

BENJAMIN CLEVELAND

WHY INNOVATIVE LEARNING ENVIRONMENTS? STORIES FROM THREE SCHOOLS THAT HELPED ESTABLISH AN ONGOING SPACE AND PEDAGOGY AGENDA.

INTRODUCTION

The research reported in this chapter was conducted to address a seemingly simple question: How are contemporary middle years (Years 5-9) pedagogies influencing the design of physical learning environments?

What the study uncovered was a deep *spatio-pedagogical conversation* about historical misalignments between middle years pedagogies and largely isolated and dissociated classrooms, and the desire to create new and innovative learning environments to better accommodate the practices, activities and behaviours of contemporary teaching and learning. During the period between 2008-2011, school leaders identified tensions between traditional classroom spaces fitted only with tables and chairs and the pedagogical objectives and intentions of leading middle years educators, such as those outlined in the *Middle Years Research and Development (MYRAD) Project* (DEET, 2002, p. web):

- 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 co-operation, communication, negotiation and social competencies generally; and
- Providing for individual differences in interest, achievement and learning styles.

Undertaken as a PhD study titled *Engaging spaces: Innovative learning environments, pedagogies and student engagement in the middle years of school* (Cleveland, 2011), the research investigated the emergence of ‘space’ as a factor in re-thinking how schools might operate, how teachers might teach, and most importantly how students might learn. The project was embedded within an Australian Research Council Linkage project titled *Smart Green Schools* and was situated in three schools in Melbourne, Victoria, Australia.

To report on a) *why* the three participating schools wished to create more innovative learning environments for their middle years’ students, b) *how* they went about creating these environments, and c) *what* characterised the learning environments they created, this chapter is divided into three main sections:

- Drivers for change;

BENJAMIN CLEVELAND

- Design process; and
- Architectural responses.

These sections are preceded by a short discussion of critical pedagogy (Freire, 1970; 1973; Giroux 1985; Apple, 1995; McLaren, 1998; 2007; Giroux & Schmidt, 2004), the theoretical framework that informed the analysis of the field-data and supported discussion in this chapter. This conceptual tool was employed to analyse and discuss the motivations, objectives and intentions of the schools' leaders and explore the ideological, sociological, pedagogical and spatial implications of their educational aspirations.

As a qualitative multiple case study (see Research Design), the findings presented have been aggregated from across the three schools. Quotes extracted from interviews have been included to support the claims made and to ensure that the voices of the study's co-researchers/participants were portrayed. On occasion, specific sites are referred to by pseudonyms to illustrate particular phenomenon.

The schools that took part in the study were selected due to their involvement in 'space and pedagogy projects' i.e. projects that dealt with the development of innovative learning environments for contemporary pedagogies. The individuals who drove these projects were largely the school leaders – principals, associate principals, assistant principals and leading teachers. The findings that are presented and discussed were mostly derived from a series of interviews with these influential people. To a lesser extent, the perspectives of the teachers and students who took part in these projects are also represented.

Of course, school communities do not act in isolation to imagine and deliver new 'socio-spatial contexts for learning'. Architects, interior designers, landscape architects, education consultants, members of school council and parents are all instrumental in driving projects such as these forward. I chose to focus on the perspectives and opinions of school leaders, teachers and students in order to portray the voices of those most likely to be directly affected by changes to learning environments and pedagogies.

RESEARCH DESIGN

The research reported here was embedded within a larger qualitative research project that explored a range of issues and themes associated with the relationships between innovative learning environments, pedagogies and student engagement in the middle years of school (see Cleveland, 2011; 2016; 2017).

Overall, the research approach was informed by Habermas' (1971; 1974; 1989) critical social theory, 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. As such, knowledge was derived from periods of change, or emancipatory praxis, uncovering hidden structures, dependencies and assumptions of both individuals and the cultures of practice within which they resided.

WHY INNOVATIVE LEARNING ENVIRONMENTS?

The project was framed by multiple case study (Bryman, 2004), ethnographic (Bryman, 2004) and participatory action research (Cohen, Manion, & Morrison, 2007; Mattsson & Kemmis, 2007) methodologies.

Three state-funded public schools in Melbourne were selected for field research using a process of convenience sampling (Bryman, 2004). Together, these sites were considered a multiple case study. One was a primary school, two were secondary schools. These schools catered for between 270-2100 students, were located in different geographical regions of the city, served communities of varied socio-economic and socio-educational advantage, and the *innovative* learning environments found at each varied significantly in their design – although some characteristics were common across all, including their capacity to support collaborative teaching approaches and accommodate classes of 50-100 students.

In this chapter, the three schools are referred to by pseudonyms: Inner City Primary School, Suburban High School, and Seaside Secondary College. For brevity, the schools are not described in this chapter, although details about each may be found in another book chapter, *Addressing the spatial to catalyse socio-pedagogical reform in middle years education* (Cleveland, 2016).

The data represented in this chapter was collected in late 2008 and early 2009 via semi-structured interviews with school leaders, teachers and students from across the participating schools. Additional qualitative data – not represented here – was collected in 2010. This included the observation of teaching and learning (both prior to and following the provision of new learning spaces), focus groups with teachers, and design-oriented workshops with school leaders, teachers and architects.

The transcripts of the semi-structured interviews were analysed using a process of thematic narrative analysis adapted from Riessman (2008). Through this process, the data from individual interviews was not fractured into thematic categories for cross analysis; rather, individual interviews/cases were maintained intact for coding. By preserving the data within each case in long chronological sequences, the finer details of the stories embedded in the data were able 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. Such interpretation was aided by the application of critical pedagogy as a theoretical lens through which to analyse the field-data. The writing of Paulo Freire (1970; 1973) and others on critical pedagogy also supported discussion in this chapter. This conceptual tool is introduced and discussed below.

THEORETICAL FRAMEWORK FOR ANALYSIS AND DISCUSSION

Critical pedagogy: a brief discussion

In common with other constructivist theories of learning, a critical pedagogy approach to education promotes learning that is situated in the lived experience of learners. Exponents of critical pedagogy, including Freire (1970; 1973), Giroux

BENJAMIN CLEVELAND

(1985; Giroux & Schmidt, 2004), Apple (1995), and McLaren (1998; 2007), have all advocated for the co-construction of learning and the application of reflective practices that enable students to become empowered to understand their situation and take informed action to improve their lives and the lives of others. To this end, critical pedagogy is about preparing students as life-long learners and about social justice. As Horne (2004, p. 6) concluded:

Schools should strive not just to create knowledgeable young people but people who know how to use and apply their knowledge in a way that is meaningful and valuable to them beyond the formal setting of the examination hall.

The origins of critical pedagogy have been attributed to the works of educational luminaries Paolo Friere and John Dewey (Leonardo, 2004). Subsequently, educators operating in a critical pedagogy paradigm have been aware of power relationships that are shaped by race, gender, class and ethnicity, and have questioned cultural and political systems by asking who benefits from such structures.

A critical pedagogy approach to education is intended to support actions that promote the development of democratic learning situations – situations that are characterised by their social cultures. Thus, critical pedagogy is expected to support connectedness between the lived experiences of students and teachers and their institutionalized education by encouraging active engagement with the cultural resources that they bring with them to school and critical reflection on such knowledge for purposes of creating a sense of identity and community.

Critical pedagogues value the development of multiple literacies, so that students may engage with the world through many modes and become agents of positive change in their communities. In addition, critical pedagogy is intended to provide a holistic perspective from which to engage in whole school change. Ultimately, critical pedagogy focuses on the democratization of schooling institutions with a view to subsequently supporting the democratization of society. To this end, Fisher (2002, p. 76) concluded:

Most importantly, critical pedagogy embraces teaching for social justice and emancipation, focusing on ‘whole school change’. It also confirms that knowledge is socially constructed, that reading is beyond both the text and the curriculum and that students can engage in a meaningful authentic process of learning directed towards social action.

McLaren (1998, p. 454) took these ideas one step further by calling for a critical pedagogy that moved in “the direction of challenging new carceral systems of social control through the development of a critical pedagogy of space”. Fisher (2002) believed that critical pedagogy was still predominantly separated from the design of school buildings. He concluded that only recently have critical pedagogy theorists explored spatio-pedagogical power in the contexts of schools, engaged in a deeper spatial analysis of schools, and considered pedagogy and social control measures within a critical pedagogy of space. He also suggested that critical pedagogy needed

WHY INNOVATIVE LEARNING ENVIRONMENTS?

to “struggle with the implications of weaving the silent and unconscious acceptance of spatiality into these ideas” (Fisher, 2002, p. 81).

Links between critical pedagogy, power, space and student engagement were identified by tertiary educator bell hooks (sic) (1994, p. 158), who wrote:

‘Engaged’ is a great way to talk about liberatory classroom practice. It invites us always to be in the present, to remember that the classroom is never the same. Traditional ways of thinking about the classroom stress the opposite paradigm – that the classroom is always the same even when the students are different ... To me the engaged classroom is always changing. Yet this notion of engagement threatens the institutionalized practices of domination. When the classroom is truly engaged, it’s dynamic. It’s fluid. It’s always changing.

In this chapter, critical pedagogy is used to examine the motivations, objectives and intentions of those who directed the space and pedagogy projects in the case study schools – the school leaders. I examine their educational rationales for change, their educational visions for the future, and the expectations they held about the influences that new and innovative learning environments may have on middle years’ socio-pedagogical cultures of practice. In doing so, I explore the ideological, sociological, pedagogical and spatial implications of their educational aspirations.

FINDINGS AND DISCUSSION

Drivers for change

Towards a new educational experience

Across the case study schools, the creation of new learning environments was primarily driven by a desire to improve the overall experience of school for middle years students. This desire was accompanied by a wish to improve the physical and social context of teachers’ workplaces – including those socio-spatial contexts shared with students (learning environments) and those dedicated to teacher study, collaboration and socialising.

A number of issues underpinned the school leaders’ desires to improve the overall experience of school for their students and teachers. Apart from wishing to replace or refurbish physically run-down facilities, the most prominent motivation for change was the belief that the ‘cells and bells’ model of education was holding back pedagogical development. Overwhelmingly, school leaders agreed that pedagogical progress had been stifled by the organisational structures embodied in traditional school architecture characterised by isolated and dissociated cellular classrooms. Among school leaders, there was a consensus that the learning experiences afforded by traditional classrooms did not align with their desired educational practices, activities and behaviours.

BENJAMIN CLEVELAND

School leaders cited a number of limitations associated with the pedagogical opportunities afforded by the traditional classroom model, including:

- A lack of opportunity for learning to occur across a range of modalities – often exacerbated by the disproportionate amount of space taken up by teachers’ desks and resources;
- A lack of opportunity for students to direct their own learning;
- A lack of ownership of the learning environment by students and teachers; and
- Concern about variation in the educational programs and the standard of teaching between classrooms.

Furthermore, school leaders believed that the ‘cells and bells’ pedagogical model was leading to poor student engagement. Specifically, they thought that instructivist teaching practices were not engaging students because such pedagogies did not enable them to set individual goals or pursue learning that was of interest to them. Jennifer, an associate principal at Suburban HS, suggested that engagement was about “taking real responsibility for your own learning ... having individual goals and taking individual responsibility” (5/12/08). Asked how this could be facilitated, she suggested that a less teacher-directed approach to learning was important.

Based on negative feedback received from students, school leaders realised that many middle years’ students were not being academically or socially challenged or adequately supported by their schooling experience. In response, they initiated space and pedagogy projects to substantially alter the *spatial and pedagogical landscapes* in their schools. Craig (26/8/09), a teacher at Inner City PS, outlined his perspective on why changes were instigated at his school:

... [the school leaders] were getting feedback that the students were bored and not extended and this is why this was put in place..

Moreover, the Principal at Inner City PS, Paul (19/3/09), suggested that schools could readily become “dysfunctional” in a contemporary world if they maintained outdated approaches to education. He suggested that it was essential for schools to keep pace with change at a societal level and respond with curriculum and pedagogical offerings that were aligned with the life experiences and interests of young people. He commented:

When they say they disengage in the middle years, I don't agree. I think they just disengage from what we are interested in. We have to try and tap into that. They are naturally ... they are intrinsically motivated and we just have to try and find out what that is.

Educational objectives

The school leaders observed in this study strove to develop new socio-spatial contexts for learning because they wanted to personalise learning for each student,

WHY INNOVATIVE LEARNING ENVIRONMENTS?

create socially connected learning communities, change teacher practice to encourage contemporary middle years pedagogies, and create a schooling experience for students that was engaging, meaningful and of value to them in today's globalised society.

The actions undertaken to pursue these objectives differed between schools, however, clear similarities between their approaches were evident. In order to personalise learning for each student, the school leaders believed that new socio-pedagogical cultures that encouraged students to take on more responsibility for their own learning were required. They recognised that if students were to pursue learning because it mattered to them, they needed to ensure that learning was “not just fun” (Jennifer, 5/12/09), but of intrinsic value to them.

The school leaders felt that personalised learning could be achieved through the development of new curriculum and pedagogical frameworks based on inquiry, project-based and problem-based learning models. To instil deeper motivation in students, they believed that students should be encouraged to set and pursue personalised learning goals within overarching curriculum frameworks. Associate Principal, Jennifer (5/12/08), at Suburban HS, suggested that the ultimate objective of the change agenda at her school was to “create an environment where kids could really get passionate and excited about learning”.

In order to improve student engagement, school leaders wished to provide students with opportunities to participate in individual and small group collaborative learning experiences that were framed around project- and problem-based activities and authentic tasks (Newman, 1992; Newmann, Marks & Gamoran, 1996). The strength of connections with ‘real world’ contexts was thought to be particularly important in helping students recognise the value of what they were learning. Providing students with opportunities to communicate their learnings to authentic audiences (people from outside the school community) was also considered important. In summarising these objectives, Margaret (14/5/09), a leading teacher at Seaside SC, outlined the intentions behind the curriculum and pedagogical framework that she and her colleagues designed:

We have tried to develop this as the inquiry model. So really we want it to be from them [the students] – creating big questions, finding out things that they want to know in relation to the topic, with the ultimate aim of trying to educate someone else at the end of it. Taking it back to the wider community is what we really want.

At Suburban HS, school leaders wished to create a socio-spatial context within which students and teachers could engage in regular in-depth dialogue. Associate Principal Jennifer (5/12/09) outlined the importance of this oral aspect of the students' learning experience:

Academic success is very important in this model. And the thread that I see supporting that is language because the kids come from homes where there are very few materials. There is very little talk and often the talk is about social

BENJAMIN CLEVELAND

things or family things. A lot of the kids have a very limited vocabulary. So a big impetus for me, through the curriculum, is language development.

A desire to change teacher practice was also central to the spatio-pedagogical projects in the three schools. Associate Principal Jennifer (5/12/08), made it clear that changing teacher practice at Suburban HS was fundamentally linked to the desire to change “an entire culture of thinking about learning and how kids learn best”. The school leaders were resolute that teacher practice needed to change if any genuine socio-pedagogical progress was to be made—regardless of the characteristics of physical learning environments.

The most notable change to teacher practice sought by school leaders was a shift from teachers working in isolation to working in collaborative teams. This significant organisational change was common to all three schools. Having teachers work in teams of two to four with cohorts of 50-75 students was the desired approach. These social organisational structures were intended to enable teachers to spend more time working alongside students to support them in their learning, rather than “doing [learning] to them”, as the Principal at Inner City PS described instructivist teacher-centred approaches (19/3/09). Such arrangements were expected to support a more equitable learning situation in which the diverse needs of individual students could be met.

Entangled in systemic change

The pursuit of new socio-spatial contexts for learning involved stepping into unchartered territory for these schools. In pursuit of these overarching objectives, these communities became entangled in intricate change processes that required the integration of myriad factors.

Paul, the Principal at Inner City PS articulated the breadth and depth of these space and pedagogy projects when he commented that, “it’s not only the space that needs to change” (19/3/09). His short but salient comment encapsulated the tremendous scope of these projects. Had these projects only been spatial, and involved the replication of existing architectural typologies, they would have been complicated enough. Similarly, had they only been social, and involved the development of new pedagogies, they would have constituted significant undertakings. Combined, the scope was enormous.

The school leaders did not expect that changing teacher practice would be easy. In fact, they believed that many teachers would initially struggle to adopt contemporary pedagogies and/or teach in new socio-spatial contexts. During the initial phases of these spatio-pedagogical projects, school leaders witnessed strong resistance to change from some staff. In particular, the value of shifting to team teaching approaches was strongly disputed by some of the more experienced teachers. They expressed concern that the proposed changes would result in a repeat of their unsuccessful experiences of teaching in open plan schools during the 1970s. They believed that changing the physical and pedagogical contexts within schools was not a worthy undertaking. Peter, the Campus Principal at Seaside SC,

WHY INNOVATIVE LEARNING ENVIRONMENTS?

related these sentiments when he said, “many of them have lived through teaching in large open plan spaces and felt that that wasn’t always a successful model” (14/5/09).

However, the school leaders insisted that the educational models they wished to implement were better developed and more highly structured than those that had been implemented during the 1970s. Associate Principal Jennifer, at Suburban HS commented that; “one of the problems I think with a 1970s curriculum – [a barrier] which people throw at me all the time – was that people said that it is ‘open’, explore what you will” (5/12/08).

The general response from school leaders to doubts surrounding the development of new socio-spatial contexts for learning was to invite teachers to create new units of work that fitted the new curriculum and pedagogical frameworks they wished to see implemented. Peter (14/5/09), the Campus Principal at Seaside SC, described the impetus behind his school’s spatio-pedagogical project:

Initially the development of the Hub was driven by a grant we received to write integrated curriculum units and we wanted to find a space to teach, or create a space to teach, integrated curriculum with a range of students of up to about 75 students at a time. So that was the initial impetus. And the theme running through those integrated units was to be an environmental theme to match the overall philosophy and vision for this campus—which is to be a model school for environmental education ... [in addition] we wanted to create a rich ICT environment.

Enhancing social connectedness across learning communities was another key objective. By combining teacher teams and innovative learning environments, school leaders wished to create new socio-spatial contexts within which collaborative learning experiences could be facilitated. The development of new curriculum and pedagogical frameworks was expected to generate new forms of social interaction that were characterised by meaningful dialogue between students and students, and students and teachers – often in pairs or small groups. Associate Principal Jennifer (5/12/09), at Suburban HS described the potential value of this type of learning situation:

One of the big ones for me is collaboration, and that might be with the teacher. I’m not suggesting that all of the learning has to be student based or exclusive of the teacher. The teacher can move in and out of that collaborative model—working with a group of four here, and five there, or two, or whatever it is. And I think that is a really important part of the pedagogy ... I think pairing is a very good model for our kids because it builds confidence and their capacity to share with a bigger group. But also the provision for kids to work independently ... I like that as well.

Apart from the wish to create a new social dynamic, the combination of teacher teams and innovative learning environments was also intended to facilitate the integration of subject matter across learning domains (i.e. English, SOSE, Maths,

BENJAMIN CLEVELAND

Science etc.). To support students to identify connections between learning domains, teacher teams at the two secondary schools were composed of teachers who were trained in a range of related subject specialisations, for example Maths/Science/SOSE or English/SOSE. At Inner City PS, where the primary school teachers were all generalists, teachers with different strengths and weaknesses were also matched.

Anticipated student and teacher behaviours

Broadly speaking, school leaders hoped to create learning communities that exhibited internal social cohesion and external connectedness. They envisaged learning communities in which students and teachers shared ownership of the physical and conceptual environment and demonstrated intellectual respect for each other. Furthermore, they desired learning settings that were supportive of healthy student socialisation and they wished to create learning communities that were well connected to other school-based communities and to communities beyond school. Finally, they envisaged learning communities that could support sound academic achievement that could be achieved through a variety of learning modalities.

For example, Margaret (14/5/09), a leading teacher at Seaside SC, explained that the integrated curriculum designed for the Hub environment was created around an intention to run a variety of simultaneous activities under the umbrella of a themed topic. She recalled:

We were going to have dedicated areas. So when the students needed to be over here making bits and pieces, they would be able to go over there to use those materials and work on that—to flow to another space. And when they needed to be skilled on something, there could be an area set up for skills lessons [as well].

Common to these educational visions was a desire for regular student and teacher movement, both within and between differentiated activity settings. School leaders wished to create settings in which students could engage in both student- and teacher-directed activities. To this end, they envisaged learning environments that provided students and teachers with access to a range of social settings, resources, and tools (including ICT).

Also common to these educational visions was the notion that ‘explicit instruction’ still had a place within a more diverse pedagogical framework. Didactic teaching was considered suitable for instruction regarding particular skills, although not considered a valid approach for teaching students about subject content. The development of knowledge regarding a particular topic was expected to be gained by students through student-directed activities and dialogue. Constructivist and social constructivist approaches were favoured because they were expected to support the development of students’ capacities for independent and life-long learning.

Breaking down conceptual walls

The creation of larger scale and more open learning environments was seen by school leaders as symbolic of ‘conceptual walls coming down’. Allan (26/8/09), a leading teacher at Inner City PS, described his perspective on this notion:

The walls that need to come down are the walls in your head. So for me, the learning space ... is really just a symbol of what has happened in my head.

Some of the most significant ‘conceptual walls’ that school leaders wished to demolish were those they associated with traditional school architecture. When presented with the opportunity to rebuild or refurbish existing buildings, the school leaders saw this as an opportunity to make significant changes to school organisational structures and overcome the organisational limitations that had been imposed upon them by cellular classrooms. They especially wished to move on from the single teacher and 23-28 student classroom model. When provided with the opportunity to instigate change, they wished to develop new organisational structures and embody these in new architecture.

The new organisational structures they envisaged required changes to a number of interdependent components: student and teacher groupings (who), the built environment (where), and the timetable (when).

Developing a critical pedagogy of space

It appeared that the educational change agendas observed in the case study schools were ideological responses to broad movements, or changes, in societal circumstances: changes characterised by globalisation, technological advancement, the exponential rate of information production, and the creation of new labour markets (Monahan, 2005). The education models that the school leaders sought to develop focussed on providing students with an academic and social education that could support their participation in contemporary society. A key objective was to create educational contexts that provided students with opportunities to better understand themselves as learners and acquire skills for life-long learning.

In the process of working towards the creation of new educational models, school leaders promoted many ideas that were linked with the literature about critical pedagogy. Although this literature was foreign to them, many parallels were evident between their educational visions and the literature. In keeping with the conceptual underpinnings of critical pedagogy, school leaders wished to engage in processes of cultural change and create educational settings that could support the development of new types of relationships and forms of communication between students and students, and students and teachers.

The collective desire for *connectedness* was closely related to ideas embraced by critical pedagogues concerning the cultivation of education that called on the cultural resources that people brought to school. Indeed, the resources and tools that the school leaders wished to see students using, especially those related to ICT, provided a clear sign of their desire for students to engage in learning that involved regular

BENJAMIN CLEVELAND

interaction with people, communities and ideas in the 'real world'. Furthermore, the vision of the school leaders was one that promoted democratization of the learning situation.

Aspects of Freire's work (1970; 1973) concerning the promotion of ideological critique, analysis of culture, and attention to discourse, were embodied in the educational visions of the school leaders. Freire's notion of the teacher as an intellectual or cultural worker (Leonardo, 2004) was manifest in the roles that the school leaders had in mind for teachers. Evidence of this was seen in their desire for teachers to work alongside students to support them in their learning, rather than act as instructors in the delivery of prescriptive curricula. Furthermore, the team teaching structures that school leaders wished to implement were intended to promote pedagogical relationships that were based on collaboration.

Although school leaders did not communicate the view that democratization of these school settings was intended to result in the democratization of society, they did express concern for social justice and a wish to empower students to become reflective individuals who could undertake informed action to improve their lives and the lives of others. Allan (26/8/09), a leading teacher at Inner City PS, communicated these sentiments:

I really, really, firmly believe that the basis for all learning in individuals is self-esteem, and how you feel about yourself. It's about your identity, where you fit in the world, where you fit within your community and culture. It's those opportunities that I think are the ones that I try to seek out and use as the basis for learning.

Through the process of re-visioning educational models, and creating new learning environments to support these visions, the school leaders inadvertently responded to calls for a 'critical pedagogy of space' (McLaren, 1998; Fisher, 2002). Without having encountered such theoretical arguments, school leaders sought to create new socio-spatial contexts that "challenged carceral systems of social control" (McLaren, 1998, p. 454). Furthermore, their ideas about how students and teachers should interact and behave at school were entangled with ideas about social control and issues of spatio-pedagogical power. Indeed, they wished to create new forms of spatiality (McGregor, 2004; Fisher, 2002) in their schools that were in stark contrast with the previous space/time/being practices that had existed within cellular classrooms.

Although spatiality was not a term familiar to school leaders, they were not unconscious of the space/time/being practices in their schools. Their desire to change prior practices was driven by preferences for pedagogical approaches based on inquiry and project- and problem-based learning. In order to successfully employ these pedagogies, school leaders believed that socio-spatial contexts that afforded students and teachers freedom to engage in frequent discourse were required. Further to this, they believed that learning environments that facilitated movement within and between differentiated activity settings were also required. hooks' (sic) (1994) ideas related to the 'engaged classroom', 'always changing' and being 'dynamic'

WHY INNOVATIVE LEARNING ENVIRONMENTS?

and ‘fluid’ were evident in the educational visions of school leaders. Associate Principal Jennifer (5/12/09), at Suburban HS, shared her ideas about spatiality while discussing the shared ownership of space:

A big factor, I think, is having beautiful spaces and telling kids that they are their spaces and they need to care for them ... So it is more of a model of sharing and caring for the learning in that space together, rather than the teacher trying to act as some sort of policeman who is maintaining students in terms of their behaviour and their responsibility.

Although the school leaders were readily able to articulate educational visions, they were not readily able to envisage the physical environments that might support their educational objectives. Their visions and ideas about new pedagogies and social/organisational structures were not complemented by clear ideas about what building structures, interior design elements or furniture items might support these visions. In order to design environments that could support for their ideological, sociological and pedagogical goals, collaboration with design professionals was required. These collaborations are discussed below.

Design process

Spatial design: A catalyst for re-visioning pedagogical practice

When describing their educational philosophies and visions for learning, school leaders were more inclined to talk about curriculum, pedagogy, and assessment than discuss architectural design and its influence on learning. This was perhaps not surprising as they had little or no experience with participating in school building projects.

However, through the process of working with design professionals, school leaders recognised that carefully designed learning environments could influence the socio-pedagogical cultures in their schools. Indeed, one of the ideas that emerged during this process was the idea that space could play a role in shaping pedagogy – an attitude reflecting Monahan’s (2005) concept of *built pedagogy*. Informed by this idea, the school leaders sought to influence pedagogy by designing spaces that were distinctly ‘different’ from traditional classrooms. This approach to school design catalysed a process of re-visioning pedagogical practice and led the school leaders to broaden their thinking regarding the development of new education models.

Shaping pedagogy: Intended influences of innovative learning environments

The school leaders were not interested in providing flexible spaces that could be reconfigured in multiple ways. They felt that learning environments that could be too readily reconfigured would allow teachers to regress to didactic instruction as the default pedagogical approach. Associate Principal Jennifer (5/12/09), at Suburban HS commented:

BENJAMIN CLEVELAND

We want the space to prevent people, in a way, from determining what they are going to do in the space. We don't want flexible spaces in that sense. We want a variety of spaces that you can move through, and into, depending on what type of learning needs to occur - rather than saying that I'll change the shape of the space to suit what I want to do, because then you don't get a change in pedagogy

Peter (14/5/09), the Campus Principal at Seaside SC, also commented on this approach to design. Based on his experiences visiting other schools, he expressed the view that flexibility (associated with relocatable furniture) often led to a lack of structure and a meaningless environment:

It's a real challenge, these spaces, because you can make it so flexible that it really means nothing. I've been to lots of these spaces that simply have a lot of ratty furniture that you can move around in various formations but [they are] essentially pretty conservative and unstructured and it always looks like a disaster ... What I'd like to see is clearly defined spaces that almost lead you through the space and have different purposes, so there's the ability to do a range of things in the space—with high quality fit out and furnishings for that particular aspect. What I don't want to see is like 200 chairs that you stack up on the side of a wall ... a) it's not realistic to expect kids and teachers to constantly move and reset them, b) it doesn't look very good anyway, and c) they tend not to get cared for so you end up with damage. So I want something that is quite artistic and sculptural and multilayered and ... flexibility, but flexibility in more where you move to the space rather than just leave an open floor ... and the more radical and different it is the better!

Aided by design professionals, the school leaders wished to create some spaces that could support small and large group collaborative experiences and other spaces that could support didactic instruction. They wanted the collaborative spaces to be designed in a way that limited opportunities for instructivist pedagogies. They expected the teachers to assume the role of a learning facilitator who would provide students with curriculum frameworks that would support them as self-directed learners. However, to facilitate knowledge transfer pertaining to particular skills (but not subject content) they wanted additional spaces designed specifically for instructivist pedagogies. In these environments, the teacher's role was expected to be that of instructional expert.

School leaders expected the innovative learning environments to be the agents of change and anticipated the environments would play strategic roles in supporting their educational visions. With the creation of these environments, school leaders hoped to support teachers to learn about, and adopt, contemporary middle years' pedagogies that were informed by constructivist educational theories.

The school leaders also believed that the creation of beautiful spaces was important. They felt that aesthetically appealing buildings and furniture items would encourage students and teachers to care for their surroundings and want to be at school. In addition, attractive facilities were thought to have a positive influence on

WHY INNOVATIVE LEARNING ENVIRONMENTS?

a schools' culture and even inspire members of a school's community. Associate Principal David (7/11/08), at Suburban HS commented that, "we all thought the buildings had to be beautiful ... Now that might not have a lot to do about pedagogy, but it has a lot to do with culture and aspiration".

Designing innovative learning environments: A process of spatio-pedagogical change

Through collaboration with architects and interior designers, the case study school communities designed learning environments they expected would support their educational objectives. These collaborative design processes required significant effort and persistence from many people, particularly the school leaders. Their commitment to holistic change was a significant factor in the creation of learning environments that contrasted with traditional notions of how schools should be designed. It is unlikely that such spaces would have been created without the strong conviction of the school leaders that changing the learning cultures and educational models in their schools was necessary. Conversely, had the opportunity to create new learning environments not been available, it is unlikely that school leaders would have been able to pursue their educational visions to the same extent. The questioning of pre-existing norms associated with the social, spatial and temporal organisational structures in schools ultimately led to the creation of innovative facilities.

The time frames for design in each of the case study schools were vastly different. This was due to the scale of each building project and the level of involvement that designers had in the spatio-pedagogical projects at each school – in particular, how committed the architects and interior designers were to understanding the educational visions of the school leaders and how willing they were to work with them to create environments that could support these visions.

A common language and shared understandings

Once a common language for communication between school communities and design professionals was established, collective understandings about education and ideas about design could be shared. Productive collaboration was identified in situations where a common language was established and a process of cyclical testing, accepting and rejecting of design ideas was part of the design process. Timothy (7/11/08), the Principal at Suburban HS, described the design process at his school as "really purging":

We went through this really purging process in our own thinking ... propositions were put up and tested and accepted and rejected. Focus groups of teachers were developed and they seemed to be endless. But they were a very healthy part of the process – that was the reflection that I have on them ... I think it took over two years in order to come to some sort of a design that we thought we could live with. And that seemed like a long time, but when you

BENJAMIN CLEVELAND

look back I think it was right. The writing and the thinking and the building and this merger of people in this notion of, ‘What are we going to deliver and how are we going to deliver it?’, was due to the talk before the drawing.

I think the challenge for them [the architects] and us [the educators] was around language and concepts to start with. I mean, architects will say, ‘Give us a brief, give us a brief, give us the brief’. But we didn't know what the brief was ... And they were very open and honest about how they were not going to give us one. And I've seen architects do that before and I feared it coming. We all did, but it never came. And indeed, apart from a few players, there would not have been a pen put to paper for 12 months. And that was the right thing to do.

Indeed, Timothy insisted that nothing could be drawn (architecturally) until a firm picture of what the school really wanted to do organisationally and pedagogically was established. He thought that drawings created too early in the process would shape people's thinking about how the school should operate and how students should engage in learning. His insistence suggested that he recognised the influence that space could have on the school's operation and pedagogical practices.

Ownership of space during the design phase

Participation of school leaders, teachers and students in the design phase was found to positively influence their feelings of ownership of their new facilities. Extensive consultation with the future users of new facilities was found to be beneficial for two primary reasons: firstly, teachers and students were able to contribute valuable ideas that informed the design of the learning environments, and secondly, their involvement enabled them to develop early understandings of what their new spaces would look like and how they might use them. Through ongoing participation in the design phase, teachers in particular did not have to wait until the buildings were constructed to begin developing ideas about linking curriculum, pedagogy, and assessment practices with innovative spaces.

Timothy (7/11/08), the Principal at Suburban HS, described the process of creating new facilities for the 2000+ students at his school as “frightening”. However, working through the design process enabled both him and his leading staff to become empowered to deliver the innovative facilities they believed would serve the best interests of the school's students and teachers. Timothy communicated the sense of empowerment and ownership that he experienced during the design phase in the following statement:

The parallel of merging the school and creating a new pedagogy, a new curriculum design, new physical design, is an unbelievable task, although it felt good that we were first. We are the pioneers of this and we have watched others kind of borrow our stuff and struggle with the same struggle ... We don't want to be following other people's agendas and this was an opportunity to

spring out on our own. And that is the story that in the end is going to be told about this place.

Architectural responses

When asked, students from across the case study schools used the following terms to describe their new facilities: big, different, open, large, exciting, colourful, sometimes noisy, light and bright, 'cool', interesting, comfortable, fun, spacious, relaxing, and modern. They also suggested that their learning environments were technology rich, allowed for freedom of movement, provided different spaces for people to move to, provided good access to belongings and resources, were very 'spaced out', were not too enclosed, provided 'air to breath' and good chill out spaces, enabled people to see what was going on, allowed large groups to get together, provided good private spaces, allowed people freedom to work with friends, and provided good spaces for talking.

Some of the common design responses/characteristics of the *innovative learning environments* that were created in the case study schools are discussed.

Learning landscapes

To provide the social organisational structures that school leaders desired, large learning landscapes (Neary, 2010) were created to accommodate cohorts of up to 75 students and four teachers. These spaces were not simply large open rooms, but environments differentiated by sub-spaces, or settings, of varied sizes. These sub-spaces were distinguished by their full or partial enclosure, by changes to floor and/or ceiling heights, and by the arrangement of interior elements and furniture items. While some sub-spaces were designed as traditional classrooms, the majority of floor space within these learning environments was allocated to other settings, including collaborative work spaces (common areas), large group gathering/presentation spaces, targeted teaching areas, wet/project areas, formal and informal discussion areas, and quiet work/reading areas.

Purposeful activity settings

The creation of sub-spaces within learning landscapes responded to the general desire to create physical settings that could support specific pedagogical encounters. Purposeful activity settings were created to support learning experiences that were characterised by specific learning activities. Specific interior elements, furniture items, ICT devices, and learning resources enhanced the purposefulness of these settings.

The annotated floor plan of the Hub at Seaside SC illustrates how *purposeful activity settings* were incorporated into a *learning landscape* with the refurbishment of this space (see Figure 1).

Interconnectedness

Possibly the most striking characteristic of these learning environments was their *interconnectedness*. This characteristic was manifest in a number of ways in the different schools. At Suburban HS, the middle years learning landscape on the first floor allowed people to move between settings without encountering doors, apart from when entering the two traditional classrooms. At Inner City PS, the learning environment enabled occupants to 'open up' or 'close down' sub-spaces using large glazed doors, thus facilitating visual connectedness while providing acoustic separation between activity settings. At Seaside SC, the refurbishment of the Hub included the creation of a small 'house' in the centre of the learning environment. This structure segregated the space into a range of smaller distributed settings, while also allowing easy movement between them.

Integrated circulation

To support *interconnectedness*, circulation routes were largely integrated within learning areas. This design response was intended to support a flow of activity and allow students and teachers to readily access a range of settings. Provision for (supervised) movement between activity settings was desired so that students and teachers could access both physical and virtual resources as required.

Dedicated teacher spaces

Unlike in traditional classrooms, dedicated teacher spaces, such as teacher's desks, were not placed in learning environments. This design response was informed by the concept of democracy and the idea that 'everywhere should be a learning space'. It was also supported by the notion that teachers should work alongside students to aid them in their learning, rather than operate from the front of the class, or from behind a desk.

To support collaboration between teams of teachers, *dedicated staff study areas* were created. At Inner City PS a dedicated teacher collaboration space was positioned adjacent to the Year 5/6 learning environment. At Suburban HS, a staff study and kitchen were incorporated into each of seven school with school (SWiS) buildings. While at Seaside SC, the co-location of teachers who worked in the Hub was not achievable because of the existing traditional faculty-based organisational structures that supported the operation of the rest of the school.

Varied furniture and fittings

Tables and chairs were predominantly the furniture items chosen to fit-out new learning environments. Tables of different sizes and shapes were chosen to create a variety of social settings. For example, the inclusion of small round tables at

BENJAMIN CLEVELAND

Suburban HS was intended to support small group discussions and student-teacher meetings. In addition, the selection of large oval tables was intended to create a setting for the ‘targeted teaching’ of six to eight people. At Inner City PS and Seaside SC, tables of non-conventional shapes were selected. These were chosen because they could be configured in multiple ways, and were thus expected to support a range of pedagogical encounters. It was not expected that they would be relocated frequently.

Other furniture items and built-in architectural fittings were also chosen for the new spaces. Ottoman stools (padded), built-in bench seats (padded) and tiered seating structures (carpeted and non-carpeted) were incorporated into a range of activity settings. These seating types were expected to support large group gathering/presentation spaces, formal and informal discussion areas, and quiet work/reading areas.

Storage solutions that provided students and teachers with ready access to resources, and in some instances divided the learning landscapes into sub-spaces, were also integrated into the new spaces. Storage units included fixed cupboards, mobile shelving units, and roll-away resource and laptop trolleys.

Integrated resources and tools (including ICT)

Learning landscapes were designed to provide ready access to physical resources, such as books and craft materials. At Inner City PS, these resources were made available to students upon initial occupation of their new spaces. Meanwhile, at Suburban HS and Seaside SC they were still working towards ubiquitous provision of such materials when the field-work for this project concluded.

These environments were also designed to be rich in ICT. Buildings were fitted with wireless and fixed-line internet infrastructure to support current and future use of devices such as desktop computers, laptop and hand-held internet enabled devices. In addition, learning environments were also equipped with interactive whiteboards and data projectors (with sound).

Acoustics

A range of acoustic materials/treatments was used to dampen noise reverberation and volume. At Suburban HS, extensive acoustic panelling was installed in the ceilings of the SWiS buildings. At Seaside SC, acoustic baffles were applied to, and hung from, the ceiling in the Hub, and sound-dampening pin board material was affixed to the west side of the central ‘house’. These acoustic treatments were retro-fitted to combat the poor acoustic properties of the Hub as originally designed. At Inner City PS, no specialised acoustic materials were used, but the inclusion of glazed doors enabled users to acoustically separate different zones/settings as required.

Light

With respect to pedagogy, the ability to control the amount of light in various activity settings was identified as important. As these learning environments were designed to be flooded by natural light, blinds were installed to allow users to control light intensity and reduce glare. The provision of blinds ensured that students could read books, computer screens and interactive whiteboards. It also enabled some activity settings to be darkened to support theatrical activities.

CONCLUSION

A decade on from the period when the data represented in this chapter was collected, it is interesting to reflect on the motivations, objectives and intentions of the school leaders involved. What, at the time (2008-2011), may have been considered radical ideological, sociological, pedagogical and spatial aspirations, have now become acceptable, even normalised, aspirations within the Victorian school education sector – with other Australian states following suit.

While other education systems in Australia (both government and non-government) watched on during the years around 2010 with intrigue as innovative school infrastructure and associated ‘soft-systems’ were developed, many of the same school systems can now be seen to have adopted similar aspirations for schooling and school facilities – supported by academic discourses that increasingly suggest that such ‘directions’ are supportive of contemporary educational objectives.

For example, it is easy to draw connections between recent discourses about *deep learning* (see for example Fullan & Langworthy, 2013) and the pedagogical objectives of the leading middle years educators of fifteen years ago. The *Middle Years Research and Development (MYRAD) Project* (DEET, 2002, p. web) promoted 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 co-operation, communication, negotiation and social competencies generally; and providing for individual differences in interest, achievement and learning styles. More recently, Fullan and Langworthy’s (2013) *deep learning* framework has advocated education that fosters character education; citizenship; communication; critical thinking and problem solving; collaboration; and creativity and imagination. With both frameworks centred around the development of critical, collaborative, and creative problem-solving skills that may be applied across a lifetime, the ideals of Freire’s (1970; 1973) *critical pedagogy* may be seen as a conceptual bridge between these related discourses.

The desire for a *critical pedagogy of space* (McLaren, 1998; Fisher, 2002) has followed, embodied in discourses concerning *learning landscapes*, *learning settings*, and *flexible learning spaces*. Proliferation of *innovative learning environments* in the Australian context over the past decade has grown steadily, with scaling of the types of educational motivations, objectives and intentions held by the school leaders reported in this chapter. Their collective desire to improve the overall experience of

BENJAMIN CLEVELAND

school for middle years students and their teachers via the pursuit of learning environments that could better accommodate the practices, activities and behaviours of contemporary teaching and learning has become a more widely held set of aspirations than was common only a few years ago.

These school leaders wished to develop new socio-spatial contexts for learning that could support personalised learning, encourage the adoption of contemporary middle years' pedagogies, catalyse the integration of curricula across learning domains, and foster the development of learning communities that exhibited internal social cohesion and external connectedness – with the objective of creating a schooling experience that was engaging, meaningful and valuable to students in today's globalised society.

Subsequent research trajectories

In the intervening years, researchers, including academics associated with our Learning Environments Applied Research Network (LEaRN) group at the University of Melbourne, have pursued further insights into the relationships between learning and space. Recent studies have indicated that the types of learning environments developed by the schools featured in this chapter are aiding the transformation of teaching and learning in schools in Australian and New Zealand more broadly (see for example Bradbeer, Mahat, Byers, Cleveland, Kvan, & Imms, 2017).

The sophistication of academic and practitioner (school leaders, teachers, architects) discourses around *innovative learning environments* has also evolved. The narrow focus on relationships between learning spaces and students' academic achievement that was pre-eminent prior to 2010 has given way to broader discussions and research about the value to individuals and society about physical access to a broader range of educational activities and experiences, and the potentials of more dynamic learning spaces to enhance such provision.

Interest in learning environment evaluation methodologies and metrics has also aided research in this domain, with resultant findings providing important feedback to decision makers about the types of spaces that can enable (or constrain) different teaching and learning practices (see for example Alterator & Deed, 2013; Byers, Imms & Hartnell-Young, 2014; Cleveland, Soccio and Love, 2016; Imms, Cleveland and Fisher, 2016).

Clearly, further research is required to aid the effective transformations of schools in keeping with societal expectations and the needs of individuals. In many ways, what we have witnessed during the past decade has been a series of forays into rebuilding the systems around which schools operate. Some existing components have been reshuffled and further ingredients have been added (most notably digital technologies), yet more research and evaluation is required to inform and build systemic confidence in new arrangements. The spatial/architectural components of these systems must be included. Continuing to cast a spatial lens over the educational experience can only help us re-imagine schools and schooling, towards realising a

WHY INNOVATIVE LEARNING ENVIRONMENTS?

contemporary vision for teaching and learning and fulfilling the wider *critical* social agenda of education.

BENJAMIN CLEVELAND

REFERENCES

- Alterator, S., & Deed, C. (2013). Teacher adaptation to open learning spaces. *Issues in Educational Research*, (3), 315.
- Apple, M. (1995). *Education and power*. New York: Routledge.
- Bradbeer, C., Mahat, M., Byers, T., Cleveland, B., Kvan, T., & Imms, W. (2017). The 'state of play' concerning New Zealand's transition to innovative learning environments: Preliminary results from phase one of the ILET project. *Journal of Educational Leadership, Policy And Practice*, (1/2), 22.
- Bryman, A. (2004). *Social research methods* (2nd Ed.). Oxford, UK: Oxford University Press.
- Byers, T., Imms, W., & Hartnell-Young, E. (2014). Making the Case for Space: The Effect of Learning Spaces on Teaching and Learning. *Curriculum and Teaching*, 29(1), 5.
- Cleveland, B. (2011). *Engaging spaces: Innovative learning environments, pedagogies and student engagement in the middle years of school* (Unpublished PhD Thesis). The University of Melbourne, Melbourne, Australia.
- Cleveland, B. (2016). Addressing the spatial to catalyze socio-pedagogical reform in middle years' education, 27-49. In Fisher, K. (Ed.), *The translational design of schools. An evidence-based approach to aligning pedagogy and learning environments*. Rotterdam, The Netherlands: Sense Publishers.
- Cleveland, B. (2017). Innovative learning environments as complex adaptive systems: Enabling middle years education. In L. Benade & M. Jackson (Ed.). *Transforming education: Design, technology, government*. Springer. (In press)
- Cleveland, B., Soccio, P., & Love, P. (2016). *Learning environment evaluation and the development of school facility design guidelines*. Australian Association for Research in Education (AARE).
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education*. New York, NY: Routledge.
- DEET. (2002). Middle Years Research and Development Project: Executive summary: Department of Education, Employment and Training, Victoria.
- Fisher, K. (2002). *Schools as 'prisons of learning' or, as a 'pedagogy of architectural encounters': A manifesto for a critical psychological spatiality of learning*. Flinders University of South Australia: Adelaide, Australia.
- Freire, P. (1973). *Education for critical consciousness*. New York: Seabury Press.
- Freire, P. (1970). *Pedagogy of the oppressed*. New York: Herder and Herder.
- Fullan, M., & Langworthy, M. (2013). *Towards a new Eend: New pedagogies for deep learning*. Seattle, Washington, USA.
- Giroux, H., A. & Schmidt, M. (2004). Closing the achievement gap: A metaphor for children left behind. *Journal of Educational Change* 5, 213-228.
- Giroux, H.A. (1985). Critical pedagogy, cultural politics and the discourse of experience. *Journal of Education*, 167(2), 22-41.
- Habermas, J. (1971). *Towards a rational society*. London, UK: Heinemann.
- Habermas, J. (1974). *Theory and practice*. London, UK: Heinemann.
- Habermas, J. (1989). *The structural transformation of the public sphere*. Cambridge, MA: The MIT Press.
- hooks, b. (1994). *Teaching to transgress: education as the practice of freedom*. New York: Routledge.
- Horne, M. (2004). Breaking down the school walls. *Forum*, 46(1), 6.
- Imms, W., Cleveland, B., & Fisher, K. (2016). *Evaluating learning environments: Snapshots of emerging issues, methods and knowledge*. Rotterdam: Sense Publishers.
- Leonardo, Z. (2004). Critical social theory and transformative knowledge: The functions of criticism in quality education. *Educational Researcher*, 33(6), 11-18.
- Mattsson, M., & Kemmis, S. (2007). Praxis-related research: serving two masters? *Pedagogy, culture and society*, 15(2), 185-214.
- McGregor, J. (2004). Spatiality and the place of the material in schools. *Pedagogy, Culture & Society*, 12(3), 347-372.
- McLaren, P. (1998). Revolutionary pedagogy in post revolutionary times: rethinking the political economy of critical education. *Educational Theory* 48(4): 431-462.

WHY INNOVATIVE LEARNING ENVIRONMENTS?

- McLaren, P. (2007). *Life in schools: an introduction to critical pedagogy in the foundations of education*. London: Pearson Education.
- Monahan, T. (2005). *Globalization, technological change, and public education*. New York: Routledge.
- Newmann, F. (1992). Higher-order thinking and prospects for classroom thoughtfulness. In F. Newmann (Ed.), *Student engagement and achievement in American secondary schools* (pp. 62-91). New York: Teachers College Press.
- Newmann, F., Marks, H., M. & Gamoran, A. (1996). Authentic pedagogy and student performance. *American Journal of Education*, 104(4), 280-312.
- Riessman, C. R. (2008). *Narrative methods for the human sciences*. Thousand Oaks, California: Sage Publications.

AFFILIATIONS

Benjamin Cleveland (ORCID iD 0000-0002-0966-1492)
Learning Environments Applied Research Network (LEaRN)
Faculty of Architecture, Building and Planning
The University of Melbourne



Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:

Cleveland, B

Title:

Why Innovative Learning Environments? Stories from three schools that helped establish an ongoing space and pedagogy agenda

Date:

2018-07-26

Citation:

Cleveland, B, Why Innovative Learning Environments? Stories from three schools that helped establish an ongoing space and pedagogy agenda, School Space and Its Occupation Conceptualising and Evaluating Innovative Learning Environments, 2018, 1, pp. 39 - 65

Persistent Link:

<http://hdl.handle.net/11343/216283>

File Description:

Accepted version