Observing the Transformation of Pedagogies and Spaces

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Teachers who look to the future, and to re-inventing a pedagogy so that it is inclusive of all students' needs whilst it also challenges ways of thinking with/in any field, must choose to construct and offer their students a re/vision of the pedagogic contract – a new way of operating in their classrooms.

(Hildebrand, 1999)

Introduction
In Australia during 2009/10, billions of federal and state dollars will be invested in school infrastructure under the Building the Education Revolution (BER) and other stimulus packages. It has been suggested that a significant impediment to educators achieving the pedagogical reforms required by this influx of infrastructure is what Fisher (2004) described as a 'deep spatial silence', or 'unconsciousness', regarding the power of space and the influence that it has over school organisational structures and learning.

For teachers predominantly using teacher-centred transmission models of education, moving into new spaces will entail having to change everyday pedagogical practices, as neither the new pedagogies, nor the re-configured spaces, encourage these approaches. Teachers need to be convinced that the flexible new spaces, environmentally much healthier, are beneficial for teaching and learning and worth expending the effort to occupy them effectively.

Research methodology
At the University of Melbourne, researchers in the Smart Green Schools project wished to investigate the impact of new buildings on teaching and learning cultures –
particularly in middle years’ classes. An interdisciplinary perspective that encompassed the domains of education and architecture was required. A case study methodology (Yin, 2003; Brown, 1992) was selected to allow the investigation of the highly complex influences of learning environments on teaching and learning. A critical social theoretical perspective (Habermas, 1971; 1974; 1989; Leonardo, 2004; Barab et al., 2004) was taken in an attempt to understand school settings and the connections between pedagogy and space. An ethnographic methodology was used to investigate middle school settings. Observation and ‘thick description’, which enable judgements about making comparisons with, or the possible transferability of findings to, other settings (Bryman, 2004) were used (Cleveland, 2009).

We were interested in investigating how space and other organisational structures influenced a school’s socio-pedagogical culture, and how space and pedagogical practices influenced student engagement in learning. Our methodology was influenced by Fisher’s (2002) methodology, and theories, practices and concepts from the fields of architecture and education.

Pedagogical practices
For centuries, the dominant teaching and learning model rested on teacher transmission and student acquisition, and only relatively recently has active student participation in their learning been promoted by education theorists. Why do some teachers still resist the new models? In the foreword to Fullan and colleagues’ Breakthrough, Richard Elmore colourfully expressed what happens when schools attempt to change ‘normal’ practices:

> The default culture [of schools] stretches, seemingly to a breaking (tipping) point, and then it snaps back to where it was. The best ideas of reformers have, as yet, proven no match for the inertia of a powerful resident culture. (Fullan, Hill & Crevola, 2007, p. xi)

This reversal can occur, even after substantial professional development sessions, if the teachers do not absorb the theory behind new pedagogical models of teaching and learning into their existing beliefs and practices or see the benefits for their students.
Our team has observed several Case Study schools over 18 months as they prepare to inhabit new buildings or refurbishments. Following extensive consultation with the school community, an exemplary professional development program was conducted by School A, a P-12 government school. Led by the school leadership team, an education consultant, the architects and interior spatial designers, the teachers were led through a collegial process of writing a vision in preparation for effectively occupying the new spaces. Some staff members (some with their students) planned curricula, team-taught, and worked in trial spaces resembling the soon-to-be-built spaces. The principal made it clear to staff that they were expected to adopt appropriate pedagogies in preparation for the occupation of the new spaces.

A photograph included in an article about the school soon after the staff moved into the newly designed spaces showed a largish space with two sets of desks in rows and teachers at each end of the space teaching in a didactic manner. For the school leaders this image must have been a great disappointment. The photo accompanied a lengthy article about the exciting, innovative spaces and the new ways of teaching and learning they encourage. What would the readers make of the image? It looked like two traditional classrooms with a dividing wall removed. That the photograph described above was even possible was disappointing to the change agents: the principal, curriculum director, education consultant, interior designer, architect and staff who were early adopters of the new pedagogies. Perhaps the photographer looked for an image that said ‘classroom’, saw something like a traditional space, and snapped. Other photos would have featured the purpose-built withdrawal nooks, the accessible wet areas, and/or the tiered multi-use spaces with groups of students engaged in activities.

How was this image possible? Why do some teachers resist changing their practice even when faced with new pedagogical models over many years? Hildebrand (1999) offered a plausible explanation, claiming that it was because the new models of learning were located at the active end of the student participation model. She also believed that a high level of consistency in the pedagogical practices used by
teachers over time had created a sense of what is ‘normal’ and what is ‘other’ in classrooms. She explained it thus:

The pre-existing *pedagogic contract* has been generated by the collective approaches used by teachers in the past: and the particular set of pedagogical practices that has become so established that they form hegemonic pedagogy. (Hildebrand, 1999, n.p.)

Hildebrand believed that the daily lived experience of pedagogy in classrooms incorporated clear expectations of how the ‘pedagogic contract’ would operate within the context of a classroom or school culture and could be shared by teachers and students. Larkin and Wellington (1994) stated that students have a certain expectation of a lesson when they walk into an education space. They quoted a science teacher:

They don’t expect reading and discussion or drama and role-play – they expect bunsen burners and practical work. They do not want to learn that science is not a set of facts, that theories change and that science does not have all the answers – they want the security of a collection of truths which are indisputable. (Larkin & Wellington, 1994, p. 187, in Hildebrand, 1999)

Teachers with whom I have worked have made similar statements about their space – paraphrased: ‘In the art room students don’t want to spend their time engaged in dialogue, they expect to make art’. I think this is because of the operating pedagogic contract. But for the students it is because of the way their teachers teach, how spaces are configured, and where, for example, sinks, taps and computers are placed. To retain comfort levels, teachers defend the way things are, rather than venturing to make changes. They often use the students’ expectations as an excuse for not changing their practice.

Hildebrand lists other factors operating within the ‘contract’. They include: whether students are expected to talk or listen, if problem posing and solving exists, whether students are expected to produce or reproduce knowledge, if there is negotiation around what and how the subject is taught, if there is support for diversity among students, and
whether new forms of learning activities and assessment are accepted by the teacher (1999). So, when a teacher breaks the conventions, the students may resist because they see it implicitly as a break in the pedagogic contract.

However, this has not been borne out by our observations. While there is a difficult and lengthy process behind, and resistance to, changing teachers’ pedagogies, we have watched students quickly adjust to new ways of working with their teachers and peers in both the new pedagogical models and new spaces they encounter. They love the varied spaces that may even look more like home than school – the nooks, the comfy chairs, the ready access to wet areas when needed, the moveable furniture, and lounging around on steps. They move chairs away from in front of computers and squeeze together on ‘ottomans’ working on various tasks and enjoy seeing their teachers team-teach. They are gaining the benefits of shared and discrete teacher knowledge, skills and styles, and enjoying being engaged in activities that cater for their diverse learning styles. Previous behavioural issues appear to dissolve. In turn, the teachers are buoyed by the experience.

What are the new pedagogies?

Caldwell (former Dean of Education, Melbourne University), speaking at a steering committee meeting at School B prior to the commencement of the building of a new purpose-built middle years’ facility (27/3/2009) said that the new pedagogies entailed neither ‘hands-off’, nor ‘discovery’ models, and did not require micro-management. He said that, given that most of today’s students are already producing their own e-products via the technologies available in their homes, curriculum activities needed to be challenging, offer trial and error opportunities and global and local community content and multi-disciplinary approaches. He saw students working in learning teams on constructive and meaningful programs in a variety of locations – virtual and real – as the future. Caldwell referred to another prominent UK educator, Ken Robinson (2009) who believes that building creative capacity will be the core business of 21st Century schooling. A recognised leader in the development of creativity, innovation and human resources, Robinson’s ABC television appearances in mid-
2009 ignited Australian educators’ imaginations through his promotion of the power of progressive pedagogies.

New ways of teaching and learning
In 1999 Hildebrand cited extensive research that claimed that, for fifteen years, the constructivist model of learning had been the dominant paradigm that informed research into science education\(^1\), even if it was rarely seen in classroom practice. Now, ten years later, constructivist approaches are still viewed by many as 'new' pedagogies.

Most teachers who use constructivist approaches prefer 'community' models, where collaboration and co-operation are the modes of operation, to 'conflict' models (as in cognitive conflict, Adey & Shayer, 2000). The favoured models include the philosophical inquiry model with its community of inquiry (Lipman, 1988) and Lave and Wenger's (1991) concept of communities of situated learning. These models are underpinned by Vygotsky’s belief (1986) that meaningful knowledge is constructed within socio-cultural contexts where shared understandings develop through interacting with others and where the teacher supports or 'scaffolds' the students' learning.

In teacher education today, the linking of ages with stages is (reasonably) viewed as outmoded. This does not mean the content of Piaget’s stages should be forgotten. It is important for teachers to understand that, by engaging students in activities that test their cognitive boundaries, they will progress through to the higher levels of cognitive and affective learning. Taxonomies (Bloom, Krathwohl et al., 1956; Anderson, 2001, etc) provide checklists for teachers to use when attempting to identify the presence of higher order thinking skills in both teaching and learning.

According to Hildebrand (1999), even models that encourage students to participate in discussions, undertake original investigations, or design original artefacts can be considered as low-level participation unless there is an expectation that the students will challenge or critique existing practice – a model of learning that Hildebrand described as 'critical activism'. In this learning model, students learn to be actively critical with/in a community. It is this model that the new pedagogies foster.

\(^{1}\) Hildebrand’s frame of reference was science education, but she claimed (and I agree) that the model was transferable across fields.
Teachers reveal their beliefs about teaching and learning through pedagogical practices that are observable. Hildebrand (1999) simplified practice in a helpful way:

1. If teachers ‘tell’, they are using a transmission model.
2. If they provide students with opportunities to reflect on their views, challenge them and support active rethinking of their positions, then constructivism is the model.
3. If they use modelling and experiential learning, then situated cognition (critical activism) is the model.

The third model is regarded by many practitioners as innovative, but, in some cases, even the second model is not practised. Because two and three break with the common transmission and participatory models, they are often met with resistance unless the teachers see the need to change. This requires immersion in educational theories that make sense to them, together with modelled classroom practice.

The researchers, education consultants, and designers in our project are reporting that those teachers not adopting the new pedagogies appear to lack depth of knowledge or understanding of learning theories in association with their practice. They have found some teachers cannot articulate whether their practice belongs to category 1, 2 or 3 above.

Teacher education, departments of education, schools and teachers themselves share the responsibility for this state of affairs for the following reasons:

- If insufficient time is allotted in teacher education courses for immersion in theories of learning, then existing beliefs about practices, usually based on their experience as school students, prevails. Raymond (1997, in Ab Kadir, 2009) found that teachers' experiences as school students is as likely as any other factor to influence their beliefs about teaching content.
- Trainee teachers only receive brief introductions to the theories of, for example, Vygotsky, Paul and Friere – perhaps in a single session. Walker (2009)
believed this was partly due to the influence of the relativist social psychology research and postmodernism of the 1980s when these models began to dominate teacher education at the expense of immersion in the philosophical underpinnings of learning theories.

- Often trainee teachers might not see new pedagogical practices in schools they visit for their practicum. They are virtually powerless to try innovative models when under the supervision of some teachers. The cultures of the schools they train in and enter on completion of their course have a profound influence on their practice.

- Specialised courses, mainly at the Masters or Doctoral levels, explore the work of particular theorists, but enrolment in such courses remains low because departments of education offer teachers no career incentives for gaining further qualifications. Departments of education tend to prefer in-house professional development based on recent curriculum documents (and/or fads!) and research into their practice (with no formal qualification awarded).

- Practising teachers undertake little professional reading, claiming they are overwhelmed by ever-increasing responsibilities and accountability requirements.

- Emphasis on narrowly applied concepts of literacy and numeracy distracts practitioners from evaluating classroom practice and experimentation.

- Traditional classroom spatial configurations do not encourage varied pedagogical activities.

As well as the complexities of today’s classrooms and the competing priorities impacting on teachers’ time, other obstacles that can hinder teachers from employing the practices that reflect their beliefs range from clashes with school priorities and philosophies and lack of expertise, to restrictive physical spaces and timetables.

The factors outlined above help to explain why, for some teachers, the ‘pedagogic contract’ hardly changes, and/or why new practice ‘snaps back’ to where it has been (Elmore, in Fullan, 2007). Unless there is an underlying
theory behind practice and sufficient time to adjust to new ways of working, the practitioner reverts to the familiar.

New spaces and 'new' pedagogies?
As observers, we had hovered around the edges of staff discussions during School A's professional development sessions. It was obvious that, despite best intentions, absorption of the processes and thinking about the new teaching methods and models that would be needed was minimal. In one session, group presentations demonstrated they were trying to grapple with too much information. Staff presented on issues like Cultural Development, Ownership, Resources, and Visions of the Learning Culture. Each of these, and there were others, covered educational and strategic issues that were enormous in scope with sufficient material for a session on each – there was just too much to think about.

Significantly, there were no plans or models of the new spaces anywhere to be seen while the teachers were discussing the move to the new spaces. This disconnection was unfortunate, given the questions that arose, some being:

- What sort of technical assistance will be available?
- Will each mini-school have its own wet areas?
- Are there any social meeting areas or teacher common rooms?

These questions indicated that if the teachers had seen plans of their new spaces, they had not been able to read or digest the spatial changes they represented. It seemed clear they needed to be provided with representations of the spaces that they could understand e.g. orthographic drawings or a model of what was being proposed (and currently being erected 100 metres from where they were meeting) so they could fully understand the spaces, scale and furnishings.

The groups' presentations were based on existing knowledge and ways of operating. We would have liked to see them considering their desired outcomes for occupation of the new school, and how they might achieve them given the new spaces i.e. start putting themselves in the picture. There was little reference to space other than storage and offices, and the teachers did not seem able to picture
themselves working in the new classrooms. Talk about learning spaces was not on most of the teachers' radars. Previously in their teaching careers none had any reason to think about teaching spaces other than to move chairs and tables for group work, and none had been involved in the building of new facilities. Supervising repairs, or having new buildings allotted with virtually no staff input, was the most anyone had experienced.

If initial teacher education or subsequent experiences have not provided a philosophical base for practice, if professional development sessions have not resulted in the use of pedagogies centred around engaging students, then perhaps exciting, reconfigured physical surrounds might be just the catalyst needed to bring about a re-thinking of practice. If spaces offer flexible settings, if they look like the examples provided below (Figure 1), if there is no discernable 'front', would teachers be prompted to think about their teaching practice? Could they continue to use the transmission model in the spaces below?

![Figure 1: First story floor plan – Case Study Middle School A](image)

It seems the answer is that, unless their beliefs and theories of learning and practice are altered, teachers tend to reorganise any space to resemble the layout of a traditional rectangular classroom.
At School A, the leadership team, because of their enthusiasm, their lengthy consultation with staff and ongoing professional development sessions, hoped that all staff members were on board. It became evident that it was only the staff who had used the new pedagogies prior to the move into the new spaces, and/or those that had the opportunity to practise teaching the new models in the ‘facsimiles’ of the new spaces, who were using the spaces appropriately. In a few cases, the lengthy professional development coupled with occupation of the new spaces had brought about changes to pedagogical practices. All the above-named groups were team teaching, using interdisciplinary approaches and centring their content on student-based activities.

Resistance to the new spaces
Will the new spaces most schools receive as a result of the BER money be the impetus that brings change? ‘Chris of Hurstbridge’s’ letter to the editor (The Australian, June 24, 2009) reflected the strength of resistance we have heard elsewhere. Responding to an article that claimed that the ‘new’ BER school designs were outdated (The Australian, June 23, 2009) she/he wrote ‘Experienced teachers know that behind the edu-babble slogans of “collaborative learning centres” and “flexible spatial arrangements”...lurks the failed 1970s fad of the open classroom’. Then followed the usual arguments against the new spaces:

...proposed by ‘hippies of the 1970s’ now running education departments and architectural firms: subject expertise is discounted, conscripted teachers supervise as many as 200 students in one learning space, students aren’t being taught, the mode was abandoned 30 (40!) years ago.

Mark H. of Queens Park NSW, in the same column, added another common claim, paraphrased: we were educated in a class of 100 (later 40), our teachers did not need electronic whiteboards or covered outdoor learning areas and we all attended universities or were successful elsewhere. Mark finished with ‘the government’s education revolution could just be a huge waste of public funds for no genuine reform’.
Sadly, both the letter writers could still be proved right if the building and occupation of the spaces is not handled well. But neither Chris nor Mark H. had read the newspaper article properly. Mark Kelly, Head of Woods Baggott, an international architectural firm that had been involved in school designs for decades, said the new BER template classrooms were based on the traditional top-down teaching system, with the teacher lecturing to a seated class. He reported that the more innovative designs featured circular tables or more flexible spatial arrangements that allowed children to interact and learn by participation. Kelly may have been talking about the templates of other states because some of the Victorian templates that have evolved over the past few years contain innovative and effective learning spaces similar to those we observed at School A.

Critics seem to assume that the school buildings of the 60s and 70s were not based on solid educational foundations. However, in the introduction to his text, Morriseau (1972) lists the ways the learning spaces were a direct outgrowth of education reform. The list is remarkably similar to the factors behind today's spatial reforms. It shows that Open Spaces were not just designer imposed. Some of the factors behind the 60s' designs were:

- The curriculum was upgraded.
- Team teaching and other innovative strategies were emerging.
- Non-graded continuous progress programs for individuals were designed.
- Students were made more responsible for their learning.
- New technologies were changing practice.

The architectural responses to, and challenges posed by, the new pedagogies and practices in the 60s and 70s resembled those faced by today's designers of educational spaces. A building designed around team teaching required spaces for groups (large and small), seminar rooms, some traditional spaces and spaces for independent study. However, Morriseau believed that many of the new spaces were as rigid and inflexible as their 'egg-crate' predecessors (and successors!) and would not be able to adapt to newer/later educational reforms. He reported that operable
walls were often left permanently open or closed. Open, they often prevented acoustical effectiveness and their lack of ease of operation meant that internal structural supports were needed. Members of our team have observed similar situations in new schools visited in 2009. 'Schools-without-walls' is the 60s and 70s model best-remembered and most maligned by those who use this model as the reason to oppose all the new educational spaces. In this version of open planning, there were no fixed walls or partitions, and moveable partitions and screens provided visual privacy. In theory, acoustic protection was to be provided by carpeted floors, sound-absorbent ceiling tiles and adequate physical separation of class groups. Educators and designers who supported the open plan buildings of the 60s believed these open spaces were adaptable to any educational teaching approach.

Preparing for new learning spaces
In terms of teacher preparation for inhabiting new spaces, none of the teachers we have observed in our study had concepts of physical learning spaces or architectural terms mentioned during their teacher education. In order to address this absence, systematic inclusion of spatial awareness to expand the teachers' content and pedagogical knowledge base is required for both practising teachers and during initial teacher education. Fisher is currently preparing a Teacher's Change Management Toolkit to assist schools to prepare for and inhabit new infrastructure. Teachers build their knowledge with experience, but it must be based on a solid theoretical foundation and accompanied by concrete classroom application, practice not description, and collegiate support or collaborative, shared learning. Theoretical aspects of space must be contextualised in the light of classroom experiences and have explicit, meaningful application to classroom practices. This is referred to as situated learning or pedagogical content knowledge grounded in classroom practice (Nilsson, 2008).

The relationship between changing pedagogies and the occupation of spaces
In School B, a P-12 private school we are observing, the principal's strength of vision and determination to bring about wholesale change to teaching and learning practices
was forcefully stated at the beginning of a lengthy process leading to the occupation of a middle years' learning space under construction:

The silo model currently operating in the junior school is no longer an appropriate model. Neither is secondary teachers using 'teacher control' and isolated subject content. Learning is too complex to be encased this way. Research is showing that puberty is occurring earlier and current learning theories reveal that students learn in a variety of ways in a range of settings. A new language of learning is required. Good leaders are required for the 21st Century – people who are able to think creatively. Our current model of teacher control, 'busy work' and summative testing model inhibits creativity.

The principal believed it was important for her staff to speak up about their concerns regarding the process of adopting new pedagogies and inhabiting new spaces, and to admit it if they did not understand theories and/or jargon. She understood that some staff members would need 'hand-holding' as they undertook change, professional development as required, and the opportunity to investigate pedagogical and built models outside the school and find evidence of improvement in outcomes. This process is occurring at Schools A and D.

At the same session, the deputy principal described the traditional practices still observable in the lower secondary school. The Year 7 curriculum was described as the 'Know Zone' delivered via 11 teachers through 11 subjects. The Year 8 program comprised 6 x 50 minute sessions per day on a 10-day cycle. Improving the current uses of existing buildings, leadership structures, timetabling and pedagogies was to be undertaken. The principal added: 'As I walk around the school, I am not seeing de-constructed physical spaces or team teaching'. She believed the Middle Years' Learning Centre could act as a research hub that generated the evidence that the new spaces would aid the adoption of new pedagogies. The key requirements were the same as for any stage of schooling, but with an emphasis on adolescence.
Raising the profile of the role of learning spaces in learning, Ritchhart, a member of Harvard’s Project Zero and extremely influential in teacher education today, named the environment as one of eight cultural forces that complement the criteria for classroom thoughtfulness. In his study that sought evidence of these forces, number eight was ‘The physical: environment and artefacts present in the room’ (2002, pp. 146-147). He mentioned the classroom environment when he spoke at Melbourne University (27/5/09), saying that 62% of teachers surveyed for his study referred to changes in their classroom environment but gave no detail. When asked for clarification, expecting (or rather, hoping) that this international leader in the education field was referring to education spaces, Ritchhart replied:

I don’t have anything written on environment. This data I was referring to was from an analysis of teacher reflections on the changes in their classrooms and instruction. When it comes to the environment, most of the comments related to documentation of students’ thinking. (Personal communication, 9/6/09)

He attached the results to his email, and examples like #3A ‘Materials are displayed neatly in clear storage containers so students may be inspired by their color, form, shape, texture etc’ probably did not refer to classroom space. However, the next section, ‘Environment: classroom set-up’, contained quotes from teachers that could only be thought of as spaces specifically set up to accommodate the new pedagogies advocated by Ritchhart and the other Project Zero leaders (i.e. David Perkins and Howard Gardner):

(#2A) My classroom: placement of chairs at table groups to maximize ease of small group to whole group discussion.
(#27A) The first thing an outsider notices is that my classroom is set up for discussion between my students. In years past (long past) my set up focus was to present discussion.
(#35B) Change in physical environment of classrooms.
(#39A) Physically my room is set up in small group areas. I now have a gathering space where
we can share our ideas and make them visible in writing.

Ritchhart does not appear to regard classroom physical and spatial elements as environments and important as separate entities. Given his influence in teacher education, this represents a lost opportunity.

If we accept that cognitive, physical and affective intellectual development rely on interactive, dynamic and creative processes, and if we accept that people have preferred thinking and learning modes (e.g. visual, kinaesthetic, aural, scientific etc), then it is reasonable to believe that learning spaces should provide the environment to foster this development. The curriculum and research leader at School B (interview, 15/5/09), although acknowledging that spaces played an important role, believed that good teachers could operate in any space, and therefore her emphasis would be on establishing the new pedagogies prior to occupation of the new space. Educators and designers at School A had a different point of view. Establishing the new ways of teaching and learning were regarded as integral to the built environment being created, but the education spaces were seen as paramount. Featherston, the interior designer who had been part of the PD process almost from inception, believed the elements of spatial visual transparency as well as acoustic containment were a vital component of education (interview, 21/5/09). As well, she said that the students who will be:

...on one floor plate should feel part of a community. This helps build a relationship of respect and trust. The transparency of spaces (i.e. lack of barriers) means they can learn about, and from others. This helps them build a sense of identity in relation to others. All of this leads to rich learning experiences and opportunities to learn from closer personal relationships.

In new and more open spaces (but not those as open as the model from the 60s and 70s) teaching activities will still need to be adjusted according to the spaces. For example, it would be difficult to have a community of inquiry discussion adjacent to the lounge area because the noise would impact. Featherston believed that there was a quality
of experience tied to the richness of the varied spaces. Activities could progress from playful, to experimenting, to sustained inquiry, with resources available nearby, as and when needed. Traditional classrooms cannot offer this flexibility. School A's education consultant believed that once the buildings were there, the teachers would have to review their principles and values.

A major advantage believed to be provided by the flexible spaces at School A was that the staff members could form close relationships as a result of team building and collaborative teaching models that both they and their students enjoyed. On occupation of the new spaces, discipline problems had virtually disappeared. It was believed that this was because the students felt privileged to belong to specially designed 'home' spaces and were engaged by the new activities. Attendance rates had rapidly improved.

Unfortunately, having new spaces does not automatically equate with engagement of students. At School C, another Year 7-12 government school, we observed teachers with minimal preparation to inhabit and operate in newly configured spaces (Fisher, personal communication, 12/12/2008) trying to operate as individuals using traditional teaching methods (to the extent that this was possible) and not engaging the students. 'Nooks' merely offered opportunities for students to be off task and unobserved, one group of boys spent an hour in the toilets, and the teachers spent much of their time disciplining other students trying to keep them occupied.

Bunting, an architect (also at the School B planning session, 27/03/2009), believed that schools today should be providing for personalised learning and using community resources as an open classroom e.g. the local racecourse or the nearby university campus. Other essentials were that the scale and size of buildings and landscape had to be right, and third spaces i.e. spaces not committed to anything, but where students could hang out. He asked, 'Can we follow, in school design, the changes for the better that have occurred in home design?' This seemed like an excellent starting point for discussions about the design of educational spaces.
'I can't visualise the space until it rises out of the ground': school leaders think about the construction process

Hedley Beare, the respected Australian educator and writer (speaking at School B, 27/3/2009), stressed that a narrative that summed up what a school wants to achieve must remain the essential driver of all phases of the construction process. He believed it was vital for school communities to envision how staff and students would fit into new facilities and ensure that teachers, parents and students were involved from the beginning and that pedagogical approaches and the provision of ICT fitted their vision. The speed associated with the BER was not allowing any of the above.

'Transforming Pedagogy and Space' was the name given to a hastily called assemblage (12/3/2009) of school leaders from Melbourne's southern metropolitan region. The need for haste resulted from the federal government's BER grant (billions of dollars) for new buildings and refurbishments that had an unreasonably short timeline attached. The speakers included Fisher and Goddard, education spaces expert consultants with knowledge of the international scene.

An 'aha' moment for those in the room occurred with the realisation that over the past forty years, these school leaders had barely needed to think about their schools' built environments other than for maintenance issues or to occupy a pre-designed, allotted space. They were used to holding school community barbecues to raise money to repair leaking roofs, having working bees where parents painted walls, and making-do with their buildings and grounds. Space had not been considered alongside pedagogy, except perhaps when moving classroom furniture aside or using corridors for discussions, gym or group work.

The school leaders at the seminar were unsure about how many details the community would need to provide if an architect, draughtsman and/or facilities planner was assigned or briefed. During this discussion, terminology became an issue as 'foreign' terms arose e.g. building footprint, egress etc. This led to the realisation that, for communication between designers and educators, architectural language would need to be in layman's terms or explained. The educators realised they would have to learn to read plans and develop knowledge of technical
specifications and building codes. Other items to be attended to would include security, maintenance and access issues e.g. changing globes in high ceilings, energy ratings considerations, how spaces would function on wet days, traffic management issues, and the involvement of local authorities in aspects of the new build. The installation of new technologies (always changing) would require appropriate power and cabling infrastructure and teacher development associated with the new technologies, and this involved financial implications and extra technical staff.

Some of the school leaders had experienced the 'schools-without-walls' design of the 60s and 70s noted for their poor acoustics, lack of storage, little opportunity to display or store projects, and accompanied by a general lack of teacher acceptance of the flexibility they provided. They recognised that the size and function of spaces, including circulation issues and catering for different groups' needs, would have to be carefully considered and catered for. Also, the brief would have to be properly developed so it was clear how the spaces would be used. Details of placement of furniture and positioning of power points to ensure that lockers did not cover vents would also be required. The inclusion of environmentally sustainable design features and functionalities was seen as essential.

They foresaw that meeting budgetary constraints without affecting the integrity of the design would be a challenge. There would be a need to first set the budget, get an elemental cost plan and investigate the impact the desired finishes would have on the cost plan. They wondered whether they could prevent the landscaping and acoustic features from being the first elements to be taken out of the brief due to a budget blow out. They knew that risk management for the project (trip over cables, trolleys etc) and an ESD plan would be other factors to consider.

The thought of new spaces exposed the need to change existing traditional pedagogies and practice to the collaborative, inter-disciplinary (or multi-disciplinary) models encouraged by the new spatial concepts. Ongoing professional development for staff, from the planning phase to occupation, was seen as a vital component of the move into new spaces, but was there support or funding for this? There was nothing obvious in the BER announcements. The BER seemed to be more interested in supporting the
building industry. Lengthy PD and the opportunity to look at other schools’ layouts and plans and visits at pre- and post-occupation stages were seen as important factors in the preparation to build. (In August 2009 Victoria’s education department announced there would be assistance for schools undertaking building projects.)

In secondary schools, the transition program for students moving from primary level to Year 7 would need to include positive information about, or experiences in, the new spaces, as they would not fit primary school students’ stereotypical vision of what being in a secondary school was like i.e. ten subjects, teachers, rooms etc.

It was recognised by the school leaders at the seminar that during both the design and build stages, decisions would have to be made about who the members of the school leadership group would be e.g. principal, ICT expert, curriculum coordinator and council representative. Other roles would include individuals involved in pre- and post-build. For example, who would meet with the tradespeople, select and order furniture, hire maintenance staff and decide on the siting and configuration of ESD factors (e.g. acoustics, lighting, ventilation etc), and who would be responsible for training and operating monitoring equipment? Other factors to consider would be: coping during down-time in administrative staff areas, covering teachers needing student-free time while occupied in business associated with new buildings, finding out about electrical and plumbing certification, establishing checklists for defects, liability, warranties, deciding where to store the new furniture and equipment as it arrives, and determining who would decide what equipment would be re-used and move it.

It was obvious to all present that the plans for their new facilities should follow decisions about visions for the future school, and whether to use the existing BER templates - rather than adopting, or even adapting them. They felt there was no time to undertake this process adequately.

One major question remained: could the teachers visualise the spaces they were about to plan and then occupy? It was agreed that not many teachers, including those at the seminar, had these skills or the ability to read plans. Who and what could help them?
The role of the designers
It seems obvious that designers will benefit from knowledge of current educational pedagogies. However, if there is an inconsistency in the way that organisations are moving ahead, for example, some staff members are adapting while others remain resistant, it places the architects who are responding to the key contact personnel, in a difficult place. They are acting in good faith and responding to a brief – usually from school leaders plus selected others. But unless they have contact with the inner workings of their client schools, they will not know whether the project is being conducted in a cohesive manner within the organisation. Following their initial briefings, architects probably assume that schools are presenting a united picture of the school’s aims. They need to maintain contact with the whole staff on an ongoing basis.

Models for this practice exist elsewhere. As part of the building process of the National Australia Bank’s Docklands centre in Melbourne, the architects were trained in change management. Teams spoke to groups of future users of the new spaces who were able to express their different needs and understandings. It was these workshops that generated the design brief.

In the case of new schools, space can be the driver of pedagogy, but the occupiers must be able to understand and manipulate spaces to support their educational vision. As well, the demands of the clients can create a new world of design use and management (Thomson, in Worthington, 1997) so a two-way learning process can occur. Prior to the build, DEGW sends questionnaires to all staff asking for their current uses of space and changes they feel would assist their teaching approaches. Of course, this requires teachers to be able to think spatially i.e. about current spaces and how they might be improved. We are hearing from designers that teachers find this very difficult. It is similarly important for the designers to gain knowledge and understanding of current and innovative practices and pedagogies in order to be able to assess the spatial effectiveness of the current situation. This data can be used to model different scenarios that modify key elements, for example, new technologies will require modified storage spaces.
Thomson (1997, p. 120) suggested that design-related presentations to key leaders and staff should include the major issues arising from the analysis of questionnaires and staff focus groups, understanding of major facility management issues, and a range of concept options and their impact on the future. He believed that concept development should include:

- Plans showing how spaces might be used;
- Budgets detailing all spaces;
- Descriptions of work settings and technological requirements;
- An indication of the new management policies that the new spaces will require.

In schools, a post-occupancy phase for the designers would involve: asking teachers about their experience of the spaces, ongoing discussions of the designers' aims and concepts of the spaces, and a revisiting of the data gathered from initial questionnaires. This would keep both the designers and teachers involved in ownership of the spaces, provide valuable insights for the designers, and hopefully assist the occupier's sense of purpose. Providing sufficient time for helping the occupiers to adapt to new spaces is vital, because in most instances their pedagogies will be changing. Thomson (p. 122) saw appropriate occupier training as a vital component of the change process. He stated that no project should be regarded as a 'normal' fit-out because of the human element. Any actions that affect spatiality will be complex because it entails all the conditions and practices of individuals and groups in relation to their environments.

**Formal preparation of staff**

As stated previously, initial teacher education and in-service PD are vital components of teacher knowledge. In the case of major change, whole school ongoing PD is paramount. Teacher education institutions should take responsibility for their role in systemic change. It is vital for teacher training institutions to look for opportunities to inject built space awareness into their courses. For example, members of the Council of Educational Facilities Planners International (CEFPI) visited trainee teachers at Melbourne University (13/5/2009) to introduce the link between educational spaces
and pedagogies. The university staff followed this with activities that immersed the students in thinking about physical spaces and places for learning (beyond dividing children into groups, moving chairs etc). Groups of teacher trainees were given photos of traditional and innovative primary school classrooms and asked to consider the following questions about space and the learning environment:

- What do the classrooms tell you about the learning environment?
- Describe how the physical layout of a classroom can affect the learning environment, enhance learning and minimise disruption.
- What are the messages about learning and thinking inherent in the spaces?
- Does the physical environment depicted respect the inhabitants of the space?
- How is the space organised? (Think of interest areas/activity centres and personal territories.)
- How are the physical layouts inclusive of all students? (e.g. child with a learning difficulty, child with hearing loss or visual impairment, child who is easily distracted.)
- What are the advantages and disadvantages of the physical layout of the classroom? (Think about movement from one activity to the next.)
- How would you improve these learning environments spatially?

Engaging trainee teachers to think about spaces is valuable preparation for their future occupation of spaces whether new or traditional. Universities in Australia are starting to provide innovative spaces in which trainee teachers can practise teaching the new pedagogical approaches within appropriate spatial environments. In some instances the furniture and ‘fittings’ are not fixed and can be manoeuvred to suit session requirements.

In schools, a shared understanding of values, vision and structure will be required before starting the building process and this will need to be revisited as new spaces are occupied. It will be important to think long term about new spaces that will be occupied by teachers and students for
many years to come. Both envisioning and visualising spaces are skills that are very difficult for students and teachers. It has not been part of their education. So graphical representations (e.g. orthogonal diagrams) of the new spaces should be produced, and teachers, students and parents should be given the opportunity to accept and reject features. As well:

- Set up opportunities for teachers to visit other schools with innovative spaces;
- Establish trial spaces to familiarise staff with approximations of the new spaces;
- Engage teachers in co-teaching activities and planning;
- Assure the teachers that it is okay for it to seem like a mystery to begin with.

It is important to ensure the new school spaces will be understood by the user-community by inviting teacher, parent and student voices. In the UK *Joinedupdesign* model, the local council supervising the design and build of new schools brings together a whole school community and the designers. Ty Goddard (Head, British Council for School Environments, 2009) reminded school representatives (Wesley College, Elsternwick Campus, 11/3/2009) to ensure they get a ‘welcome’ to students into the design because of the need to establish ownership (Kidder, 1991).

The creation of new spaces has been driven primarily by constructivist philosophies with student engagement as the desired outcome. Their effectiveness will be measured by the extent to which the teachers are satisfied with both the pedagogical practices and the learning outcomes occurring as a result of occupying these spaces.

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