and to cross borders which are formally controlled by teachers and administrators. This happens primarily on the digital plane, where students are "digital natives" as this plane formats their thinking and behaviour, starting from the immanent plane, an intensive 'spatium' (Buchanan and Lambert 2005, p. 12), which brings one closer to self-actualisation, or the real experience.

A new educational policy and architecture of open spaces has to serve for better communication and education, though evidently it is not a panacea since new ways of communication continue to appear. Openness inside buildings results from the situation dictated by social transparency and new technologies or goes side by side with new technologies, in other words, imitates virtuality. Unfortunately, it does not necessarily lead to progress as planned by architects of buildings designed for educational purposes. Following Stiegler (2010), space becomes uncontrolled and pharmacological. While Stiegler thinks that State educational institutions are not able to control the process as it is in the power of the new media, Deleuze describes the State as a strong power that penetrates all the novelties, incorporates the alternative nomadic life and transforms it into that which belongs to the State apparatus, thus limiting initiative.

Thus, the problem of education towards space formation emerges from the double-faced contemporary education policy and a new double-faced style of thinking and behaviour of students. The pharmacological effect not only emerges from the digital field, but is undoubtedly related to it. The policy of open space and humanistic and democratic intentions on the one hand and an evident orientation towards competition for highest achievements on the other create the problems of discipline and control and, consequently, an undue tension rather than a lived space (Simons and Masschelein 2008). Furthermore, it is evident that students are developing the ability to live in constant transition and know how to escape unwanted reality, no matter what kind of environment is created for them.

It invites us if not to take a political revolutionary position, which would help change social spaces to escape automation control and promote new ideas as suggested by Bell (2003) or Thompson (2010), who also follow Deleuze, then at least to rethink ethically the link between the real and the virtual, all for proper understanding of what is the meaning of open spaces in education. Simultaneously, it might help to change the new position of the young generation in the open and smooth space, that of "I don't give a damn" (Stiegler 2010, p. 165). This requires an attentive but critical approach to Masschelein and Simons' (2013, 2015) ideas in defence of school, which loses its essence by getting into a smooth space and, consequently, starts lacking some binary poles. The binaries of open–closed are not relevant here; rather, I would suggest a reflection on the situation of today's school in the context of pharmacological policy and concentration of efforts to create a responsible and sensible school in the conditions of multiplicity, heterogeneity, transition and the smooth space.

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Student-Centred Classroom Environments in Upper Secondary School: Students' Ideas About Good Spaces for Learning Versus Actual Arrangements

Anna Kristín Sigurðardóttir

Abstract The aims of this chapter are to shed light on upper secondary school students' ideas about good spaces for learning and to explore how the actual arrangement of the physical learning environment fits with these ideas. Data were collected in nine schools in Iceland through classroom observations and group interviews with students using the diamond ranking method. Pictures were used to learn about students' attitudes about good and bad places for learning. The data were reviewed in the context of theories on student-centred learning. The results indicated that the physical environment in upper secondary school classrooms was rather traditional, with students sitting at individual tables in rows and the teacher positioned in the front of the room. The students seemed to acknowledge this arrangement, as they know it best. It was also most often ranked somewhere in the middle of the diamond. They especially liked arrangements that allowed them some flexibility or which enabled them to influence the environment, which was not very common to these schools. Most lessons were characterised according to the teacher-centred approach.

Introduction

The aim of the study is to shed light on students' ideas about good learning environments (spaces for learning) and how their ideas fit with the actual arrangements in school. Student-centred learning is in focus as it reflects the possibilities for students to influence their own learning environment. 'Spaces for learning' are physical learning environments such as places in the school building that are available for different learning activities, the arrangement of furniture in the classrooms and technology. This study is limited to the space inside the school building or activities on behalf of the school, such as fieldtrips. It is expected that the results will be useful for designers, teachers and others who influence the

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physical learning environment in schools. The results are reviewed within the perspective of student-centred learning environment and student engagement, which has gained increasing attention in the research literature. It is assumed that physical learning environments that cohere with students' ideas about good places for learning are student-centred, which is a supportive condition for student engagement in school, and in such cases, might therefore enhance students' well-being so that they are less likely to drop out.

Background

The upper secondary school phase in Iceland is a 3- to 4-year programme for young people aged 16–19/20. Some of the schools are academic while others are comprehensive, offering a variety of programmes, both academic and vocational. The incidence of high dropout rates in this school phase is indeed worrying and is considered one of the major challenges of the educational system in Iceland, with less than half of the students graduating within 4 years (Ministry of Education, Science and Culture 2014).

Icelandic laws relating to the upper secondary school phase (Upper Secondary Education Act, No. 92/2008) stipulate the right of students to affect their learning environment, but do not define the ways in which they can exert influence:

> All upper secondary school students shall be entitled to receive suitable instruction carried out in a stimulating study environment in appropriate premises. Students shall have the right to express their views on the study environment, learning arrangements, organisation of schooling and any other decision concerning them. These views shall be taken into account where possible. (Article 33)

Theoretical Framework

Constructivist approaches to learning assume that students' active participation in shaping their learning environment is a fundamental condition for learning; thus, the learner must be active in building his or her own understanding. This calls for student-centred learning environments that provide multiple activities enabling individuals to address their own learning interests and needs and to study at multiple levels of complexity (Land et al. 2012). Based on this, the structure of daily school work must allow space for students to influence and participate in decision-making regarding their own learning environment. There is evidence to suggest that this kind of learning environment can support higher levels of perceived autonomy and student motivation (Smit et al. 2014), which influences student engagement and well-being in schools (Blackmore et al. 2011; Fullan 2016; Fredricks et al. 2004; Greene et al. 2004; Tanner 2008). A recent study (Blöndal and Aðalbjarnardóttir 2012) on Icelandic upper secondary schools drew a clear

connection between student disengagement and dropout risk, which was congruent with Kanevsky and Keighley's (2003) results, suggesting that students perceive that they are not heard and are more likely to become bored in school. Prain et al. (2015) use the term personalising learning as an "integration of differentiation and self-regulation strategies by individual students" (p. 17). They maintain that the term is based on students' rights and capacities as learners for self-regulation, which is addressed through flexible approaches to curricular structure.

There is an unfortunate lack of empirical evidence linking the physical learning space, educational practices and student outcomes (Blackmore et al. 2011; Gislason 2010; Woolner et al. 2012). There is much to be learned, however, from previous studies on students' attitudes towards the physical environment, studies that attempt to make students' voices heard. A common theme is that variety and flexibility, which allow individual choice, seem to be preferred by students for many reasons (Blackmore et al. 2011; Woolner et al. 2012). A physical learning environment that is in coherence with students' ideas about good spaces for learning is a supportive condition for student engagement in school (Fredricks et al. 2004), and students participate in school if the physical learning environment enhances their well-being (Blackmore et al. 2011).

It is a long tradition in school design to have classrooms of the same size along corridors as well as classrooms designed with individual tables in rows and every student facing the same direction. Veloso et al. (2014) refer to this as an industrial design that relies on old ideas, assuming that learning is a simple linear process where the teacher transmits knowledge to the students. This also seems to be the case in Iceland. A recent study in upper secondary school (Óskarsdóttir 2012), revealed that the traditional arrangement, with individual tables in rows and everyone facing the same direction, was the most common. At the same, observations in lower secondary schools disclosed only few indications of student-centred learning, such as self-directed inquiry or opportunities for students to make independent decisions about learning (Sigþórsson et al. 2014). This, however, was more frequently noted in open-plan classrooms than in traditional ones (Sigurðardóttir and Hjartarson 2016), where the entire space is seen as a learning area and is not divided into traditional classrooms. Rooms are of different sizes and serve multiple functions; common areas are designed in such a way that makes them suitable for collaboration. This is congruent with results from an Australian study, indicating that open-plan classrooms enable more personalised learning and student well-being (Prain et al. 2015).

There is a relative consensus in the literature that educational practices are not influenced by one single factor but, rather, by a complex interaction between different components (Barrett et al. 2013; Blackmore et al. 2011; Gislason 2010; OECD 2013). The focus of the study on which this chapter is based is on the extent to which students' views, as they appear in the interviews, conform to the physical environment; however, there are many other factors that could affect their attitudes towards their learning and well-being in school. Based on the literature discussed above, the authors suggest a causal link, as illustrated in Fig. 1. A student-centred learning environment is likely to have positive affect on student engagement, which could in turn improve student well-being and learning outcomes and decrease the
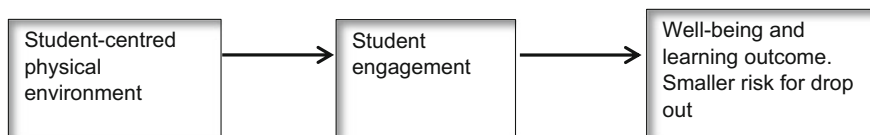
Fig. 1 Proposed relation between student-centred environment and student well-being and learning outcome

Table 1 Arrangement in observed classrooms

	Physical arrangement	Number of lessons	%
1	Traditional classroom with individual tables in rows (2–5 in each) or in a U shape; all students facing the same direction	81	63
2	Traditional classroom with tables of different sizes clustered together so that the students sit in groups and face each other	20	15
3	Untraditional space such as an open learning space, outdoor education or community hall	22	17
4	A classroom for vocational activity or sports	7	5
	Total	130	100

risk of student dropout. This study is limited to the first box; it enquires about the extent to which the physical environment is student-centred by comparing students' ideas about a good place for learning versus the actual arrangement.

Method

This research is part of a larger project on school practices in upper secondary schools in Iceland. A group of researchers collected data from nine schools from a population of 31 upper secondary schools in Iceland, which were selected on the basis of stratified sampling. These schools comprise about 33% of the student population at this level and are located in different places around the country. They also constitute a mix of schools providing vocational and academic programmes. Two types of data inform this part of the study: classroom observations and group interviews with students.

Classroom observations were carried out during 130 lessons, which were randomly selected within selected study programmes in each school to ensure variety. Detailed descriptions of the physical environment in each classroom were made and involved, e.g. information about the arrangement of the furniture, the use of technology and the procedure of the lesson. The school leaders sought the teachers' permission, and all but one accepted. The researchers were allowed to observe, write notes and take pictures in an empty classroom. All descriptions were stored in an electronic database and categorised into four groups based on the physical arrangement listed in Table 1.

Group interviews with students were conducted on the same days as the classroom observations. The students volunteered for the interviews and were all over 18 years old; thus, their parents' permission was not required. A total of 56 students participated (54% female and 46% male) in 17 groups, with two to five students in each group. Each interview was about 45–60 min long.

To encourage discussion in the interviews, a diamond ranking method (Clark et al. 2013; Clark 2012) was used. This method involves presenting nine pictures that participants are asked to arrange in a diamond shape (Fig. 2). Clark et al. (2013) describe this method as a 'thinking tool' meant to encourage group discussion. At the top of the diamond (rows 1 or 2) are pictures displaying an environment that students categorise as a good space/arrangement for learning, and at the bottom (rows 5 and 4) are the arrangements that students count as a space that is not good for learning, and in the middle is an arrangement that is considered neither good or bad.

While Woolner (2010) and Clark (2012) recommend the use of nine pictures, in this study, twelve pictures were used, from which the participants were asked to select nine to rank in the diamond shape. The purpose of using twelve pictures instead of nine was to increase the variety and not overly limit the students' choices. The results were more diverse, however, and not as clear as if there were only nine pictures (for more detail in Magnúsdóttir 2015). The researcher also asked the group whether there were any other settings they could think of that was not displayed in the images. Only one group could come up with something else. The pictures illustrated the following settings:

- Traditional classroom, tables in a row, all students facing the same direction,
- Tables arranged in a group (not necessarily group work)
- A private table somewhere in school
- Group work (anywhere)
- Working alone at a computer (could be anywhere)
- A computer room
- Fieldwork outside the school premises, in nature or at workplaces

Fig. 2 Diamond ranking method (illustration is based on Clark et al. 2013, p. 6)

1. row

2. row

3. row

4. row

5. row
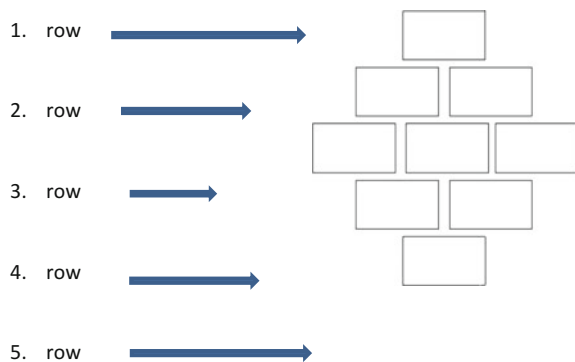
- A lecture hall
- Reading alone in a quiet area
- Art and craft facilities
- The library
- A 'technical' classroom.

The participants in the group were asked to work together and try to agree on one diamond. The researchers occasionally encouraged them to discuss their decisions by asking 'why' questions. The discussion was recorded and transcribed. In conducting group interviews, there is always the danger that one person in the group takes a leading role and makes decisions on behalf of the remainder of the group. To prevent this from happening, the researchers tried to encourage silent participants to reveal their opinions so as to ensure that the group would agree on the final conclusion.

The use of visual methods when studying physical environments is common and is used as a tool to trigger and initiate fruitful discussion; however, this should be seen as complementary to discussion (Burke et al. 2014). Therefore, in this study, the discussion among the students in the group did not constitute less valuable data than the results from the diamond at the end of the interview. Since the researchers selected the pictures in this case, there was the danger that the selection did not fully reflect the students' ideas. Another option would have been to ask the students to walk around the schools and take their own photographs of places that they deemed good or bad places for learning. As the purpose of this study was to expose students' views in general, rather than towards some particular space in their own school, it was, however, more suitable to use pictures that were unfamiliar to the students.

Students' Ideas and the Actual Classroom Environment

The results are presented in two parts: first, the classroom arrangement as it appeared in the classroom observations and, second, the results from the interview describing how the students ranked the pictures and why.

Classroom Arrangement

As expected, the majority of observed lessons took place in traditional classrooms (63%) where the students sat in rows at individual tables facing the same wall where the teachers sat or stood in front of a blackboard or screen (see Table 1). Other arrangements were less obvious, such as clustered tables in 15% of the observed lessons and untraditional spaces in 17% of the observed lessons. These involved, e.g. open-space classrooms in one of the schools, a classroom consisting

only of chairs (discussion room) and an outdoor lesson. In order to gain a clearer picture of the environment, an example from the descriptions is provided below, which is rather typical of a classroom arrangement in this category.

> The classroom is on the first floor with large windows on one wall and light green curtains. There are empty cupboards under the windows and a white blackboard behind the teacher's desk upfront. There is nothing on the walls except a clock. An old projector (for transparencies) is in one corner of the room, and a newer one is hanging from the ceiling. There are four individual tables in eight rows (all facing the same direction), and the students are sitting on a wooden chair with pink pillows. The doors open onto the corridor. (Author observation notes)

The open-space classrooms (category 3) were found only in one of the schools, which is a new school in an innovative building. The arrangement in one of the lessons was described in the observer's notes:

> The lesson takes place in the so-called math area where there are five closed classrooms (of different sizes) that open onto a central area. In the central area are ten workstations (group tables). The students are sitting there in groups of two to four on wooden chairs on wheels. Almost all the students have their laptop on the table in front of them. The teachers (5–6) are sitting in a group in one of the workstations. There is artwork on the walls. (Author observation notes)

These above descriptions reflect the classroom conditions that students in upper secondary schools could expect in terms of a place for learning. It can be said that the classroom arrangement in the observed lessons was rather traditional and well known by the students. It is, however, noteworthy that the classroom is far from being the only space for learning; the whole school building should be designed as a space for learning, not to mention the home environment. The following sections present the students' voices about the best and worst spaces for learning within the school.

Students' Voices

In the group interviews, the participants were given 12 photographs and were asked to prioritise them in a diamond ranking shape (Fig. 2), which had already been drawn on paper, based on their ideas about learning in different settings in the school environment. The top of the sheet read: 'this is a good space for learning'; the bottom read 'this is a bad space for learning'.

The pictures did not display an actual environment which was familiar to the participants, and text describing the settings was also written on each picture in order to avoid overly focussing on what was actually displayed. As the group had more than nine pictures, each group had to exclude three of them. They tended to exclude pictures of unfamiliar settings, with only three groups selecting high-tech classrooms with interactive, electronic tables (Table 2). Some students claimed that they knew nothing like this and therefore decided against using it, even though it

Table 2 Overview of the settings reflected in the pictures, their ranking and the number of groups using each picture

		Row 1	Row 2	Row 3	Row 4	Row 5	Total
a	Traditional classroom	2	1	5	6	3	17
b	Tables in groups	4	1	7	4	0	16
c	Private table	3	2	7	0	1	13
d	Group work (anywhere)	1	2	6	5	2	16
e	Alone in a computer	1	6	4	2	1	14
f	Computer room	0	0	2	7	4	13
g	Fieldwork	1	6	3	5	0	15
h	Lecture hall	0	1	4	4	3	12
i	Alone in a quiet area	3	5	4	1	0	13
j	Art and craft classroom	3	0	4	0	3	10
k	Library	2	9	3	0	1	15
l	Technical classroom	1	0	2	0	0	3

could be considered 'cool'. Seven groups excluded the picture of the art and craft classroom. Most of the students were enrolled in academic programmes and claimed that doing art and craft was not for them. A picture displaying a traditional setting was used by all 17 groups, most often in the bottom rows but also in the top rows (Table 2).

Figure 3 illustrates the frequency with which 10 out of the 12 pictures were ranked on the two top rows (1 and 2), the middle row (3) and the bottom rows (4 and 5). There was obviously considerable diversity in the responses from the 17 groups. Therefore, the students' comments on each photograph provide valuable insight into their views.

Spaces Deemed Good for Learning

As illustrated in Fig. 3, the library and working alone in a quiet area were most often ranked in the top two rows as a good space for learning. The library was ranked in row 1 by two groups and in row 2 by nine groups (Table 2), and only one group ranked it on the bottom rows. When asked what they liked most about the library, these conversations came up in one of the schools:

S1. "Just comfortable and cosy"

S2: "There is peace and quiet; no noise"

S3: "Easy to access different resources … computers … and almost everything one needs."

Reading alone in a quiet area received similar remarks, more specifically, was located eight times in the top rows and three times in the first row. As with the library, only one group ranked it on the bottom row. The same occurred with the
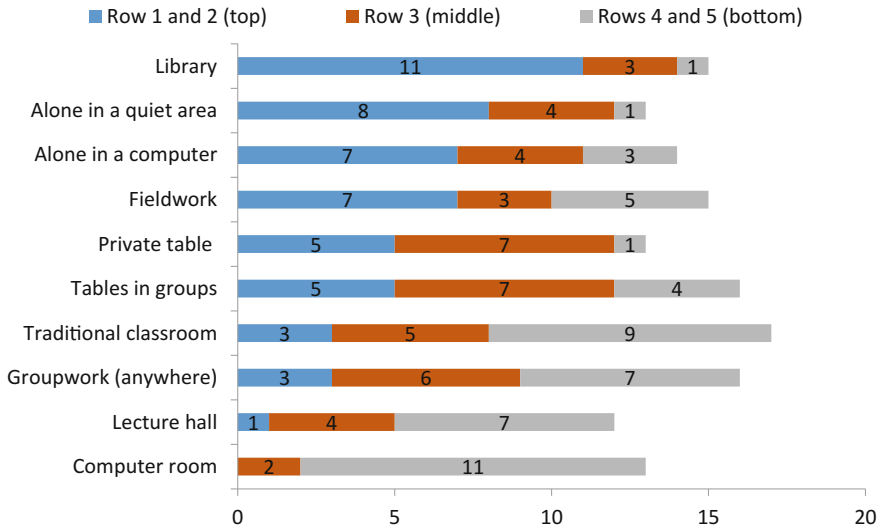
Fig. 3 An overview of the frequency with which each picture was selected and located at the *top*, in the *middle* and at the *bottom* of the *diamond*

picture: 'working alone on a computer anywhere in the building' was ranked by seven groups in the top rows and only once in the bottom row. Three groups ranked it on the bottom rows. The positive comments from the groups came when these pictures were most often concerned with the quietness and freedom of being able to work anywhere in the building. As one student put it: "Freedom and peace: I can go anywhere I want to; that suits me". The groups which ranked the picture on the bottom rows thought it was too easy to get distracted while sitting alone: "it is too tempting to do something else [than what you are supposed to]".

Having access to a private desk is not common in upper secondary school. Nevertheless, it was selected by five groups on rows 1 or 2. Four groups excluded the picture because it was unfamiliar. Most of them thought that this was a great idea, answering positively to the question: 'Do you agree that it would be brilliant to have your own private desk in school?' (school A). As an advantage for having a private desk, students mentioned: to be able to access all their things in one place and "definitely a very good place for learning". Some of them said that it was similar to being in the library, but your own place. They were somewhat concerned, however, about whether there would be enough space for private desks in the building.

A picture of a classroom with tables arranged in groups (not as group work) seemed to be rather popular since it was ranked on the first row by four groups (Table 2), five times on the two top rows, never on the bottom row but four times on row 4 (see Table 2). During the discussions, this arrangement received many

positive remarks as it enabled the possibility to work independently as well as to work with fellow students if so desired. As a student in school B said: "You see, we often sit like this, really comfortable; if you are working on a project and don't understand something, you can always ask the person sitting next to you". In school (E), the students agreed that this was a 'nice' arrangement, which gave them the flexibility to choose whether or not to chat. It was also good for learning because "you learn best by talking about the topic". They thus valued the ability to learn close to other people, without formal collaboration, as well as to be able to learn without being disturbed.

Spaces Deemed 'Not Good' for Learning

It seemed that the very worst room for learning was the computer room. In these kinds of classrooms, several computers are on tables in two or more rows, with everyone facing the same direction. This picture was used by 13 groups and ranked four times in row 5, seven times in row 4 and never in the top rows. The students' negative views mainly concerned disruptions, a lack of space, or: "it is always too hot in these rooms" (school G), or "it's like you are suffocating or something" (school K) and "there is always a lack of space in a computer room, no space for books, for example" (school J). "There are constant disruptions from computers, from other people from everything" (school H).

The unpopularity of the traditional classroom arrangement (Fig. 3) is indeed interesting as it is the most common arrangement in upper secondary school (Table 1). This involves students sitting at individual tables, side by side, in rows and facing the same direction. All groups used this picture, which ranked three times in row 5 and six times in row 4. It was, however, also ranked in the top rows by two groups, claiming that it was satisfactory and that they were used to this kind of arrangement. One of the groups ranked it on the bottom rows and said it was "rather boring; it has been like that since grade 1". One of the groups in school A was among those who did not like this arrangement:

> S1: "This is what we are always complaining about – always sit and listen and write."
>
> S2: "It is so boring, always the same."
>
> S3: "It would be okay to have it sometimes like that, but not for all lessons."

Two other pictures were ranked on the bottom rows, indicating a less than ideal place for learning. The lecture hall was ranked eight times in rows 4 and 5. Students explained that it was too easy to fall asleep or lose interest: "you learn better by doing the tasks yourself" (school C). A student in school H explained: "I feel the lecture hall a bit too big somehow; you are far from the teacher, and maybe you cannot hear so well".

Rather negative remarks were also made about group work as the work tends to be split unevenly between participants. One student in school E described it as follows:

> There is usually one person that does all the work; the others only get a piece of paper to read you know. And the only one who wants to get high marks for the projects makes it nice and prints out and everything. The others then receive a copy.

Another group in school H complained about people not doing their fair share in group work: "There are those who like group work because they do not need to do as much work".

It seems that the students did not value an environment for learning that was overly rigid, crowded, hot and lacked flexibility, such as in computer rooms and in traditional classrooms where everyone sits in rows, facing the same direction. They also did not value environments that made it easier for them to avoid tasks.

Students' Influences on Their Own Learning Environment

During the classroom observations, we looked for signs of student choice or their influence on the learning environment. From the observation notes in the traditional classrooms (63%), there were very few signs of student influence and little flexibility or space to adapt; the teachers hardly asked for students' opinions and neither did they ask the students how they wanted to do things. The students did not request it either. Below is an example that is rather typical of this type of lesson:

> The whole lesson (one hour) was characterised by one-way instruction. The teacher used slides and walked back and forth at the front of the classroom; he had a lively way of expressing himself and used rich body language. The students spoke once in a while, especially four of them who mostly responded to the teacher's questions. The other students remained silent. (Author observation notes)

In general, the lessons were teacher-centred, and the students were not expected to do much else than listen and take notes. There was, however, an exception from the norm, especially in one of the schools (the open-plan school). The students there were allowed to leave the room and work on the task in another room in the centre, just outside the classroom or wherever they wanted. Here is an example from the observation notes in one of these lessons:

> The students were working freely on their task in this lesson. The atmosphere was relaxed, and the students moved in and out of the classroom. The teachers walked between the students and talked to them about their ideas about their projects. It was obvious that they wanted the students to develop their ideas and find their own means of realising them. (Author observation notes)

These ways of working seemed to be more common in this particular school than in the others; the lessons were more student-centred, with the teachers assuming the role of a tutor.

In the interviews, students where asked whether they were given possibilities to decide on their environment or their learning process in general. Their opinions reflected a similar situation. They thought that they had very few opportunities to make decisions about their learning, except in relation to choosing programmes. They rarely thought about the physical environment when asked about their possibility of affecting their learning.

Discussion and Conclusions

The aims of this study were to shed light on students' ideas about a good learning environment (space for learning) and to explore how the actual arrangement of the physical learning environment fits the students' ideas. The research questions concerned the arrangement of the classrooms, students' ideas about a good space for learning and their possibilities for influencing their learning environment. Obviously, talking about good or a bad space for learning may seem like an oversimplification of a complex reality. In most cases, it is not a question of either or; rather, much depends on the person involved and the task that needs to be done. Using the diamond ranking method, however, requires putting forward contradictory statements in order to encourage the participants to prioritise, discuss their ideas and talk about what kind of physical settings they value or disvalue.

It turned out that classroom arrangements in the majority of the observed lessons were very traditional, with students sitting at individual tables and everyone facing a blackboard in the front of the classroom. These were teacher-centred lessons dominated by one-way instruction. This is not surprising, and echoed other studies, both in Iceland (Óskarsdóttir 2012) and in other countries such as Portugal (Veloso et al. 2014) where the teaching methods in upper secondary schools remained traditional despite extensive renovations to school buildings. According to the sources cited in this chapter, such arrangement can hardly be seen as supportive of student-centred or individualised learning (Blackmore et al. 2011). There are, however, indications of a more student-centred approach in schools that are designed with more open plans, variety and flexibility in the environment (Sigurðardóttir and Hjartarson 2016), as in one of the schools in this study. This is in line with results from Prain et al. (2015), suggesting that open-plan schools are promising in terms of enabling more personalised learning and student well-being.

Students' ideas about a good space for learning seemed to largely contradict the actual arrangements. They valued learning environments giving them flexibility or power to make decisions about their learning preferences. They liked to sit in groups where they could choose whether to work or consult with other students. Contrastingly, they also liked environments where they could expect a quiet area and various working conditions, for example, libraries. They did not, however, value rigid environments for learning, or those that are crowded, too hot or too inflexible to influence their situations. This was the case for computer rooms and traditional classrooms where everyone sat in rows, facing the same direction.

There thus seemed to be a significant gap between student preferences and the existing environment in upper secondary schools. This mismatch is not likely to support student-centred learning, at least with regard to Fullan's (2016) suggestion that students' views about how they learn best need to be taken into account.

Indeed, the students in this study were given few opportunities to make choices and had few possibilities to influence their learning. This was a common theme, which persisted even as the students got older (Fullan 2016; Óskarsdóttir 2012). The observed lessons were characterised more by teacher-centred work than by student-centred tasks that are "student focused and student built" (Murphy 2016, p. 152). Different studies emphasise student autonomy and increased student influence on their learning environment as one of the fundamental conditions for student engagement (Fredricks et al. 2004; Murphy 2016). It is, however, difficult for this study to make a link between this teacher-centred approach in Icelandic upper secondary schools and the high dropout rate in the country. There was no evidence, suggesting that there was less student autonomy in Icelandic schools than in other countries with lower dropout rates. Nevertheless, this is a noteworthy point, and effort should be made to heed students' opinions and to create a greater level of student-centeredness through a more open and flexible environment. Indeed, the construction of classrooms as flexible learning spaces that better accommodate the new, digital didactical orientation (Norlander 2014) and that enhance twenty-first-century learning (Benade 2015) will encourage student-centeredness. The ideas expressed by students cohered well with international recommendations about innovative learning environments (OECD 2013), thus making it worthwhile for education authorities at all levels to take heed. Even though this study is limited in scope, the results contribute to the discussion about ways to support students in constructing their own learning, knowledge and understanding. It is important to listen to students and provide them with opportunities to influence their own learning conditions in schools.

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Virtual Reality: Its Transformative Potential

Irina Kuznetcova and Michael Glassman

Abstract This chapter explores the role(s) that virtual reality can play in using new information technologies to transform the classroom. In some ways, virtual reality represents the frontier of Internet-infused learning because of its potential to open up new spaces of learning even while maintaining the traditional classroom as the outer shell of the educational process. Students can sit at their desk in a four-walled environment while exploring new and different worlds with limitless possibilities. But virtual reality in education is also fraught with pitfalls and dangers for almost identical reasons, as students can experience autonomy and freedom in ways that are completely new to how we conceptualise learning environments. In this chapter, we describe the use of virtual reality in a college-level class. The teaching team used the desktop virtual reality platform 'Second Life' as a central part of the curriculum over the course of a fourteen-week semester. Every week the class would receive a lecture on the class topic and then sit in the classroom and enter the world created through Second Life dubbed 'Wisdom Shores' and engage in activity related to the topic. A critical issue was understanding the space (Second Life)–place (classroom) dialectic and how it plays out in the learning process.

Introduction

One of the more important implications of the information revolution, especially the Internet, is the emergence of what Illich (1973) referred to as convivial tools. Illich criticised the rituals of traditional schooling as manipulative tool(s) used to promote larger social agendas. Individual engagement (enabling immediate and relevant problem-solving) was not possible using what had become a universal approach to schooling. In actuality, schooling moved students away from the idea that they

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could independently use tools to engage, solve problems, live and subsist with others. In *DeSchooling Society* (1971), Illich's first and most famous work on the split between individual agency through tools and social manipulation based on controlled tool use, he suggested computers as a possibility for a new generation of convivial tools that could offer important counterpoints to the control of traditional schooling. Illich's ideas coming at the beginning of the information revolution were necessarily simplistic, and he soured on the possibilities of using computers to escape manipulation a few decades later, but we argue his ideas of computers as tools for exploration through individual and community engagement were prescient if premature.

The first generation of Internet applications was often times anything but convivial, based on linear, one-way communication (what O'Reilly 2007 refers to as web 1.0). Computer applications seemed to be moving in the opposite direction that Illich and many early pioneers in computers/networking envisioned for the new technology. But in the last decade there has been a renaissance of the types of computer and network applications that can serve as tools for open-ended activity/experience, based on exploration and developing communities for problem-solving—these include applications such as blogs, wikis, (sometimes) social network sites and short messaging services. Perhaps no application offers greater possibilities for tools of engagement, exploration and democratic problem-solving communities than virtual reality, or more particularly what we will refer to in this chapter as virtual worlds (e.g. Second Life). Virtual worlds offer users opportunities for engaging in open-ended learning in school settings while leaving behind the manipulative nature of schooling. The classroom still has titular social approval because activities remain under the aegis of teachers as socially approved interlocutors, but students are capable of travelling to a new type of reality where traditional (many times manipulative) socio-educational tools hold relatively little sway. This can happen while students sit at their desk in a traditional classroom under the gaze of the teacher. These virtual worlds belong to students as problem solvers at least as much as they do to the school. They provide a context for what Dewey (1916) referred to as vital experience while still maintaining contact with the traditional classroom. The key for the teacher is setting up a permeable boundary between the corporal reality of the classroom and the reality of the virtual world, making it safe for students to cross over at will, recognising new options for autonomy and exploration when in the virtual world along with social histories and responsibilities of their corporal worlds, understanding how the two influence each other and in many cases recreate each other through vital experience; in other words, it is key to establish a place–space dialectic (Glassman and Burbidge 2014). Researchers have been examining the roles that virtual reality/worlds might play in education (e.g. Dalgarno et al. 2011; De Lucia et al. 2009; Dickey 2005) as well as core developmental issues such as identity (e.g. Kafai et al. 2010). This chapter looks to go perhaps a step further in exploring the ramifications of integrating virtual worlds as a teaching tool that is a major component of the curriculum.

Democratic Education and Constructivism

As early as the beginning of the twentieth century, Dewey (1916) questioned the value of hierarchical, linear educational processes where teachers controlled what was learned and how it was learned while students were passive recipients of socially approved knowledge. He believed the central goal of education was teaching students to be engaged in vital experience—the empirically based investigation of immediate and relevant problems that students saw as critical to their needs, the merging of the desire to know with the active, logical experimentation in the world that brings knowing. Dewey believed that education should reflect life as lived (and life as lived should reflect education, over the lifetime), with everything else more or less window dressing. The desire to know cannot be separated from the need to know, and the need to know cannot be separated from interest. Critical to Dewey's perspective is the idea that we do not really solve problems through vital experience by ourselves. Humans are social creatures, and their greatest attribute, the ability to learn and gain greater understanding through experimentation, is ensconced in the sociability (Glassman 2016). Like learning, problem-solving is not a passive process where we go into a room somewhere and use our special knowledge to come up with a solution based on prior knowledge. Each problem is unique so therefore each solution is unique, tied to the context of the problem and the individuals attempting to solve it. Humans benefit from multiple perspectives and multiple histories when they attempt to solve unique problems. Democratic problem-solving is not, however, natural to the human condition but a process we must continuously reach for, sometimes through more individualistic/selfish inclinations. Individuals must learn to work together in an environment of mutual respect and concern with other interest-driven individuals over and over again so that it becomes part of their nature, the first choice in any activity. The concepts of learning—that is learning to be a problem solver—and citizenship—being a productive open member of a shared community—are deeply intertwined in the Deweyan framework.

Despite the obvious qualities of Dewey's approach, it has taken hold in only limited educational contexts. For the democratic education Dewey proposed to work, the teacher must be willing to transfer much of the responsibility for learning and ownership of the topic to the students. It is the students who for the most part drive the educational processes and not the teacher, who hovers in the background as facilitator and general guide. This also requires ceding a great deal of institutional control not only on the part of the teacher but the educational establishment as well. In Dewey's democratic classroom, the school or the teacher does not determine what is important to learn, that is left to the students themselves. Student interest is the critical component of the educational experience. If there is no organic interest on the part of the students, they are not going to work together, to put solving the problem at hand ahead of their own individual needs no matter what the teacher does. And without this interest-driven community experience, the students have little chance of learning to become democratic problem solvers through their activities.

There are a number of reasons why Dewey's ideas on education have been so difficult to implement (Glassman and Kang 2011), some of them philosophical (many believe for instance is the trained individual as expert and not the group that function best in problem-solving scenarios), some of them are political (many do not believe in the efficacy of the participatory culture Dewey promoted). But at a practical level, the types of tools necessary for true democratic education oftentimes do not exist in the traditional classroom or are not accepted as legitimate by educational institutions. Illich would suggest that schools are set up as tools of control and manipulation, even if we often do not realise it, and this is deeply ingrained in our cultural attitudes towards schooling. Attempting to implement a democratic classroom in these types of traditional classrooms can lead to chaos for even the most well intentioned of educators. What is needed, we would argue, is a new world, open to the types of democratic educational processes Dewey believes so important, within the context of traditional education (which even Illich might have admitted is difficult to overcome). This would have seemed a strange paradox, even impossible just a few years ago. How can there be multiple worlds in a single social context? Yet virtual worlds do offer this possibility. They give the chance for students to adhere to the demands of schooling while simultaneously experimenting with problem-solving groups where there are few consequences for failure.

Virtual Realities/Worlds in Education: Prior Research

The technological advances of the past decades brought into play many new tools that educators can use in the classroom—some of them manipulative (e.g. MOOCs, management systems) but some convivial, meant primarily for engagement. One convivial tool that has emerged recently is virtual reality (VR) platforms. Mikropoulos and Natsis (2011) broadly define VR as "a mosaic of technologies that support the creation of synthetic, highly interactive three dimensional (3D) spatial environments that represent real or non-real situations" (p. 769).

Sherman and Craig (2003) identify four essential elements of virtual reality: a virtual world, immersion, sensory feedback and interactivity. A virtual world refers to the virtual space and its content that are generated by a computer; immersion can be described as a sensation of personal presence in the environment; sensory feedback is the sensory data the user is provided with in response to the user's actions in the environment; finally, interactivity is the freedom of being an active participant and co-creator in the virtual space and the responses of the space to the user's actions. When all four elements are present to the fullest extent, such virtual environments are defined as fully immersive and interactive (e.g. VRs accessed through a head mounted display). In this chapter, we make the argument that the concepts of virtual space with interactivity should be combined because it is not possible to have human-occupied virtual worlds without some level of interactivity (i.e. from a psychological perspective individuals cannot be completely solipsistic and still be considered as engaging human endeavour). We refer to this combination as virtual worlds.

While virtual realities can have all four elements to varying degrees, we suggest virtual worlds focus primarily on the combination of virtual space and interactivity —immersion and sensory feedback are not particularly useful and can actually be detrimental from an educational perspective (e.g. a distraction, inhibit high-level interactivity). Our view of virtual worlds demands a higher level of agency on the part of the user (they must make conscious decisions about their participation in virtual worlds as opposed being immersed in sensory data which set virtual behaviour trajectories). The hardware is often different for the types of virtual worlds discussed here, using mediating, tool-based technologies that are separate from the user. In the literature, this type of hardware is classified as desktop virtual realities. Desktop VRs (DVRs) are the type of a computer-generated VR that can be controlled through the use of mouse and keyboard or any other controllers and represents the 3D environment on the computer screen (Burns and Ausburn 2007). The emergence of DVRs can be traced back to text-based Multi-User Dungeons (MUDs) and MUDs Object Oriented (MOOs) which, following the fast development of graphic technology and computing and processing power, developed into complex, highly interactive digital spaces that can be accessed using an ordinary desktop PC and Internet connection (Peachey et al. 2010). Game industry popularised so-called non-immersive virtual worlds about three decades ago, but the technology still continues to advance with each year.

In spite of similarities in hardware, virtual world platforms have a number of unique features that differentiate them from games. Particularly, there is no predetermined narrative or a story line, or designer-defined objectives. For instance, in games players are expected to complete (most often) successive levels as determined by the designer(s), to collect specific items identified by designer(s), to defeat an enemy, etc. Many games also allow for (and sometimes build on) user-generated content (Girvan et al. 2013), but this still falls within a designed system. Games are sometimes defined as virtual worlds as well, but in this chapter our definition of virtual worlds is dependent on virtual open spaces which welcome (sometimes high levels of) interactivity but have no predetermined rules and goals. In other words, virtual worlds as convivial tools.

VRs as convivial tools provide a number of possibilities that teachers and students can use for specific educational purposes. They offer avenues for increasing social presence as well as create opportunities for collaboration (Dalgarno and Lee 2010). They can provide an opportunity for new types of vital experiences, especially when normally such experiences are difficult, if not impossible, due to technical, ethical or any other considerations (e.g. practicing costly or complicated surgeries in medicine). They also add an element of playfulness and encourage exploration, which are important for educational purposes (Twining and Footring 2010). Steinkuehler and Squire (2009) identified 7 principles of virtual world cultures that should be addressed by educators as students engage in virtual world exploration outside of school with consequences for their in-school learning (some of these principles are true for modern media and technology in general):

1. Ubiquitous access to information: when information can be accessed in a matter of seconds, the focus should be on teaching criteria of filtering and selecting information rather than transmitting it;
2. Overlapping co-presences: student in the classroom can also be in other virtual spaces, e.g. communicating with friends through chat—such multitasking becomes a usual thing;
3. Collective intelligence: in virtual worlds, collective work is encouraged and often expected—mastery is collective rather than individual;
4. Learners are information producers, not just consumers: virtual worlds allow for user creation of content;
5. Authentic participation: meaningful participatory culture;
6. Learners are designers of messages;
7. High student autonomy: their personal learning goals matter.

Therefore, desktop VRs provide a potential educational space that is (or can be):

- Collaborative
- Encouraging exploration and play
- Student-driven (in content and actions)
- Socially meaningful
- Promoting learner's autonomy

Despite these possibilities, educators tend to use virtual worlds as a tool to support traditional learning and teaching systems, in essence as the same type of manipulative tool that Illich decried in *DeSchooling Society*. Educators look to replicate traditional classrooms in virtual space and use the virtual world as a platform for disseminating information; assign tasks to achieve predetermined academic objectives or stick to the realistic representation of the real world. Even as a manipulative tool, virtual world platforms can increase students' engagement and social interaction, as well as interest and motivation (e.g. De Lucia et al. 2009). Using virtual worlds this way is, however, to miss their radical transformational capabilities, creating educational opportunities once thought impossible by creating a second world where students and teachers are not subject to the same institutional histories, barriers and demands in learning processes. Instead of directly challenging schooling rituals as Illich (1971) suggested, virtual worlds offer possibilities for going around them. In a world where everything is possible, imagination, creativity and means to achieve one's personal vision have almost no constraints. Why build a real classroom in a virtual world simply to lecture students when you can have a class riding dragons, travelling through every part of a gigantic eukaryotic cell or flying a hot air balloon? Even when VR activities do not imitate those of the real world, they are often geared towards a specific educational objective imposed by the teacher and limiting students' autonomy and exploration.

The idea of virtual worlds in education needs to be taken to the next level, where these tools are not used for the sake of replicating traditional instructional approaches, but to enhance and complement as convivial tools that can aid in breaking institutional barriers to create new avenues/funnels for student agency and engaged problem-solving.

The Case of Second Life

We tried to take a step in this direction using a DVR called Second Life (SL) in a college-level course. Second Life is a virtual world platform developed by Linden Lab that was initially developed in 2003. It functions as a multi-user DVR where users ("residents") are represented through avatars. They can interact with objects and other avatars, create many different types of objects, buildings and structures, animate and script them, and participate in economic transactions using the in-world currency (Linden Dollars). It is a world primarily driven by user-generated content.

We implemented SL as a the central learning tool (along with more traditional lectures) in a semester-long undergraduate-level course in a general education programme for pre-service junior and senior high school teachers. The course was focused on adolescent development. SL, as well as other many other forms of virtual reality, is usually used in science instruction or social and art studies incorporating such topics as communication, art and history, where there is a natural affinity on the part of the students and the curriculum for SL activities (but this also limits SL activities to the boundaries of the particular course objectives). One of the goals of this particular intervention was to explore how SL can be used as a tool to change the teaching and learning process in a course that does not naturally lend itself to an SL context (the course itself is not about computer applications, exploring models or building/creating objects).

SL features a private ownership system where residents can buy or rent private islands or parts of regions and set the rules for their private territory. We bought an island for our course that we called Wisdom Shores. This island was developed as a safe space for students to learn. Since it was private, students could perform actions that they would not be able to on other territories, such as building objects. No outsiders (SL users who were not members of the class) were allowed access to the island. Learning was not assessed in traditional ways—there were no testing or grades involved. In other words, the environment was arranged in a way that allowed students/users to make mistakes in the process of learning without real consequences. SL has an infamously steep learning curve, so mistakes were a common part of the learning process during the first few weeks. This is the type of learning environment the classroom (ideally) is supposed to be—a sandbox, a safe playground for testing out situations and ideas that could have undesirable consequences in the real world.

Researchers have claimed that virtual worlds can be playgrounds for identity creation and experimentation (Kafai et al. 2010). This is certainly true of the SL platform that has unique possibilities for creating any imaginable avatar. Using the built-in tools (see Fig. 1), you can change the shape and look of every part of the avatar's body; you can change an avatar's sex in a matter of one click. More advanced options, such as creating or buying hairstyles, tattoos, jewellery, different colours of eyes, makeup, clothing, shoes and many other things, provide an

Fig. 1 Example of SL appearance editing options

opportunity to create (or replicate) any possible look. Moreover, you can create an animal avatar, a monster avatar (such as a vampire), an alien avatar… the possibilities are endless.

The students in the course created their SL identities during the unit focused on exploring issues of identity formation, based on the works of Erikson (1950) and Marcia (1966). The students were asked to create avatar identities in their new virtual world as they were hearing lectures and discussing the larger concept of identity formation. Where traditional classrooms may have asked students to take a test to prove their knowledge of identity formation, SL allowed the students to actually examine the concepts in practice as they developed their avatars over a period of three weeks, blogging weekly about their experiences. While in the traditional classroom the teacher controlled the learning processes, in the virtual world it was the students who became the creators in their own avatar identity formation.

The evolving identities of the avatars were, however, not completely detached from the user's place-based selves, suggesting the importance of recognising the permeable boundaries between corporal world and the virtual world in navigating the educational possibilities of the dialectical relationship between place (students' everyday lives) and space (Wisdom Shores). Many of the students brought their personal views, perspectives and experiences into the creation of their avatar's identity, even if they did not realise it while they were in the process of creating it. For example, the only African American student in the class decided not to change anything about her initial avatar (that every resident picks upon entering the world and can edit afterwards). After analysing her interviews and blog posts, it became

apparent that she was unhappy with the underrepresentation of the African American community in SL choice of avatars and the absence of racial awareness in in-world communication, and her in-world decisions about identity were pushback against this. The avatar became a manifestation of the students' corporal world experiences even though SL is a theoretically new social and emotional landscape that does not carry any outside history (except, of course, the history the users bring with them). The avatars are separate but deeply connected to the users who create them.

At the same time, it is not entirely clear whether students perceived their avatars as students in SL (i.e. many did not seem to be translating their classroom experience and educational histories to the virtual world). The traditional hierarchy of the relationships and power structure of the classroom seemed to change once the students entered the virtual world. The teacher was present through his own in-world avatar, but the students almost never sought out any type of guidance or expertise to complete projects (which was the reason the teacher decided to have an in-world presence in the first place), or even communicated with him. Moreover, they engaged in some teacher-related activities (almost pranks) that they would never do in the real classroom. The instructor had a house on the island where students could come and ask questions. The house walls featured a picture of dragons. One of the students put a huge dragon on the top of the roof to "complement" the interior as well as several small dragons inside the house (see Fig. 2). Some other students, while riding a car, ran over the teacher assistant (they apologised for that). Students did not treat the instructor and TA as the authorities on Wisdom Shores; rather, they treated them as equals and actually became angry whenever the teacher attempted to create a hierarchical learning experience (e.g. teaching about constructivist-based education and asking the students to build a constructivist classroom). The students were still working on the activities given by the teacher; however, they did so on their own without communicating with the instructor; they were rather discontent when interrupted with suggestions or

Fig. 2 Dragon on the instructor's house roof

corrections. In other words, the evidence suggests that the place-based rules of being a student in the traditional classroom were no longer in place for them. They were students in the virtual world, but completely different types of students. What is interesting is that the students remained in their traditional schooling roles when they were in the corporal classroom over the course over the semester. They sat at their desks and listened quietly to lectures, they raised their hands every once in a while to ask non-probing questions, and they almost never challenged the authority of the teacher or the teaching assistants. The difference between the type of students they were in the traditional classroom and in-world actually increased over the course of the semester.

One of the most interesting aspects of the virtual world educational experience is that SL seemed to give (or students took) ownership over the island during their in-world activities. This sense of students' autonomy and ownership grew in time as they advanced in their technical in-world skills and soared the highest after introducing building. Building in SL allows users to create any object that one can imagine (see Fig. 3). If you cannot build something, you can always buy it on the SL Marketplace using the in-world currency. Therefore, even if you just buy and arrange things on the island, you still get the sense of ownership. The students did both. This was especially apparent in the situation when before one of the classes the TA deleted the trial buildings to clear space for further building activities. Students were very upset and angry that their work was deleted. Next time the TA left everything untouched and asked students to delete the buildings as they saw necessary, and there were no objections to this. In other words, through the act of virtually building something on their own, even though the act took place in the settings of a virtual world, students developed ownership of the island as their learning world: they were deciding where to place the objects and what objects would survive and what objects would be excessed. They were deciding what the island will look like, not the teacher.
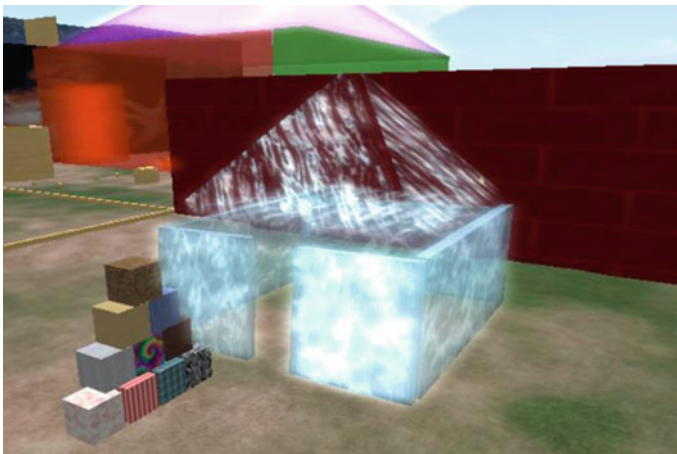

Fig. 3 One of the buildings created by students

From the constructivist and democratic education standpoint, the opportunity to build in-world is one of the most effective pathways to empowering students with agency in their own learning process. Building (which broadly includes manipulating things that one can buy on the Marketplace) causes the sense of ownership over the produced content. This sense of ownership allows students to engage in experimentation and exploration and can lead to deeper processing of information.

In Wisdom Shores, building was done in groups that were formed in-world in the beginning of the course by students themselves. Some students knew each other before starting the course, but most members of the groups did not know who were the avatars in their groups. From the blog post and SL chat analysis, it was clear that the students enjoyed working together, and the communication in groups was always friendly and engaged. It is interesting that the groups seemed to be completely separate from the classroom. The students engaged in active in-world conversations in their group chats during the class and communicated with each other on the blog as well, but in the corporal world they oftentimes did not even know the names of their groupmates.

The groups became the driving force in the process of building. All groups received general directions of the building activity (e.g. build a constructivist classroom) and then discussed what exactly they want to build, why and how they will do it. Group work also made the building process more manageable and faster. All the decisions regarding building were made within groups, and there were no questions directed to the instructor (except a few questions about technical issues).

To summarise, what was happening on Wisdom Shores was collaborative, predominantly autonomous knowledge construction, with students being in charge of the learning process and the instructor gearing the course towards the direction of students' thoughts and perceptions of the learning process. This is the way Dewey and Illich envisioned what education should look like.

Conclusion

Was the use of Virtual Worlds in education successful? This is a difficult question. When SL was successful it was extremely successful. There were times (e.g. during the identity unit) when the student weekly blog posts seemed much more reflective and imbued with higher-order thinking than blog posts in other classes (this particular class was run in parallel with another class using the exact same curriculum and weekly blogging by students). The students also seemed to achieve high levels of autonomy when engaged in virtual world activities—but this did not transfer back to their traditional classroom attitudes. As student autonomy became more advanced, particularly in activities involved building, it became more difficult for the teacher to maintain any type of control over the trajectory of those activities in Wisdom Shores. At times deep in the semester students seemed to become resentful of the teacher's attempt to control in-world activity. One of the students actually wrote a blog post with the title "We don't need no MAN tell us what to do".

The growing open-ended nature of in-world activity did not lead to greater exploration as anticipated. As a matter of fact it seemed to lead to confusion on the part of the students about what the activities on SL meant to them. Observations, interviews and blog posts suggested students were engaging in more democratic style education but perhaps one of the difficulties of being immersed in another world is it is difficult to recognise this. The process-based educative approach combines with the steep learning curve led many students to question the efficacy of the tool.

Wisdom Shores in the end became a place we did not really understand. It took on its own character and meaning. The avatars took on new roles that were more autonomous but also more confused. The experience convinces us that virtual worlds offer possibilities for radical transformation, but it will require a great deal of vital experience to understand it.

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Coup D'etat in the Panopticon: Social Networking in Education

Diana O. Koroleva and Ashley Simpson

> *Whenever one is dealing with a multiplicity of individuals on whom a task or a particular form of behaviour must be imposed, the Panoptic schema may be used.*
>
> 'Surveiller et punir', Michel Foucault, 1975
>
> *'I do not know how I should communicate with students online, when they write me a private message and call me by my first name. Should I play by their rules on this space? Or, do I need to use the constructs from school?'*
>
> Geography teacher, public school, 2014

Abstract Contemporary compulsory schooling emerged in the nineteenth century for the needs of an industrial age. Compulsory schooling has always relied on the Panoptic schema described by Michel Foucault. In recent decades, the development of surveillance technologies has made Panoptic schemas in schools even stronger. Information technology and the transition to an information society has significantly undermined schools' power structures. Teachers no longer possess a monopoly on knowledge. Students have learned to escape the teachers' gaze and can lead virtual lives through their own smartphones inside and outside formal educational settings. One form of modern peer-to-peer interaction takes place on social networking websites that give users the option to be 'hidden', 'passive' or 'inactive' if they wish. To examine the influence of social networking on education we rely on the Foucault's Panopticon theory. Whilst the traditional Panoptic regime may be crumbling, the social network phenomenon can transform modern learning environments for productive educational engagement. Foucault's framework does not take into account the social networks phenomenon. Therefore, empirical evidence is required to articulate the nuances of the modern-day Panopticon. In this chapter we use interviews with teachers to illustrate the reflection of Panoptic logics

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and practices onto the social networks in classrooms. We explore the possibility for developing dialogically based and student-led pedagogies through social networking websites.

Introduction

The concept of the Panopticon was developed by Jeremy Bentham (see Bentham and Bowring 1843). The principal notions of the Panopticon are viewed as an (in) visible surveillance system with an absolute, totalitarian, authority over its subjects. This, however, is not merely physical control as the Panopticon embodies the thought of the 'modernity' project (Graham and Wood 2003). The Panopticon reflects the *tour de force* of the modernity project, the *dispositif* of the Panopticon (see, Bigo and Tsoukala 2008; and Foucault 1977), and an apparatus designed to manipulate and coerce the subjectivity of the self through forces of [in]security. The Panopticon is "a body that reflects some fabricated God" (Miller and Miller 1987, p. 5). This critique of Bentham is a venomous attack on the metaphysical understanding of the 'being' of the self, and how the self 'comes-into-being', as this particular metaphysical 'being' is understood through the externality to, and in relation with, the external Other (God/Judeo-Christian dogma) (1987).

Expanding on Bentham, Foucault (1977) articulates the displacement and disunity of the Panopticon. The Panopticon is not a single unit or being (1977). The Panopticon is made up of multiple *dispositifs* which constitute the architecture of the Panopticon (1977). Foucault articulates the genealogical regime of Panoptic control through bio-power (Foucault et al. 2007), as a regime of control through a multiplicity of forces upon differing and disunified bodies.

Foucault reminds us that the governmentality of control is not a new phenomenon (1977). His work is important when analysing the performative role of education in respect to 'new', 'disruptive', pedagogies within the classroom (see Hedberg 2011). Social media-based pedagogies are emerging in different areas of education, in social work pedagogies (Hitchcock and Battista 2013), in higher education (Chamberlin and Lehmann 2011; Elavsky et al. 2011) and, in secondary education (Richardson 2010).

The Panoptic field does not remain static (Foucault 1977). There are 'new spaces' and 'emerging fields' in education that require deconstructive approaches to uncover deeper meanings, logics and forces (Hedberg 2011). Amidst shifting educational and technological forces the symbiosis of technology and education is becoming more and more intertwined (Madden et al. 2013). Modern students are saturated by technology (whether this is smart phones, computers, laptops) daily and through a number of ways (2013).

Social media and social networking sites have become a performative platform for students to interact and communicate. According to statistics on social

networks, 90% of US teenagers Perrin (2015), 63% of European students from 9- to 16-year olds[1] and 91% of Russian adolescents[2] use social networking sites. Social networks are full of rules which are produced and reproduced by users, which, in turn, provides a problem for users: the ability of 'joining' groups and sub-communities which facilitates the formation of identity (Erikson 1996), whilst, simultaneously, these processes enable users to 'stay in the shadows' whilst overseeing the activity of others. The relationality of the Panoptic scheme in educational processes and social networks takes an ambivalent role as they could be used contemporaneously to extend and to disturb the status quo. For example, social networks have all the properties of surveillance: an appearance of visibility when the user visits the page (who are his/her friends, what are his/her interests) which could be used for control over the user. In contrast, a consequence of social networking sites is the potentiality of new 'spaces' of dialogue and communication emerging that challenge archaic power structures.

Here it is important to note the discursive and symbolic functions of power and how regimes of power are discursively engendered (Foucault 1971). Building on Mikhail Bakhtin's work on dialogism (1975, 1981) one must pay attention to the social function of language in engendering social structures, meanings (individual and collective) and identities (of the self and others). The utterances contained within language symbolically and discursively index individual, group and socio-cultural identities (Blommaert 2007). As a result, Michael Halliday's functional linguistics (1973, 1993, 1994) offers a framework in understanding the communicative and dialogical edifice of language.

It is within these emerging and developing 'spaces' where new forms of teacher–student relationships and new pedagogies can open new logics and possibilities in education (Wegerif 2006). As a Pedagogy for Liberation Freire and Macedo (1987) articulate a dialogical method for the creation and recreation of resistance contrary to dominant hierarchical structures of power. Importantly, Freire notes the pedagogical importance of teachers in providing a 'liberating' education that would ultimately lead to the 'conscientisation' of students and educators—resulting in societal change (Freire 1970). Shor articulates that the dialogical method is not a method in the traditional sense, but a collaborative learning process, whereby, through language, the student is the radical agent of change, and the teacher is "simultaneously a classroom researcher, a politician, and an artist" (Shor 1987, p. 11). Dialogical pedagogies have been developed whereby dialogical approaches offer a reflexive, inclusive, and participatory (Alexander 2008; Ball and Freedman 2004) dynamic to teacher–student relationships.

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Context

In this chapter we analyse the Panopticon as a generalised model of functioning and as a way to determine the relations of power in relation to social institutions such as schools (Foucault 1977). We identify the following essential functions of this system: control through the visibility of objects and invisibility of power; the vertical and horizontal communication limit; separation of the individual from the crowd, and, identification—the construction of relationships, identities, and 'being'. These basic principles of a Panoptic schema will be used to redescribe the organisation of power within educational processes in schools and on social networking sites. As Internet-based social networks were formed much later than Foucault's philosophy, empirical evidence is required to problematise the uses of social networks in contemporary educational settings. For illustrating the applicability of the selected framework we will use interviews with educators. For this reason 30 semi-structured interviews with middle and high school teachers were chosen as the main instrument. The purpose of the research is to analyse how teachers perceive modern technology in education, in what cases they use in practice, what limitations they see and what their personal attitude to the intervention of modern technologies in the teaching process. In the study we interviewed educators from Russia, USA and the European Union (Italy, Spain and Greece). The sample is not representative of the specific schooling dynamics within these countries; rather, the findings serve as a basis for understanding teaching attitudes towards modern technologies in educational processes. The respondents are mostly teaching in public schools (24 respondents) and a few respondents work in private schools (6 respondents). There is a large variation in the age of the respondents. The average age of the respondents is 35 years. The interviews were conducted by one researcher throughout the year 2014–2015. The questionnaire included 30 questions about teacher attitudes towards the uses of modern technology in education and included questions on applying social networks to educational practices, communication with students and organising school projects on/through the Internet. The questionnaire helped to complement the interviews. The questionnaire aided us in identifying certain criteria such as; which teachers had experience with students in the social networks (commonly through the Facebook platform) and which teachers were strongly opposed to social networking websites. The questionnaire was useful in determining the diagnosticity of teacher attitudes/beliefs as it allowed us to identify potential limits and barriers and how teachers generally understand social networking websites.

Visibility and Invisibility

I told my students: "once you graduate we'll be friends" 'Cos: this is my personal website, and my job with you except my personal life and most students understand that. 'Cos I tell them "would you like me know what you're doing at home? - No, not at all "So, we're

gonna keep that life separate." (Special education teacher at a public school in New York, USA, 2015)

I do not want my students to see pictures of my daily life – of my family and me out of school, I want to be invisible to them. (Russian language teacher at a public school Krasnoyarsk, Russia, 2014).

Students have their mobiles and many, many unpleasant things happen because they can record teachers, I mean, some unpleasant things during the class could be recorded, and then posted on Facebook. (Foreign languages teacher at a public school in Athens, Greece, 2015).

From the interviews one of the key topics with students on Internet-based issues is an unwillingness to be under the spotlight. Whereas, in our study, educators problematise the separation of public and professional life. Teachers noted the force of the Panoptic regime as operations within the classroom usually remain closed to inquisitive eyes. Educators are seemingly afraid to be seen by students on 'new' or 'uncontrolled territories' thus finding themselves in the role of a prisoner. The Panoptic system is built so that the guard himself always remains invisible from the prisoner: "Visibility is a trap" (Foucault 2008, p. 5).

But is it always a teacher having supervisor role and never the other way around?

Today, surveillance in schools has grown exponentially. Schools have installed metal detectors at the entrance, smoke detectors, alarm systems, security cameras and in some instances armed guards. It is usually forbidden to gain access to a school without an appointment. Students wear uniforms, have a student ID cards or some form of an electronic card. Teachers also use electronic badges. Parents have online access to assessment results, timetables and have access to information about student attendance. Thus, students are under permanent control. Invisible to the student, their guardian, whether a teacher, a security guard, a parent or the police, is watching their every movement. In every modern school, year by year, security measures have intensified (see Cheurprakobkit and Bartsch 2005; Gabbard and Ross 2008; Hylton and Hylton 1996). Schools use a variety of practices and procedures intended to promote safety. 'Safety' is explained by the importance of preserving the health and life of students and staff and includes parents, teachers and the wider society. Though there are some fundamental questions here: Safety for whom? Safety for/against what? Who requires securing against the other? We argue, similar to Leonardo and Porter (2010) who discuss discourses of 'safety' amidst discourses on race, that the logics of 'safety' encourage discourses of 'risk' to subjugate particular subjects—for example, school students.

Simultaneously, teachers' activities are also controlled by the hierarchical power of a head teacher, senior leadership teams, parents and school administration staff. If a conflict situation arises between a student and a teacher, and if CCTV is operating the video captures and documents the incident. In this sense, the presence of surveillance is visible as the camera[s] loom over the subjects. Moreover, the teacher's day is filled with electronic forms of assessment, and their daily duties include submitting reports and monitoring of the students. Thus, in the school system we have an omnipotent power/knowledge praxis, in this sense we

(re)encounter Miller and Miller's (1987) Panoptic 'God', who is simultaneously everywhere and nowhere.

Arguably, social networks provide the same glass affect: whereby a particular translucent image of a self is visible to all. Though, we argue, the translucent image does not contain or reveal all of the subjectivities of the self. Nonetheless, published information is available on social network user pages. This information contains data on age and gender, biographical information, photos and other media, contacts, the last moment of log in, and places in which the user checked in. Social platforms have privacy settings: any user can to block (restrict) access to his/her page, choose for whom the post will be available to and have the ability to hide certain information from other public users. Students can choose what to demonstrate to the 'public' or a specific person. The individual user has a 'private' space, has the ability to hide, but what is more important, the user also has the ability to 'lurk' in the background.

The site of the social network includes teachers and is not merely confined to student activity. Liu (2007) argues that social networking site profiles contain socio-economic and aesthetical influences from society in the construction of the 'online self'. Thus, we argue teachers (like any other type of user), who use social networking sites, construct their 'online self' in relation to and through a dialogue with the social strata (see Harrison and Thomas 2009, on the role of language learning and identity formation). Therefore, user-generated content follows certain rules and regulations existing through the activities of other users. The amount of information a user wishes to publicise, the types of information and the specific preferences are all mediated through this 'networked site'. 'The networked self' within the 'networked site' has a performative function on group identity, collective self-esteem and behavioural characteristics (Barker 2009). The effects of online identity construction are complex and difficult to determine. It is important to note the heightened scholarly interest in narcissism and social networking activity (see, Buffardi and Campbell 2008; Papacharissi 2010) whereby egotist self-promotion and self-vanity trace the multiple identities of the self. In this regard, the question of identity subordination is raised: If teachers choose to use a social networking site to engage with students with regard to teaching content, learning materials and the like, the teacher–student relationship may grow wider due to [in]securities within the self. This may be due to 'the fear of the unknown', an unwillingness to change pedagogical styles or an unwillingness to accentuate and re-accentuate dialogical (Freire 2000) types of communication between teachers and students.

The teacher–student relationship has *guards and prisoners in both directions*— everyone watches over everyone else. Technically and logistically it is possible to set privacy settings (the admission of other users to your page) to monitor and control who has access to a teacher's personal site. A naïve response to this point would be that it is at the user's discretion what information they wish to share or not with public users. Though, the fact is this space (social networking sites) is mediated internally (such as the social construction of identity within social networks) and externally (through the use of marketing, advertisements, and data generated to the specific interests of the user). Social networking sites ultimately

blur the distinction of private versus public information, as well as, private and public relationships. These distinctions are rendered obsolete. The Panoptic scheme in this territory does not work within nor through binary forms of opposition.

What happens if one fine day the prisoner leaning against the glass wall sees the Panoptic scene in its purest form? This generates unknown fears already in someone who until this moment has always been in the tower.

Identification

> I did some project with my students on the Facebook. I can't say that it was very successful project. 'Cos some of them participated, some didn't. And I didn't give them marks for this 'cos it wasn't possible to understand what was their personal involvement. (Science teacher at a private school in Rome, Italy, 2015).

> Not all of my students have added me as a friend, I could not find all of my students in the social network Vkontakte. Either they are registered on some other site, or they are under an assumed name. (High school teacher at a public school in Moscow, Russia. 2014).

The analysis of the interviews we conducted shows that the issue of identification is important for teachers when using new spaces of communication. Teachers say they do not know who are they dealing with in cyberspace: Who is behind an invented name or avatar? How can they identify a student? Is it an individual piece of work or group work? "The crowd, a compact mass, a locus of multiple exchanges, individualities merging together, a collective effect, is abolished and replaced by a collection of separated individualities" (Foucault 2008, p. 6). Due to the fixed allocation scheme of many 'solo performances', the guard can always identify the prisoner.

Tasks of isolation and segregation for unambiguous identification can be described through the militarisation of the classroom (Hirschfield 2008; Pane and Rocco 2014). The forces of militarisation within schools include physical measures (for example; removing students from schools, disciplinarian approaches to isolating and segregating students, monitoring or removing underperforming students or disruptive students) instrumental measures (reports, assessments) and behavioural/relational ways such as the way[s] a teacher speaks to and interacts with a student. All of these factors can result in students feeling isolated or segregated from their peers. The (usual) single-cell classroom layout with desks facing the front of the room is how most students come-into-being with their relational superiors (teachers). Most classrooms have this archaic and hierarchical structure of intimidation. In some schools it is a common practice when at the beginning of the lesson a conducted roll call characterises the start of the lesson whereby individual students raise their hand to identify themselves. There are also a number of bureaucratic measures to create generalisations and assumptions about students, which include class monitor reports about individual attendance and attainment. The school administration has a personal file on every pupil including information about his/her behaviour, grade estimates, family, and progress. School assessment

procedures are conducted under special arrangements to prevent cheating and to help students achieve 'objective' examination results. In all school procedures the student is separated from the class and responds one-on-one with the system. Information about the objects is obtained usually through standardised examinations (see, Kohn 2000; Ricci 2004 for the academic cases against standardised testing).

We argue, such controlling measures foster a pedagogy of fear and violence (Giroux 1996, 2008; Leonardo and Porter 2010) prohibiting 'youth voice[s]' within the classroom as this 'system' constrains and curtails students in a number of ways (physically, psychologically, bureaucratically and through the forms of assessment standardisation). We identify pedagogies of fear as a Panoptic system of control within schools.

Social networks not only enable one to design one's 'own' profile whereby the user can decide what information the page will contain, but also gives an opportunity of user identity 'spoofing' and the creation of alter ego[s]. If a student wants to hide under a false name they are permitted to do so and they can do this without falling out of communication with classmates and friends. Parents or teachers may also choose to register under an alter ego to differentiate their 'online self' amidst the many Other's-within-the-self (Bakhtin 1981).

Thus, the full identification of the self within the social network is not available nor it is required for each contact. Mutual trust is required by all participants. Problems may arise from breaches of this trust, such as; it is difficult for a teacher to assess an individual student's work, since [s]he does not know who produced a particular piece of work. If the student's identity is 'known' group assessments and collaborative projects can be assessed through social networking sites. Social networks and teacher pedagogies can be combined as a universal platform for ascertaining meta-subject competencies and the implementation of student knowledge. We suggest that on this new territory of social networks the supervisor function itself is being questioned. The guard sees only shadows and can only guess who they really are.

Communication

> I have to get in touch with students unnecessarily. I'm afraid to see them discuss some of the teachers, or even myself. I do not know how to react on it. I don't know whether to intervene or remain a mute witness, my attitude towards them will change when I move into the school life. (Literature teacher at a public school in Krasnoyarsk, Russia. 2014).

> I do not know how I should communicate with students online, when they write me a private message and call me by my first name.[3] Should I play by their rules on this space?

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[3]Every Russian has three names: a first name, a patronymic (the father's first name), and a surname. The common respectful treatment to the teacher is by name and patronymic.

Or, do I need to use the constructs from school? (Geography teacher at a public school in Moscow, Russia, 2014).

Among issues relating to communication in social networks, with the reliance on interviews we can highlight several categories:

- Use of unknown/unclear terms for teachers, such as emoticons, 'likes' and different tones of the conversation (more informal). Teachers say they do not know how to react to this 'language' which is used in the social network;
- A willingness to communicate outside the classroom. This saves time and constructs distance between teachers and students;
- The fear of saying something 'wrong'. The fear of being misunderstood and recorded in the space of the social network.

The Panopticon functions through discursive and symbolic apparatuses. For example, as children enter the classroom they are positioned in a class of single or double desks designed to isolate them from each other. This is another example of the comprehensive Panoptic schemas within schools. Within the Panopticon, the prisoner is the subject of communication. In many ways, we see this reflection in school practices: it is impossible and impracticable to say that a teacher cannot communicate with students. But what are the forms and types of communication?

Michael Halliday's functional linguistics (1973, 1993, 1994) offers a sociolinguistic model to offer a site of analysis. Halliday's functional linguistics focuses on the relationship between the linguistic structure and the social structure. Here, through the metafunctions of language, linguistic meaning is expressed in relation to social context and differing environments (1973). Halliday argues within the context is where the text comes alive, it is within the context—in our analysis, within schools and within social network sites, it is these locations where the student "takes over the code" (Angermüller et al. 2014, p. 268). As the students begin to code (linguistically) for themselves this socialisation process is how students begin to encounter, understand and interpret meanings. We argue, it is in the site of the school and, now, the site of the social network where these processes of socialisation come-into-being.

Here, it is important to note the symbolic and discursive function of power (Foucault 1971). As Norman Fairclough (2001, 2013) demonstrates, power exists and acts through grammatical and linguistic structures. Forces of power are located within language and are performed through communicative acts (Fairclough 2013). Therefore, relationships such as student and teacher relations are constituted by and through the power/knowledge praxis (2013).

Language and power play an important role in constituting relationships (Foucault 1971) Here the power/knowledge praxis (Foucault 1980) can be a useful tool in illustrating Panoptic forces within schools. For example, 'data' that is produced from these relations can act as a force of control over students. With regard to mental and physical health in many Russian schools, for example, it is mandatory for students to take a drugs test. The school system constantly monitors

and receives information about the subjects of exposure. The information about the system (the 'objective data') reinforces and reproduces the systems of control.

Social networks have their own language-based 'rules'. It is impossible to bring the 'rules' from school into the social network. But it depends on how one views these complexities. We argue that social networked-based pedagogies can restructure the relationship between students and teachers, and have an impact upon student socialisation in building new relationships inside and outside the classroom. Arguably then, the prisoner not only sees the warden, but communicates with the warden in their own language.

Coup D'etat: Resisting the Panopticon

Perhaps the key to the coup and regime change in the Panopticon is precisely communication in social networks. Firstly, there is a significant change in the student–teacher social role. Teachers lose their socio-historical iconography of being 'enforcers' of education rather than facilitating learning in a dialogical environment. In social networks teachers can be seen as one of the users. Social networks can transform relationships through offering different platforms for communication. For example, many scholars have noted the role social networks play in political regime change (Attia et al. 2011), engaging young adults in politics (Baumgartner and Morris 2009) and how social networking sites can have an impact in changing political attitudes and behaviour (Zhang et al. 2010). Moreover, social networking sites develop horizontal connections between the agents of change—teachers and students. In comparison with the school lesson it is impossible to control any of the agents at one specific moment. Social network users produce a flow of events and messages which can pedagogically open up educational practices to new methods and styles whereby one can move beyond the standard schema of 'questions and answers'. Another feature of such horizontal communication among teachers and students is a mixture of all of their interests and levels of communication. In the 'physical' school space students can switch between peer-to-peer communication and student–teacher communication enabling possible debates and discussions of different levels, rather, than having segregated language 'in the peer-to-peer network' and language 'to speak to teachers'. Social network pedagogies can facilitate ways to break historically institutionalised boundaries between students and teachers.

Social network-based pedagogies can enable the possibility to create new and temporary identities. These possibilities can be liberating, as one can feel like one has a greater expression of how the identities within the self are represented. One example is dogmatic stereotypes about young people whereby users have the ability to reconstruct these meanings, identifications and representations. Such forces will extend beyond the realms of the 'virtual' spaces and into other social spaces. Moreover, social network-based pedagogies enable the fluid transition from one social space to another. For teachers, social network-based pedagogies can be used

to make a transaction from formal to informal learning. In addition, students can use this fluidity to rupture new possibilities, as users can organise and acquire stronger collective voices through dialogical interactions and communication. There might, however, be a number of practical difficulties in implementing dialogic social network pedagogies. For example, it may be unclear how to assess student work within the network. Further critical scholarly work will be required to understand the role of social networking pedagogies in compulsory education.

Conclusion

In articulating the results from our data collection we built our interpretation based upon the premise of three areas of analysis: visibility and invisibility, identification, and communication. The theoretical and linguistic approaches we have discussed enable one to locate historical trends of power evolution. Modern learning environments, such as those connected to social networks, are ambivalent. They both contain a danger of increased surveillance and diminished freedom, and yet also offer a possibility of transforming the Panoptic schema into a dialogic social network pedagogy.

We cannot foresee dialogic social network pedagogies through the current Panoptic structures in schools. Panoptic structures in compulsory education (logical structures, pedagogical practices, schooling structures, and practices) are too oppressive to reform, so the only solution we see is a coup d'état from within the Panopticon. Educators must learn to convert the student resistance to the Panoptic schemas into educationally worthwhile experiences. To put it simply, social networks are still a space largely unmediated by Panoptic logics. To free students from institutional subjugation alternative pedagogies must be sought. We argue that social networking pedagogies can offer an alternative space to construct new teaching methods and learning relationships. Thus, the spaces of modern learning environments must be co-designed and co-constructed through teacher–student collaboration.

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Transferring Pedagogical Spaces: Schoolyards as Learning Environments in the Perspective of Students and Teachers

Ulrike Stadler-Altmann and Peter Hilger

Abstract At school, inside and outside spaces, defining an educational milieu, are important for teaching and learning, for students' and teachers' well-being and motivation in class. These are all important factors for successful teaching and learning. Even outdoor space and schoolyards may have such an influence. It is necessary to involve students and their views of educational space in any school spatial design and planning process. We examine students' views on schoolyards and outdoor areas. Approximately 8.000 students completed questionnaires between 2005 and 2011 regarding their satisfaction with, and their understanding of the importance of their schoolyards. The students also described their activities there. We found that students prefer schoolyards with differentiated zones of action and silence, correlating with spaces defined as public and private. These results differ between primary and secondary school students and further between girls and boys. We also surveyed approximately 360 teachers with a questionnaire concerning size, equipment and design of schoolyards. Although we could not match the data of the two surveys, we could find related and interesting convergences. In considering that schoolyards and outdoor areas around schools are important educational and recreational spaces for students and teachers, the aim of this chapter is to highlight transforming processes in the use of schoolyards. Based on the perspectives of students and teachers, we aim to show key notions for the educational design and use of schoolyards as a possibility for school development, and for further research in this field.

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Introduction

In Germany, most children aged two to five spend five hours a day or more in kindergarten or preschool (see Destatis 2016). At the age of six, children start attending primary school, and at the age of ten or eleven they attend secondary school. Many of them attend after-school programmes (Malecki 2016), usually located in the schools or in buildings within school grounds. In German preschools, children typically play outside for at least one hour a day in all types of weather. In primary and secondary schools, children's outdoor playtime is usually limited to breaks, the longest ones generally lasting about 20 min, and occasional outdoor lessons. Children can, however, play in the schoolyard as part of after-school programmes.

Schoolyards at German secondary school are typically flat areas with small vegetation and sometimes smaller furnished areas with fixed seats and tables. At German primary schools, schoolyards usually contain playground equipment, spaces for ball games and large flat areas with little vegetation (see German School Building Guidelines DIN 18031 & 18034). These yards are usually fenced. Outdoor areas at preschools, however, are generally enclosed with a fence and have more vegetation; more thought is also given to opportunities for children's play, and informal and formal learning activities.

In general, schoolyards and playgrounds constitute the outdoor environments most familiar to young children, but not for older ones. Hence, it is important to consider carefully what kinds of experiences these environments may offer for school students and why schoolyards in primary and secondary schools are often not used for teaching and learning in general. One way to address this is to find out what students, who are the most frequent users of these environments, have to say about them.

School Building–Schoolyard–School Surrounding

The term "schoolyard" generally describes all areas, which are used by students or by school staff in their free time or for lectures. Mostly, these flat areas are nearby the school building, fenced and not open for the community. The size of a schoolyard depends on the school type and the school location. In primary schools, we often find bigger schoolyards than in secondary schools. Schools in rural areas usually have more space for their schoolyards, while schools in towns often have very small schoolyards. These spatial situations depend on the German tradition of school building policy. Most German schools were planned and built in the nineteenth century (see Buddensiek 2008; Tanner and Lackney 2006) based on the conviction that schoolyards have to be conducive for teachers' control of students' discipline, health and safety (see Becker et al. 1997). The governmental guidelines for school architecture are still based on these traditions (see Rittelmeyer 2010).

As Tanner and Lackney (2006) have shown in their *History of Education Architecture,* there was and still is a relevant discussion and critique of school building, classroom design and design of schoolyards. The progressive movement of the late nineteenth century has had a strong influence on school architecture, with new forms of school buildings being designed. These schools are often private schools, such as the Laboratory School of John Dewey, the Waldorf School of Rudolf Steiner, the Jenaplan School of Peter Petersen and the schools in the tradition of Maria Montessori. One can also find some influences of the progressive movement in public schools (see Tanner and Lackney 2006). But in general, traditional school buildings and traditional schoolyards—in the sense that these schoolyards are flat, without equipment for learning or playing, fenced and with only small vegetation—prevails. Most of these playgrounds were planned as spaces for breaks between lessons (for more details, see Buddensiek 2008; Montag Stiftung 2011).

Current Situation

Innovations in housing density have led to a reduction of open space for activities for children and adolescents within and around residential areas. They spend much of their time in school, in class or in after-school programmes. Physical inactivity and an inactive lifestyle are common risk factors for health, even during childhood (see Möhrle et al. 2015). Against the background of health problems, lack of social competencies, increasingly aggressive behaviour and weakness in motor and co-ordination skills of children, the quality of schoolyards is becoming important. The planning and designing of schoolyards becomes fundamental in order to connect pedagogical processes indoors with pedagogical possibilities outdoors. These transferring processes are in most cases deficient. Neither school administrators, nor planning architects, nor teachers are aware of the importance of schoolyards for students' everyday school life, for social learning and recreation. Schoolyards should become places for learning and teaching, and for social and informal learning.

Pedagogical Relevance of School Building and Schoolyard

School buildings and schoolyards are physical environments used in daily routines. They also fulfil basic needs. Steele (1973) mentioned that the physical environment can influence the way teachers and students feel, think and behave. Following his considerations, Weinstein (2007) and Weinstein and Romano Mignano (2011) argue that five of Steele's functions are especially important for teaching and learning:

- *Security and shelter*: These are the most fundamental functions of all built environments. Physical security is a precondition that must be satisfied, at least to some extent, before the environment can serve students' and teachers' further, higher-level needs. Additionally, psychological security is also an important precondition; that is, the feeling that a school and its schoolyard are safe and comfortable places to be.
- *Pleasure*: Equally important is the fact that teachers and students find their school buildings, schoolyards and classrooms attractive and pleasing. Some educational studies demonstrate that an aesthetically pleasing environment can influence behaviour (see Barrett et al. 2015).
- *Symbolic identification*: This is the so-called personality or character of school buildings, schoolyards and classrooms, when they are used and equipped for daily routine by teachers and students.
- *Task instrumentality*: This function describes the ways in which the environment helps to carry out the tasks teachers want to accomplish.
- *Social contact*: The design of schoolyards can support or retain social interaction, if the schoolyard has zones defined for action and rest, e.g. a playground, an outdoor lounge or a school garden.

Based on these basic needs, schoolyards may be designed with pedagogical and curriculum aspects in mind. Schools and schoolyards also have to fulfil pragmatic and technical requirements, however, and nowadays, financial and spatial limitations dominate school building and schoolyard design. These different perspectives have to be balanced when inside and outside school spaces are to be changed for pedagogical purposes.

Schoolyard and School Surroundings: Views of Students and Teachers

The importance of school buildings, classrooms, schoolyards and school surroundings for teachers' and students' practices has been ignored for many years (see Martin 2002). Most teachers do not think about their school and schoolyard as an environment built for teaching and learning, focussing rather on the restrictions of their school building and their schoolyard (see Walden 2009; Weinstein 2007; Weinstein and Romano Mignano 2011), while students often focus on the poor physical conditions in their schools and their schoolyards. Students and teachers are able to describe the school buildings and schoolyards they desire, however, when asked—for example in the studies of Woolner et al. (2007, 2011, 2012, 2013). Norðdahl and Einarsdóttir (2014) too provide a detailed overview of educational research on children's views and preferences regarding outdoor environments for northern European countries. The realisation that better conditions for teaching and learning in schools and classrooms is significant leads to a focus on the constructed

environment and its possibilities to support teaching and learning. Hence, the perspectives of teachers and students are seen and included in our study.

Schoolyard Survey

Beginning with pilot testing in the school year of 2007/2008, participating students and teachers were surveyed annually. The two surveys were developed from students at university in different courses and with advice from different lecturers. The sample comprises results from 8100 students from the first to the tenth grade, aged six to eighteen years. The sample consists of 3952 girls and 4203 boys (91 missing), so 48.5% of the participating students are female. Furthermore, 368 teachers were polled of which 75.6% were primary school teachers and 21.9% secondary teachers (273 primary school teachers, 79 secondary school teachers, 9 missing). The dataset was evaluated by using the program SPSS.

Students were asked to name break activities and features they would like to have on their schoolyards. We used open and polar questions. Response categories were determined by pre-examinations. The teachers' questionnaire included information about their schools, size of schoolyard and, if existing, of school garden, fixed gymnastic equipment, fixed play equipment, as well as playground characteristics such as materials specifications and special facilities in the schoolyard (Table 1).

Table 1 Semantic differential—item examples (students)

In your Schoolyard: What are you doing there?						
Walking around alone	⬅ like		☺	☺	☹	don't like ➡
Playing together	⬅ like		☺	☺	☹	don't like ➡
Doing homework	⬅ like		☺	☺	☹	don't like ➡
What do you like to have in your schoolyard?						
Benches, chairs, stool …	⬅ necessary	☺	☺	☹	dispensable ➡	
Goals	⬅ necessary	☺	☺	☹	dispensable ➡	
Board games	⬅ necessary	☺	☺	☹	dispensable ➡	
What do you wish to have in your schoolyard?						
Kiosk	⬅ necessary	☺	☺	☹	dispensable ➡	
Artificial pond	⬅ necessary	☺	☺	☹	dispensable ➡	
Playground	⬅ necessary	☺	☺	☹	dispensable ➡	

Findings

I. Students' views

The mean value of 2.1 (on a scale from one—very good, to four—very bad) showed that students were *satisfied* with their schoolyards in general. Aspects of *design and arrangement* were regarded even more positively (1.62). Usage *beyond teaching time* in the afternoon was, for example, interesting (mean 1.26) but not specified. Overall, no considerable gender-specific differences were identified, with boys' and girls' decisions being virtually identical.

There were age-specific differences, which are portrayed by the youngest (6-year-olds) and the oldest (18-year-olds). Older students were generally less satisfied with their *schoolyard design* and its *arrangements*. Nevertheless, these comparisons of the results—especially between 6 year-olds and 18-year-olds—were not significant, because of the small number of participants (see Table 2) in these groups. We choose these results to highlight the extremes of students' rating.

What are students doing in their schoolyards? We asked for different activity categories: solitary activities (*to be on my own*), *calm play,* and *action* (intense physical activities). In general, students rated in similar ways between categories. Active break behaviour, however, attracted more attention. We found slight gender-specific differences. Generally, girls preferred *calm play*, whereas boys rather liked activities that included intense physical effort such as football (soccer). Older students typically prefer solitary activities (*to be on my own)* and *calm play*. Nevertheless, comparisons of the results—especially between 6 year-old and

Table 2 Students general judgement		Mean	N
	Satisfaction	2.10	8129
	Boys	2.10	4183
	Girls	2.10	3937
	6 years	1.92	12
	18 years	3.00	4
	Design/arrangement	1.62	8117
	Boys	1.63	4181
	Girls	1.62	3927
	6 years	1.64	11
	18 years	1.75	4
	Use beyond teaching time	1.26	7935
	Boys	1.25	4083
	Girls	1.27	3840
	6 years	1.08	12
	18 years	1.00	4

18 year-old students—are not significant, because of the small number of participants (see Table 3) in these groups. We choose these results to highlight the extremes of students' rating.

We separated into two areas the category, *what would you like to have in your schoolyard?*: *Resting* (seating accommodation) and *Action* (for example, the wish for a football/soccer field or a basket for basketball). In this category, one can observe certain trends as well (see Table 4). There were small gender-specific differences; for example, girls rather preferred aspects of *Resting* areas; especially older female students favoured rest areas rather than *Action* areas. Due to a small sample size of 18-year-olds, we included 15-year-olds. Boys especially favoured *Action*, but with rising age this preference was noted to decrease.

The last part of the questionnaire referred to what students wanted or desired. The results of our survey place a playground and a kiosk (a small shop where students can buy snacks or drinks during the breaks) on the top of the student 'wish list'. As before, the *Wish List* category only revealed small gender-specific differences; age-specific differences, however, were again recognisable. Nevertheless, these comparisons of the results—especially between 6-year-old and 18-year-old students—were not significant, because of the small number of participants (see Table 5) in these groups. We choose these results to highlight the extremes of students' rating.

Table 3 In your schoolyard: What are you doing there?

	Mean	N
To be on my own	2.26	7868
Boys	2.26	3816
Girls	2.25	4036
6 year	2.58	12
18 year	1.75	4
Calm play	2.09	7704
Boys	2.14	3943
Girls	2.03	3746
6 year	2.36	12
18 year	2.25	4
Action	2.05	6244
Boys	2.02	3212
Girls	2.08	3019
6 year	2.07	10
18 year	2.67	3
Doing homework	2.45	7637
Boys	2.42	3926
Girls	2.47	3697
6 year	2.82	11
18 year	2.00	4

Table 4 What do you like to have in your schoolyard?

	Mean	N
Resting	1.81	7759
Boys	1.86	3960
Girls	1.76	3785
6 year	1.86	12
15 year	1.88	208
18 year	1.67	4
Action	1.79	6873
Boys	1.74	3497
Girls	1.84	3362
6 year	1.96	12
15 year	2.29	174
18 year	2.30	2

Table 5 Students' wish list

	Kiosk		Fireplace/ Barbecue place		School garden		School pond		Playground	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
All	1.40	7559	1.75	7655	1.66	7882	1.54	7931	1.37	7756
Boys	1.38	3914	1.68	3944	1.82	4039	1.60	4064	1.40	3971
Girls	1.43	3672	1.83	3699	1.49	3831	1.48	3854	1.33	3378
6 year	1.64	11	1.64	11	1.75	12	2.00	12	1.67	12
18 year	1.00	4	2.00	4	2.00	4	1.58	4	1.00	3

II. Teachers' views

The results of the teachers' survey focussed on the aspects of the size of a schoolyard, gymnastic equipment, fixed play equipment, special facilities and lendable games and toys. In contrast to the students' survey, a high average value represents consent. Furthermore, we distinguished between qualitative and quantitative aspects. The size of the schoolyard as such is commonly referred to as not sufficient. In contrast to the size, the conditions in the subcategories receive a more positive rating.

By looking at the results of primary school teachers, we noted the following differences: In primary schools, the size of the schoolyards receives somewhat adverse ratings. Special equipment as well as gymnastic devices fare better than the schoolyard size. In general, teachers rate the equipment of primary schools significantly more positively. Hence, a bigger schoolyard produces better ratings. A school garden, as such, also leads to more positive results (3.24) and a big school garden even more so (3.55). The question is: Are primary schools better equipped?

III. Combination of Students' and Teachers' Views

By combining the survey results of both students and teachers, we determined that the overall satisfaction with schoolyards and school surroundings as well as their arrangements from a student perspective and a teacher perspective is similar and positively rated throughout. The average values have different orientations, however: smaller values indicated consent in the students' survey, while higher values indicated consent in the teachers' survey.

IV Discussion

This study was conducted in a middle-sized town in Germany, and the data are gathered from two independent questionnaires completed by students and teachers over more than five years. The findings indicate that in general students and teachers are satisfied with their schoolyards in general and satisfied with the design of their schoolyards. Nevertheless, the interesting question is why they are satisfied with their schoolyards. Taking into consideration that the schoolyards of the students we asked are typically not well designed, the result is surprising. One explanation could be that students and teachers are not aware of the possibilities of a well-designed schoolyard, or even had any idea of how a well-designed schoolyard for teaching and learning might look. As others mentioned, the role of schoolyards is neglected or forgotten. Nevertheless, there are many ideas to use schoolyards as successful teaching spaces, e.g. for science and mathematics lessons in primary schools (Cronin-Jones 2000), or as spaces for sustainable education and development in schools (Rentsch et al. 2013). Another factor might be that schoolyards have no importance for daily life at school. As Derecik (2015) mentioned, schoolyards fulfil many preconditions for informal and formal learning opportunities, though teachers have to be trained to use them.

The younger students who participated enjoyed being outside and having activities located there, which is consistent with previous research (Norðdahl and Einarsdóttir 2014), indicating that young children in different countries share this attitude. Differences between the younger and the older students concern activities in the schoolyard during lesson breaks: younger students prefer physical activities and active play; older students prefer low-key activities and calm conversation. This is consistent with research in pedagogical psychology about the development of activities during childhood and youth.

Additionally, the students in this study were inventive and came up with detailed wishes and different ideas of play equipment that they thought could encourage and give opportunities for interaction, e.g. a fireplace and a school pond. We suppose that on the one hand these ideas are an indicator that students identify themselves with school and like to enhance their surroundings. On the other hand, these ideas could be taken to make schoolyard more familiar.

The findings from teachers were similar. Primary school teachers rated the size and design of their schoolyards positively, in cases where outdoor surroundings were designed to fit the needs of younger students. Both primary and secondary school teachers rated the schoolyard positively, when the yard was big enough and

had a school garden. The importance of school gardens indicates the role of education for sustainable development in schools nowadays.

The findings of this study indicate that diversity in the environment was important for all students and teachers, and thus emphasis should be placed on the natural environment in the design of outdoor surroundings at school, as well as on built elements and the size of schoolyards.

Concepts for Schoolyards and School Surroundings

Schools and schoolyards could be spaces for teaching and learning with typical requirements and responsibilities. Hence, schools and schoolyards are pedagogical spaces with typical effects, often described as a hidden curriculum (Kemnitz 2001). Taking this into consideration, schoolyards have to be planned as learning environments to transfer pedagogical ideas and methods to physical (outdoor) surroundings. In combination with our findings, we refer to some principles for planning and designing schoolyards.

According to the pronouncements of educational researchers (such as Dietrich 2005), as well as the results in our surveys and the wishes of students, we define four principles:

1. Design of schoolyards as part of the pedagogical concept
2. Participation of all school members
3. Constant design process
4. Steps towards schoolyard transformation

Although our findings can serve as initiators of changing schoolyard situations and establishing outdoor learning projects, most changing processes and outdoor learning projects are inspired and implemented by teachers (Broda 2011). These are a starting point for a whole-school development process, and, in this sense, it is important to make a distinction between 'beautification' projects and schoolyard enhancement. Reflecting on our results of the teachers' and students' questionnaires, we see that students aimed at beautification projects (Table 5). In contrast, teachers thought about outdoor teaching and learning opportunities according to size, design, facilities and greening of their schoolyards (Table 6). Hence, the remainder of our chapter focuses on transformation processes, where the designing of schoolyards is equally a process for school development (Table 7).

Design of Schoolyards as Part of the Pedagogical Concept

As we noted in our two surveys, schoolyards should be teaching and learning spaces that support communication and recreation, provide possibilities for physical

Table 6 Teachers' views

	Mean	N
Size of schoolyard	2.27	306
Fixed gymnastic equipment	3.29	281
Fixed play equipment	3.13	326
Special facilities	2.92	326
Lendable games and toys	3.71	311
Overall assessment	2.95	347

Table 7 Findings in combination: students' and teachers' views

	Mean	N
Students' satisfaction	2.10	8129
Boys	2.10	4183
Girls	2.10	3937
Teachers' satisfaction	2.95	347
Primary school	3.04	262
Secondary school	2.59	21
Students' view on design	1.62	8117
Boys	1.63	4181
Girls	1.62	3927
Teachers' view on design	3.17	212
Primary school	3.18	183
Secondary school	2.98	11

activities, and must be a living part of nature and the environment. As spaces for teaching and learning, schoolyards reflect the teaching and learning culture of a school (Cunningham 2010). Approved pedagogical methods such as open learning, phases without work, or project teaching need to be considered in the design of the schoolyard. For children (up to 12 years), the method of sensual and observatory hands-on learning is to be given priority. For adolescents, school grounds are interesting as places of learning and for lectures, but only if as many subjects as possible are taught in open spaces. Hence, schoolyards have to be integrated into everyday school life, e.g. as a place to observe fauna and flora, as an experimental field for sensual experience or as an individual place for quiet activities. As a consequence of different needs during childhood and adolescence, schoolyards have to provide different opportunities, e.g. fixed games and a well-equipped playground in primary schools and a schoolyard with zones for communication, recreation and silence in secondary schools.

Students spend most of their time during the day in school, so schoolyards also have to be a place to meet, communicate and interact. Hence, all the various types of communication such as verbal/nonverbal, observing/not observing, seeing/not to

be seen should be possible. During schoolyard transformation, all communication needs should be respected and developed in a pedagogical way, for example, when younger and older students have the potential to interact in common physical activities supported by the schoolyard's design. In a re-designing process of a schoolyard, zones for different types of communication (zones of retreat, playing, meeting, monitoring or taking a walk, and open spaces) have to be planned with differentiated areas of communication in smaller and larger groups.

Schoolyards are also spaces for recreation, relaxation and private retreat. Students who do not think about school when they are having their break are more receptive and focused during class (Cunningham 2010). Therefore, schoolyards need to have a pleasing quality, small and divided quiet zones, wind and weather protected places, and suitable plants, which promote a sense of well-being, as well as recreation and re-activation of the senses—seeing, feeling and smelling.

In the healthy development of children, schoolyards play an important role. Playground activity, as compensation for a lack of physical activity in classrooms, involves communicating, experiencing skills of the body, as well as experiencing material and social relations. Physical activity also promotes self-regulation (Delidou et al. 2016) and intellectual, motor and psychosocial skills and competencies, which are learned via physical activity (Ericsson 2012). Hence, schoolyards have to provide the opportunity to experience the relation between cause and effect, to provide opportunities for swinging, going down a slide, balancing, rolling, climbing and spinning. Balance, body co-ordination, reaction speed, agility, power and perseverance are important prerequisites for being able to actively avoid accidents, in schools and in everyday life. Looking at our results, we find that, according to the age of the students, the possibilities for physical activities are rated highly (Table 4, *Action*).

Green schoolyards provide the opportunity to come into contact with nature through all senses (Dahlgreen 2000). The change of the seasons can be experienced, ecological correlations are illustrated, and students can do research on living environments. A school garden designed for ecological variety offers natural habitats for flora and fauna in an area of settlement. Students may realise very early the significance of sustainability by the economical use of natural resources, and so global correlations become clear and transparent. Based on these pedagogical and curriculum ideas, the teachers in our survey rated their schoolyard more positively when there was a school garden, irrespective of the use of the school garden.

Participation of All School Members

The planning and designing of schoolyards have to respect all school members' needs, aspects of gender mainstreaming and have to give the possibilities for multi-use with multifunctional equipment. Very different expectations and ideas are seen in our results. Schoolyards should give room for co-operative and social agency. Hence, activities and interaction within the schoolyard may help defining

identity through social thinking and learning and this plays an important role in learning democratic rules. In participatory processes (Woolner 2010), students, teachers and other school staff experience school as a habitat, something where there is room for design and thus as an area to test one's own effect on others. This has implications for planning, e.g. for sustainable utilisation and careful treatment of schoolyards, as places for the development of present and future generations of users.

Even though we found only small differences between female and male students in our study, we know that girls and boys, women and men use public open space in different ways. Analysis of parks in Barcelona and Paris (Oertzen 2002) has shown that design has a significant impact on the activities of girls and young women. In the early stages of designing a schoolyard, it is important to clarify characteristics that are necessary to ensure the satisfaction of the needs of all participants.

A key issue for schoolyards in Germany, as in other European countries, is that they are financed through the public purse. Thus, they are to be made available to the public whenever schools do not use them. In order to ensure this, the legal and financial framework, as well as spatial conditions, must be guaranteed. Multi-use schoolyards open up playgrounds for children living in the neighbourhood and thus contribute to improving the availability of open space. Through co-financing projects, this availability can be expanded and equipment can be of higher quality and multi-use frames schools centres of a community (Canto Moniz and Ferreira 2015). With new developments, this multi-use concept must be considered early. Access from the street and the availability of, for example, toilet facilities need to be into account (Sanoff 1994, 1996).

Schoolyards may be developed as school-based and community-based presentation and exhibition areas. Thereby, they represent the image of a school. The appearance of buildings and outdoor areas communicate the attitudes, the curriculum approach and the openness of a school to the outside world. Schoolyards could attract people from outside, make them curious and increase the identification of students, teachers, educators and custodians. Therefore, pedagogical content is potentially illustrated by schoolyards and schoolyard use, as a visible part of school development and openness.

Constant Design Process

Schoolyards must comprise areas suitable for change and new interpretation by future generations of students and teachers (Stadler-Altmann 2016a, b). The planned elements should leave space for further development. Hence, future users should not be confronted with the results of planning and designing for past activities and thus being relegated as pure consumers of schoolyards. Opportunities need therefore to be provided for active transformations.

Over the past twenty years (Broda 2011), there has been a growing interest in making the schoolyard more functional and appealing. Many early efforts focused

almost entirely on the installation of play equipment that offered a broader variety than traditional swings and slides. Even the students in our study wanted more of these features in their schoolyards. Teachers recognised school grounds as spaces not only for recreation but also for instruction. All these different perspectives have to be taken into account in any planning and transformational processes.

Steps Towards Schoolyard Transformation

Relating to the students' and teachers' perspectives of schoolyards, the steps towards designing and planning a schoolyard have to be based on the pedagogical concept of each individual school. Therefore, the school community has to be involved and has to answer the following fundamental questions (Dietrich 2005), as a practical guide through schoolyard transformation:

 I. Why?

In the beginning of planning a schoolyard, or changing the design of a schoolyard, the school community has to clarify its ideas and concepts. Because schoolyards have different users, the different views of students, teachers, parents and school staff have to be taken into consideration.

II. What are we doing?

In a second step, all schoolyard users have to analyse the inventory and the use of the schoolyard to clarify needs. They have to find and to select elements that work quite well within the schoolyard and for all users.

III. What could be better?

Depending on analyses in step two, the school community has to collect ideas and aspirations of all users for a better schoolyard. These could be special aspirations of teachers, e.g. a 'green classroom' (Roth 2005), a space of the schoolyard designated especially for teaching and learning. In addition, students' aspirations have to be considered, e.g. the list of wishes (see above Table 5) we found in our study and the aspirations of parents for security and safety of their children. Additionally, the views of school staff and the surrounding community are important for planning and designing a useful schoolyard. All these views have to be taken into consideration to develop a concept plan for development.

IV. What could we realise?

Based on the discussions and findings in the planning steps one to three, a concept plan for realisation has to be written by a focus group and discussed with the school community.

V. Do we need help?

 Finally, the school community has to clarify if help is needed to transfer the ideas, wishes, and concepts for development, and concepts for realisation. There is also the question of how to get financial support, how to organise fundraising and sponsorship. This depends, on the one hand, on school policy and legal frameworks and, on the other hand, on the possibilities of finding partnerships and sponsorships.

Conclusion: Design of Schoolyards as Part of School Development

As we have previously discussed, planning and designing a schoolyard should be a participatory process and, in this sense, the design of schoolyards is part of school development. For the internal school development process, developing a schoolyard would be a good starting point. Based on broad discussion with all school members, a pedagogical concept has to be written before a schoolyard is built, re-built or redesigned. As seen in our findings, the judgements of students and teachers are similar, but students' desires for their schoolyards are in some senses not realistic. This is a challenge for teachers to develop a schoolyard that is useful for educational practice and loved by students as well. To balance this is a task for teachers' professionalism.

The opening of schoolyards may be an impetus to involving a surrounding community (see Canto Moniz and Ferreira 2015) and to gather external partners. Hence, the opening of the schoolyard could bring the school and the needs of the school back into the awareness of a community and stakeholder in that community. In that way, a schoolyard could be used by other members of a community, e.g. during summer holidays.

As Woolner and Tiplady have shown, the "change in parts of the physical school setting and the inclusion of specific features was able to produce change in learning and social practices" (2015, p. 79). Therefore, in general, school development processes have to focus on learning enhancement. Schoolyard transformation could foster this in two ways:

> 1) The schoolyard can provide a venue, or backdrop, for an activity (e.g., going outside to read a story). 2) The schoolyard can provide the content and serve as an essential element of an activity (e.g., going outside to use a statistical sampling technique to estimate the population of ants on the school lawn). Both approaches are very valid uses of schoolyard-enhanced learning. In both cases the outdoors serves as an instructional resource and provides a valuable change of pace and place. Just the simple act of occasionally going outside for class and using the schoolyard as a classroom can energize a lesson and refocus attention (Broda 2007, p. 99).

Whatever success accrues as outcomes in teaching and learning, schoolyard transformation is an essential part of whole-school development, and schoolyards are hopefully planned and designed with respect to the needs and aspirations of students and teachers.

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