LEARNING SPACES
The transformation of educational spaces for the 21st century

Clare Newton + Kenn Fisher (Eds)
TAKE 8 EXPLORES THE INTERSECTION BETWEEN ARCHITECTURE AND EDUCATION WITH A FOCUS ON AUSTRALIA.
TAKE 8
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LEARNING SPACES: The transformation of educational spaces for the 21st century.

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TAKE 8 contains a mix of refereed journal articles, papers by practitioners, case studies and edited transcriptions of interviews and advice from professionals and academics working in the field. The papers and interviews will take you through the process from design conception of the educational philosophy to the implementation of new learning spaces.

An ambition for TAKE 8 is to support better communication between educators and designers. We have included two glossaries in recognition that we come from different disciplines with our own tribal languages and ways of knowing.

Space is irrevocably linked with pedagogy. The shape and size of the spaces, the furniture, and the finishes are silent influences on the behaviour of educators and students. The interaction between space and learning is complex and the impact of the space on teaching can be invisible to its occupants. Not surprisingly, the most innovative spaces have evolved as design responses to strong pedagogical direction in schools.

TAKE 8 can be viewed as being organised largely into two categories. The first can be considered under the overall concept of educational planning which includes the first three chapters:

- Educational transformation (Lynne Sutton, Sue Wilks)
- Linking pedagogy and space (Mike Davies, Ty Goddard)
- Learning environments—formal and informal (Peter Stewart, Ken Woodman and Ben Cleveland, Peter Jamieson)

The second significant category of the TAKE 8 organisational model is that of planning and design. These themes include the following authors:

- Civic connections (design and community) (Max Chester, Stan Salagaras)
- Design and architecture (Mary Featherston, Geoffrey London and Jennifer Calzini)
- Sustainability (Dominique Hes)

The two categories are best understood as loose rather than defined. It is difficult to tease pedagogy and educational transformation away from planning and design. These close links between pedagogy and design are best illustrated in the case study interview on Dandenong High School.

1 Researchers at the Faculty of Architecture, Building and Planning at the University of Melbourne received ARC Linkage Grant funding to investigate the influence of innovative and sustainable school building designs on the education of middle-year school students. A teacher and architect were awarded APAI scholarships to work on the research topic in collaboration with the five Chief Investigators. The research is unusual in that it sits at the intersection of education and architecture. The Chief Investigators Clare Newton, Senior Lecturer in Architectural Design and Practice, Dr Dominique Hes, Dr Sue Wilks, Dr Kenn Fisher and Professor Kim Dovey respectively come from the diverse fields of architecture, sustainability, education, facility management, and urban design. Partners for the Smart Green Schools project are The Department of Education and Early Childhood Development (Victoria), the Office of the Government Architect (Victoria), Hayball, Mary Featherston Design, H2o Architects, McGauran Giannini Soon Pty Ltd, Sustainable Built Environments, Rubida Research, & McBride Charles Ryan. Loris Malaguzzi The Hundred Languages of Children: Catalogue of the exhibition. Reggio Children 1996 p.40
Educational planning is a concept that has been adapted from the health sector, where health planners are in great demand to work alongside doctors, nurses and administrators together with design teams of architects, engineers and quantity surveyors. They, and educational planners, develop and articulate an operational model that involves interpreting key discipline concepts and outlining these to architects. Conversely, they also work with architects to interpret their design language so that teachers can engage with the collaborative design process.

Editor Kenn Fisher has written extensively on this and likens the role of educational planners to that of advocating spatial literacy. This is an important concept in education, particularly as multiple literacies, as espoused by Gardner, reflect the significant array of literacies and competencies learners—and teachers—need.

Both Australia and New Zealand are recognised internationally for their innovative approaches to education curricula and learning spaces. Ty Goddard, Director of the British Council for School Environments, worked with the Smart Green Schools team during several months in late 2008 and early 2009. In an interview with the editors, Ty Goddard records his impressions of innovation in school design within Australia and notes the differences and similarities with the UK.

To an extent, the Australian state and federal governments have been following in the footsteps of the UK in terms of funding and processes. Both Australia and the UK have committed unprecedented funding to education infrastructure in recent years. The UK Building Schools for the Future, BSF, program was a strategic approach to capital investment announced in 2004. The UK government in partnership with local education authorities aimed to upgrade, rebuild or remodel schools so that every child would be educated in 21st-century environments which were ‘flexible, inclusive and attractive’ (see extract right).³

Australian governments made a similar commitment to upgrade schools. In TAKE 8, initiatives developed within the Department of Education and Early Childhood Development, Victoria, are described in interviews with Lynne Sutton and Peter Stewart. Concurrently, other Australian states have developed programs for upgrading and rebuilding schools. Education departments in some states across Australia are developing schools through a procurement process called Private Public Partnerships, PPPs, similar to the UK Private Finance Initiative, PFI. In this process, developers build and manage the school environment for a lifespan such as 25 years.


EXTRACT FROM A 2004 FACTSHEET FROM THE PRIME MINISTERS’ OFFICE—UNITED KINGDOM

Prime Minister Tony Blair said:

“Over time this investment will see the entire secondary school building stock upgraded and refurbished in the greatest school renewal programme in British history.

Capital funding available for investment in school buildings has risen sharply from £683 million in 1996-97 to £3.8 billion in 2003-4. It increases further to £4.5 billion in 2004-06 and to £5.1 billion in 2005-06.

BSF will include both conventional and Public Finance Initiative funding. Of the £2.2 billion for BSF, £1.2 billion (55.5%) will be covered by Public Finance Initiative credits.

Spending on schools in Australia accelerated exponentially this year. In February 2009, in response to a world-wide economic downturn, the Australian federal government committed $16.2 billion over three years for the Building the Education Revolution, BER, program. Spending was focused on primary and secondary school infrastructure along with 500 new science laboratories and language learning centres in secondary schools. What was the catch? Spending had to happen quickly. The government’s focus was primarily on job creation and protection to avoid a recession. State education departments quickly developed a range of template designs to facilitate schools getting proposals funded and ready for construction. It is too soon to capture the impact of this rapid spending. The template designs developed for the state of Victoria have operable walls which enable choice between a traditional classroom setting and a more fluid open-plan setting. Keeping options open has meant that the settings are not bespoke matches between pedagogy and space as seen in the Broadmeadows, Dandenong and Australian Science and Mathematics School case studies.

The question of why classrooms have persisted for so long cannot be ignored. There is a dark joke that has been around educational circles for some time, imagining Rip Van Winkle waking up after 100 years. He is bewildered as he visits airports, offices, shops and hospitals. Nothing is familiar until he finally sees a classroom and knows exactly what it is even though the blackboards are now white.

Many teachers at school and university levels remain committed to the classroom and lecture theatre as the best venues for teaching and learning. The open-plan schools from the seventies and eighties are still fresh in our collective memory and are often remembered as noisy and chaotic learning environments. There are lessons which can be learnt from that time but there are also new opportunities particularly because of the ease with which students can now access information and networks of people. The paper by educator Ben Cleveland and architect Ken Woodman tracks school design in the eighties against current thinking.

What is different for today’s students? The access to information and learning within a virtual world is pervading and enriching student learning. This year, the Australian government has committed $43 billion over eight years to roll out a National Broadband Network which will reach 90 per cent of homes. We will be the first country in the world to have such an extensive network enabling information-rich content to be rapidly transmitted. Concepts such as ‘cloud computing’ will mean users can access infrastructure and programs via the internet without reliance on a particular computer. For students, the learning environment will more easily extend beyond the classroom walls. Global neighbourhoods will be enabled with students more able to work and play effectively within collaborate groups that are non-collocated.

Schools are gradually changing from classrooms into learning and information environments. Students play, communicate and learn in virtual as well as physical worlds. Schools are therefore shifting from teaching institutions to learning organisations through increased connectivity between students and their local and global environments. As teachers are released from being the knowledge providers, they can work with students as co-learners on authentic problems which draw on interdisciplinary knowledge. Physical space for learning environments is being rethought as interdisciplinary learning requires a range of settings.

Funding for both schools and higher education environments needs to be adjusted to recognise the importance of informal learning. Associate Professor, Peter Jamieson has written a paper which describes new campus based initiatives to support informal learning. Spaces for informal learning and collaboration need further consideration in the internal and external school settings. Editor, Clare Newton, is taking a travelling studio group of architecture design students from the University of Melbourne to the famous Thomas Jefferson campus at the University of Virginia. Their aim is to work with a group of University of Virginia students to develop propositions for informal learning environments. As the students work through the design process they are reflecting on their own learning and communication outside the timetable.4

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4 The studio is part of a research project for a Master of Science (Information Systems) student, Kate Goodwin under the supervision of Dr Frank Vetere and Dr Gregor Kennedy at the University of Melbourne. Her topic of “Slippery” Interactions: Exploring Informal Interaction and Co-Presence in Hybrid Spaces for the Support of Student Learning aims to record how virtual and physical learning spaces converge to facilitate learning behaviour.
School environments embody our society’s attitude to youth and education—they are a significant community asset with the potential to provide settings for lifelong learning as well as other community venues for recreation and services. The recent injection of funds into school and university infrastructure will help ensure that students are educated in facilities that are valued by the community as assets. Hopefully the new learning spaces will also be inspirational and support student engagement. Papers by architect Max Chester and educator/developer Dr Stan Salagaras describe the benefits of schools sharing facilities with other schools and with the community.

Briefs to architects for school and higher education facilities increasingly require responses to issues such as embodied energy, environmental impacts, operating costs and life-cycle costs. The article by Dr Dominique Hes outlines the new Green Star rating system being used in education and argues for thinking of the building as a 3D text to support student learning about the environment.

Each of the schools described in the case studies is the result of a transformative design process in which educators have explored alternatives to the classroom model of pedagogy. The drawings and images of one case study school are expanded by a conversation between the designers and educators. In the conversation, the partnership of educators with designers is highlighted along with role of leadership and key moments in the transformative process.

The process from educational brief, to architectural brief then into design, documentation, construction and occupation is a tangled path that needs to be negotiated. Pitfalls can occur which risk undermining the success of new spaces. Stories abound.

**EXAMPLE ONE**

A principal and a leadership group work hard to transform a traditional classroom setting into an open-plan, fluid team-teaching environment. The building is completed but the furniture seems to have been forgotten. A teacher is given a range of furniture brochures and has less than a week to select furniture. How does he decide? The importance of furniture in the success of a learning environment is not well understood by educators even when the educators are trying to develop new learning settings and pedagogies. Design advice is not often available to help with furniture selection.

**EXAMPLE TWO**

A new open-plan learning environment is documented but the quantity surveyor’s estimate of cost is over the budget. The acoustic treatment of the spaces is removed from the contract to bring the estimate back to within the budget. The contract is tendered to builders and the winning price is well below the budget but the department of education will not allow the acoustic treatment to be reinstated. The teachers and students occupying the new spaces are now struggling with poor acoustics.

**EXAMPLE THREE**

One open-plan learning environment is included in a school which is otherwise classroom focused. The acoustics, the furniture and the ICT facilities are unsatisfactory. Teachers allocated to the space relocate their students whenever possible to the library or a computer laboratory. Even if the acoustics, furniture and ICT facilities were improved overnight, the editors suspect that this space will still not function in an optimal way unless the educational strategies, space ownership and timetabling are adjusted.
An early finding from the Smart Green Schools research has been the importance of good professional development and change management as new schools spaces are developed. Dr Sue Wilks and Mike Davies contribute papers on how best to support change within the teaching profession from the perspective of educators.

The change process ideally begins with the educators prior to the designers being appointed. Good leadership is a crucial ingredient. Teachers often speak of how a visit to an exemplar school is a changing point in their understanding of how space impacts on learning.

The chapters of TAKE 8 are structured to begin with the transformation of education. Later chapters deal more specifically with design issues and sustainability. A key understanding that readers will gain from the papers is that it is not enough to explore how space can support new pedagogies. The space needs to fit the philosophy and educational structure of the school.

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The editors appreciated the excellent graphic design service offered by Orbit Design.

Much of this publication has arisen out of research being undertaken within an Australian Research Council Linkage Grant funded project called Smart Green Schools.
Clare Newton —
Faculty of Architecture, Building and Planning, The University of Melbourne

Prior to working at the University of Melbourne, Clare was a Director of the architectural firm, Newton Hutson Pty Ltd. In 1998, Clare received the Victorian NAWIC Award of Excellence for Innovation in Construction. Clare has been a Council Member of the Victorian Chapter of the Australian Institute of Architects, AIA, and Chair of the AIA State Education Committee. In 2003, Clare was one of 19 Melbourne architects asked to debate the best Victorian architecture from the past 75 years for the 2003 book titled Judging Architecture. She has been invited as a guest architecture critic at interstate universities and has been the AIA Competition Advisor on many architecture competitions including a new school and a campus building for neuroscience. She regularly sits on selection committees for architects and award juries. Clare was a jury member with the Government Architect and DE&T for the inaugural Minister’s Awards for Innovation in Victorian School Buildings.

Clare’s research is interdisciplinary. While her focus is on architectural practice and the translation gaps which occur between architectural ideas and their built form, she has other research strengths in pedagogy and the use of innovative IT suitable for communicating visually rich information. Clare is first named Chief Investigator on two Australian Research Council Linkage grants worth over $1 million in research funding.

Since 1997, she has won several nationally competitive grants in multimedia. These multimedia projects developed web-based communication of visually complex information.

In 2005, Clare completed a Grad. Cert. in University Teaching and is currently undertaking a Doctorate of Education in order to better understand how learning spaces can better support 21st-century education.

Dr Kenn Fisher —
Rubida Research, Woods Bagot and Associate
Professor, Learning Environments, The Faculty of Architecture, Building and Planning, The University of Melbourne

Kenn is recognised internationally as a leading educational facility specialist. Throughout his 30-year career he has worked in a range of disciplines in all education sectors as a teacher and academic, a structural engineer, a strategic planner, a campus planner, a project manager, a facility manager and, more recently, as an educational researcher. Now operating exclusively as a specialist in campus master planning and educational facility strategic consulting and architectural briefing, Kenn acts as the prime interface between designers, teachers and students to create environments for new teaching, learning and research trends. He has been engaged by more than 30 universities in Australia and overseas, numerous vocational training and community colleges, a number of state and national government ministries of education and many school organisations, and has directed numerous consulting and master-planning studies. Two of these projects include leading the winning design team of the United Arab Emirates University campus plan competition and serving as project director for one of the world’s leading bioscience research campuses, the Waite Institute at the University of Adelaide. Kenn has served as a campus master planner for more than 20 institutions. He has also undertaken consulting for UNESCO in Laos and has been responsible for projects in Thailand, the United Arab Emirates and Europe.

Kenn wrote ‘Linking Pedagogy and Space’ guidelines for the DEECD for the Leading Schools Fund programme discussed in the next section.

Kenn has been invited as a member of several juries to determine winners of design competitions. From 1997 until 1998 Kenn was the head of an OECD Program on Educational Building in Paris and was responsible for overseeing 12 activities related to educational building planning, design and management for 25 countries in all sectors of education.

In addition to Kenn’s PhD, he was awarded an honorary Doctor of Science (honoris causa), Deakin University in recognition of his outstanding contribution to the fields of campus master planning and educational facility strategic planning, both within Australia and internationally.

Kenn is a part-time A/Professor at the Faculty of Architecture, Building and Planning at the University of Melbourne.
THE TEAM HAD RESPONSIBILITY FOR CREATING ONE OF THE BLUEPRINT FLAGSHIP STRATEGIES, WITH RESOURCES EAR-MARKED BY THE LABOR GOVERNMENT TO INVEST IN FACILITIES FOR EXCELLENCE AND IN TEACHERS TO SUPPORT EXCELLENCE. THE LEADING SCHOOLS FUND WAS THE RESULT.

EDITORS’ PREAMBLE: Lynne Sutton provides a recent history of some initiatives developed within Victoria to fund and support transformation in learning environments particularly through the Leading Schools Fund (LSF). Around half of Victoria’s secondary schools received funding through the LSF and an extensive action research process was implemented to try to ascertain the impact. As a result, key variables were identified around transforming teaching practice. The LSF emphasised links between innovation in pedagogy and space, setting new expectations and helping to change practices.

INTERVIEW: August 11, 2009

LS: Lynne Sutton—Manager, Leading Practice and Design, Department of Education and Early Childhood Development

TAKE 8

TAKE 8 is a journal that aims to communicate to both educators and designers about issues around learning spaces. Can we begin by hearing about your background and your role with the Department of Education and Early Childhood Development?

LS

In 2003 I was a Principal at a country secondary college when an opportunity arose to be part of a team in the newly formed Innovations Branch. At that time the government had embarked on a far-reaching consultation process about the platform of initiatives and strategies that would form the blueprint for government schools. The team had responsibility for creating one of the Blueprint Flagship Strategies, with resources earmarked by the Labor government to invest in facilities for excellence and in teachers to support excellence. The Leading Schools Fund was the result. The Innovations Branch managed stakeholder consultation, government approval, and the research base underpinning the strategy.

The research foundation established the key principles that guided the development and implementation of the Leading Schools Fund:

• School improvement and reform occurs from the inside out and depends upon teacher effectiveness and school effectiveness;
• In order to improve student outcomes, they must be clearly defined, measured and baseline/benchmarked, then linked to individual teacher’s beliefs, values, skills and behaviours;
• School improvement requires research and evidence-based change. This involves constant collection and analysis of data to track progress and to measure improvement;
• Changes in teacher effectiveness can only occur with the support of world class professional learning and a focused commitment over a number of years;
• Leadership capacity in schools is a key factor in improved school effectiveness;
• A key lever for success is gaining the enthusiasm and the commitment of schools that school improvement comes first;
• Improvement is not just about short-term results. It is about building capacity for continuous improvement and sustainable change;
• Sharing with and learning from other schools will assist in the primary task of school improvement;
• In order to participate in the program, education provision challenges must be considered and, if necessary, addressed by schools – (too few students, too many schools); and
• Rates of improvement vary according to the capacity of schools to engage in the improvement processes. Schools with low capacity require more time, more external support and limited objectives initially.

TAKE 8 Even at that early time, facilities were seen as one of the two key issues. Was that to do with the change of government? Did it come from the precedents in the UK where a lot of money was being spent on schools?

LS Developments in the UK had a significant influence over the way the money was tagged originally. However, a key consideration for the LSF was the pledge by the government to employ 450 additional teachers. Therefore, it was decided to align the resources for teachers with money for capital works. Accordingly, schools had the opportunity to develop project plans utilising combined resources, time, space and ICT. The definition of facilities was expanded to include ICT infrastructure and schools could redevelop existing spaces or create new spaces. It is important to note that the capital works allocation was a very small amount in relative terms.

TAKE 8 Emphasising the links between space and innovation set new expectations and changed practices and expectations within Victoria.

LS Yes, this was an interesting concession in order to get teachers to think differently about their learning environments. Back then we thought that all teachers needed was the flexibility to be innovative. Our job, as we saw it, was to provide this flexibility through the combined resources so that teachers had the permission to innovate.

We rolled the Leading Schools Fund out in three rounds. It was clear from the first round that greater clarity was required around the objectives and criteria. Consequently we reflected on the key messages and became more specific about what we meant about facilities that could support new approaches to teaching and learning. We also realised that we had to be more explicit about pedagogy. At this time, robust dialogue about pedagogy was only starting to emerge in Victoria, particularly around what innovative teacher practice looked like.

TAKE 8 That has changed

LS It certainly has.

TAKE 8 Would you please talk about how you see those changes happening? It is not just in Victoria that there has been greater understanding of pedagogy.

LS Certainly there were other places. One of the recurring questions being asked in the beginning was what does it look like? We were constantly sending schools elsewhere in the country or referring them to websites to look at exemplars overseas.

The three core objectives are also probably important to mention. They were central. The first core objective was to improve student outcomes through improved teacher effectiveness and school effectiveness. This was very simple to achieve. The second was around sharing knowledge with a view to up-scaling. The third objective, which was important at the time, was around education provision, which is ensuring that students, regardless of their locality, can access a breadth of programs and subjects. This is a focus that was equally important in rural Victoria as it was in metropolitan Melbourne. Schools that were wanting to apply for funds through the LSF had to collaborate with one another if provision was an issue and come up with a solution or a model to address those provision issues. They could then work collaboratively around an application for the LSF.

So those were the three objectives. Giving permission for people to talk about provision was important.
You said that you went through three stages. You have spoken about the first stage. How did it play out over the later years?

In the second stage there was greater clarity around the selection criteria and the definition of teacher effectiveness. We became clearer about the need for schools to describe how the teacher practices would be different in these spaces, when compared with what was already happening. There was a need for hard thinking by schools before they developed an expression of interest. In the end a total of 162 schools with a secondary component, or 50 percent of our secondary colleges, received resources through the LSF. An evaluation framework was established around the LSF with The University of Melbourne and Roy Morgan Research. The latter pointed to the need for action research into each school, to find out how the resources were being used and how the strategies were being implemented. Therefore action research investigations were undertaken at each one of the 162 schools.

Tell us about the research? What did it involve? What did you find out?

First of all it involved analysis of the quantitative data that was available at the time. Each school supplied existing planning documentation and focus group discussions were held with each key stakeholder group in the school community. The University of Melbourne quality assured the process, the action research and case study reports. They produced two meta-evaluations from the data and action research. In the first meta-evaluation eight key variables were identified around transforming teaching practice.

This is the diagram that you use within the website that looks at the key factors.

Yes, it looks like a wheel on the website. The key message is that schools need to focus on each of the eight variables in any plan to make significant change. There is another diagram on the website called ‘Transformation in Action’ that shows the relationship between each of the variables. This is a powerful diagram because it shows you can’t just start anywhere with the variables.
Schools need to work through an actual order and to self-reflect, starting with student learning needs and what the evidence is saying. Everybody needs to share in this process of self-reflection. The decisions that schools make about how to improve are fundamental to success. If the focus of the decision is not on teachers—what teachers know, understand, can do, or are practising, in that order—then success will be incremental at best.

It is important to note that a vision may not be clear initially. It may emerge at different points in a planning process, as a school becomes more confident about what it is going to do about student learning needs and how they are going to do it. It is a cyclical process.

We were also able to look across all of the individual action research reports and identify the key practices being adopted by schools that were successfully delivering whole school change. Each of the practices enabled educators to cater for diversity in students’ learning needs.

**TAKE 8** Can you see parallels in the issues that you are talking about, coming out of other countries as they go through a transformation process?

**LS** We have just had some guests here from the UK, who have been rolling out a change management program to all of their schools, which is a huge undertaking. They are in the process of developing a specific program of professional learning and change management for schools with new building designs. One case study school in particular is going to have a $30 million project for 2000 kids so it will be this group’s job to build the capacity in the teachers to effectively use the spaces. I took them to Yuille Park K-8 Community School and we shared some of the lessons that Victoria has learnt. The UK team was confident that they could support their schools to understand and address the necessary change management processes but were not confident about what the actual teacher practices would look like. In Victoria we have been able to tease that out through our research which the UK visitors have found useful.

**TAKE 8** Now thinking about other states, is this an understanding that the other states have been working through?

**LS** I think Victoria is ahead in terms of thinking around spaces. In the last year or so I have helped the Northern Territory to develop an educational rationale around a new secondary school. That was a really interesting project because a secondary school hadn’t been built in Darwin for many years. Their thinking and narrative was not around teaching and learning and yet there was a thirst for it. In the early days when the LSF began, Western Australia was one of the states where new practices were occurring, for example at Canning Vale College and Kinross College. This therefore became one of the destinations to see innovation in education.

**TAKE 8** What about the Australian Science and Maths School in South Australia?

**LS** Yes, although the ASMS was a little different in that it was specialist school.

**TAKE 8** Lynne, you have focused on secondary schools. Does this learning translate into other sectors of schools particularly now the department includes early childhood? Do you think there are lessons for all age groups?

**LS** We certainly know that it translates into primary schools. Most primary school designs reflect the educational needs of different stages of learning, the specific curriculum requirements of Victorian Essential Learning Standards (VELS) and then how these translate into the design of learning spaces.

**TAKE 8** You have spoken about a carefully staged process of supporting innovation and transformation in schooling. There is a lot of money being invested into capital infrastructure currently. Can you talk about some of the challenges associated with this investment?

**LS** It is now our systemic responsibility to look at how we support new practices and the changes to be considered by school communities. Hundreds of primary schools in our state are going to have library learning neighbourhoods. Some schools will be ready to occupy the new spaces from day one and others won’t have invested much thought into it just yet. It is an imperative to raise awareness at the very least and build capacity at the very best.

**TAKE 8** It is a very different role for you from the Leading Schools Fund. What are the different activities that need to be done?
The team in the Innovation and Next Practice Division is in the process of developing resources, support materials and programs to stimulate understanding and self-reflection. I have been fortunate enough to secure a number of people from schools into roles as innovation leaders to help with this. At the moment we are designing an Innovative Learning Environment support program that will hopefully meet the needs of schools that are at different stages in understanding how to fully utilise their new learning spaces. We are holding an Innovative Learning Environment Design Conference for educators and architects. It will be practitioner led and focused. We are also considering the allocation of resources to a program of immersion for teachers to support understanding of new practices in new spaces and the value of developing an educational rationale. Many schools are already sharing widely with other schools. We aim to provide some formal support and evaluation to sharing. This will be done by supporting schools where it works well to accommodate teachers from other schools in a shadowing and coaching model that is focused on new practice. We are also the only state or territory in Australia contributing 10 Victorian exemplars to an OECD Innovative Learning Environment research project.

In looking at what you are doing, you are shifting cultures through picking early adopters and case studies with the aim that knowledge filters like a virus through the rest of the profession.

It is interesting that the architects in our state have picked up on the notion of what design could or should look like even before we have the school communities ready to occupy them. I had the good fortune recently to talk to a group of three schools which are coming together in a regeneration project. It is hard work because school communities are often not equipped with the resources to embrace the changes. It is quite tricky to talk about what 21st century learning might look like while the pathway to get there is still a little murky.

Probably for many educators there is a reluctance to change practice.

Yes, educators need to see the reason and value in the change, and need also to know that they will be supported with a clear plan and resources.

In keeping with this I am trialing another resource at the moment. We found that we had nothing to give to teachers so they could baseline or benchmark where they are at, what they are doing, and to give them direction about what they needed to do. We have developed a tool that is helping teachers to self assess around the practices that we have distilled from the research. That has been fantastic because it means that teachers can have a professional conversation about what their needs are and how they are going to work together in their teams. The professional learning and teamwork becomes purposeful.

Can we clarify the role of the teachers that you have taken out of the schools to support professional development? They have been chosen because they are experts in some way and given further training to support others in this process of transforming learning.

They are recognised as innovators. They are supporting our work with their expertise and are working with schools to support innovation and change.

What policies exist in the department regarding furniture design and acquisition? We understand the importance of furnishings and fitouts and are coming across case studies where the furniture selection is left as a somewhat last minute decision. Is this an issue which you have been tackling as part of the Leading Schools Fund or elsewhere in the department?

The LSF demonstrated the importance of looking at capital works in connection with infrastructure. We have had some interesting conversations recently with Swinburne about their recent research in this area. I suspect that this is an opportunity for further research.

Do you have any final comments about how architectural design influences student learning?

Educational functionality is a primary consideration of the design of learning spaces. The learning spaces need to be designed in such a way that the flexibility to group students, to work in teams, and to access resources are maximised. The challenge remains to ensure that the work force in each of our schools can utilise new spaces in the most effective way, to address student learning needs and to embrace the change with their wider school communities.
BACKGROUND

Schools that are part of any initiative involving major spatial change—whether it is partial re-building, a new building, or a new campus—are facing a major challenge. In order to receive funding, the school leaders and interested staff have held numerous planning meetings and responded to specific criteria that require detailed documentation of their commitment to improved school learning environments and student learning outcomes. The latter means schools are expected to develop, implement, and share effective practice and programs and forge community partnerships that support collaboration. In doing this they are expected to think beyond traditional practices and structures.

THE MIDDLE YEARS

The recommendations that resulted from research into the middle years of schooling\(^1\) can be grouped around two themes—pedagogy and organisation. The new pedagogies being advocated meant that teachers would need to, among other items, foster differentiated, independent and collaborative learning and plan and teach with colleagues in multi-disciplinary teams. They would also need to assist their students to develop the skills and dispositions required for self-directed inquiry, problem based learning, teamwork and ‘real world’ research.

\(^1\) Especially Hill, P. & Russell, J. 1999, Systematic Whole-school Reform of the Middle Years of Schooling. Presented at the National Years of Schooling Conference, Melbourne.
For most schools the new approaches would have significant impact on administrative routines, timetables, room bookings etc. Time for teachers to plan together and attend ongoing professional development (PD) sessions etc would need to be found. Strategically placed PD sessions throughout the year would also be necessary.

To be effective, the new pedagogies require different physical spaces, but in most teachers’ minds—including many curriculum writers up to the present time—that constitutes little more than requiring desks to be pushed back at times to allow for face-to-face discussions. Teachers may be intuitively aware that the physical environment provides ‘both affordance and constraints for learning’ but they do not explicitly state such things. Learning space for most teachers is in the students’ heads. However, the Rudd government’s 2009 Building the Education Revolution (BER) scheme, with its tight timelines, is expediting spatial change. Most schools will be either undergoing refurbishment or building a new facility.

**PROFESSIONAL DEVELOPMENT**

Radical shifts in any culture require immersion of the ‘players’ in the supporting theoretical back-up. In-depth professional development sessions will be required before, during and after occupation of new spaces.

Members of the school leadership team or external consultants will need to support and guide the staff through this period. This might include offering incentives like time release for teachers to: collaborate when planning to use new pedagogies in new spaces, reflect on teaching strategies and student activities, and undertake associated professional reading. It is important for the staff to be kept informed about the stages of the building process and given opportunities to have substantial input. This process will hopefully lead to the teachers seeing the new pedagogies and spaces as superior to traditional models.

As school building projects progress in Victoria, the Department of Education and Early Childhood Development will need to recognise the scale of the PD that will be required. Teachers are outside of their comfort zone because they are suddenly being faced with new campuses, colleagues, classroom configurations, technologies and teaching models.

Teachers can observe powerful new teaching and learning models by visiting campuses that have adopted learning philosophies like the Reggio Emilia student centred model, Philosophical Inquiry with its emphasis on rigorous discussions and ‘communities of inquiry’, and/or schools that have incorporated Thinking Dispositions or Habits of Mind to name a few.

> “Learning space for most teachers is in the students’ heads.”

Dr Susan Wilks

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CASE STUDIES

New school building projects can be vast in scope. For example, in one outer suburban Melbourne region, several closely situated secondary schools will combine and be sited on a single campus (School A). It comprises ‘schools within a school’ (SWIS). Each SWIS will house approximately 300 Year 7 to 12 students and their teachers. In another Melbourne district (School B), two Year 7 to 9 and one Year P to 6 schools will be built on two sites in close proximity. Fourteen hundred students and their teachers will be affected.

These two examples entail immense changes. Issues range from relatively minor items like whether there will be a new school uniform, to the huge task of handling the cultural clashes resulting from amalgamations. Many teachers will be required to adjust their teaching approaches as they move to open or re-configured spaces. They will be expected to team teach in cross-disciplinary modes, perhaps with people they hardly know. What if they don’t like team teaching or being observed by others as they practice their craft?

In mid-2008, the high schools soon to be amalgamated into School A had gathered to discuss the changes being ‘imposed’ as a result of falling enrolments across their region. The schools had vastly different cultures for historical reasons. An experienced educator and learning consultant facilitated the session.

She had already worked with a small group of teachers drawn from disparate campuses to develop a presentation for all staff on issues such as 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.

When the ‘resources’ group presented, the floodgates opened. It appeared that the teachers were starting to realise the magnitude of the change ahead. Some of the questions that arose were:

• What sort of technical assistance will be available?
• Will each mini-school have its own wet areas?
• Will the mini-schools ever combine classes with other mini-schools?
• Are there any social meeting areas or teacher common rooms?

These questions seemed to indicate that teachers had not seen plans, or if they had, were not able to read or digest them or understand the spatial changes they represented. It was clear they needed to be provided with representations of the spaces that they could understand, eg 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.

7. eg Student Leadership, Community Connections, Personal Learning Plans for Students.
Walking around one of School A’s existing, soon to be replaced buildings, it was obvious that the traditional model of delivery of discrete subject content by specialists—if such a thing is possible!—continued behind closed doors, despite the ‘new’ curriculum requirements. The teachers’ tables were facing rows of desks in traditional classrooms that had been set out that way since the school was built in the 1930s. The teachers and students occupying these rooms would be using the new learning environments in less than 18 months—ready or not. As they faced their transition into new learning spaces, the time and opportunity for these teachers to explore new teaching and learning methods as well as observe the early adopters at work would need to be provided.

**OPPORTUNITIES TO PRACTISE IN NEW SPACES**

The architects associated with the case-study schools described in this chapter had all had a long and fruitful association with the schools during the design process. Given the short timelines associated with BER how many designers will have the opportunity to observe staff cohorts over a lengthy period as they prepare for new spaces? How many will have time to observe a class from start to finish or live a day in the life of a student to experience their routines and activities in existing spaces?

Mary Featherston, an expert in school refurbishment with a sound understanding of current educational theory (Featherston Design) believes that design professionals need to be involved in long-term action research projects with educational consultants, practitioners and students in order to develop effective design briefs. She believes that the research and development phase should also include ongoing evaluation of facilities.

Many Australian universities have built new technology-rich learning spaces that reflect an awareness of the requirements of the new pedagogical aims (eg Queensland University, Engineering Faculty; Melbourne University, Education, Engineering and Chemistry Faculties; and Deakin University, Education).

8. Personal communication with Mary Featherston, Featherston Design, 12.2.09.
These spaces facilitate student involvement in small group discussions about concepts and problems and ICT is at hand. The building of innovative and flexible teaching spaces for faculty staff and trainee teachers to use with their student cohorts is a positive move within teacher education. If, in the future, newly trained teachers are assigned to schools that contain new learning environments—and, given the BER, many will be—it will be beneficial for them to have had a prior opportunity to experience teaching in a non-traditional space.

On the grounds of School A and under the guidance of Mary Featherston, two portable classrooms were joined and set up to roughly simulate the proportions of the various spaces that the teachers would inhabit in their new buildings. Selected staff were offered the time to plan units of work based around ‘big ideas’. They then worked in small multi-disciplinary teams to immerse students in a range of learning activities. The students enjoyed working with the teachers as they learned to co-teach a range of groupings. Because these temporary spaces contained almost no integrated technologies or ‘groovy’ furniture, only part of the future experience was possible. However, the experiment was judged to be a success and the transition to the new spaces was almost seamless.

Temporary set-ups, despite their limitations, provide useful teaching and learning ‘tools’ for educators and designers. What if departments of education were to offer a range of adaptable and flexible prefabricated classrooms that could be delivered to the grounds of schools where new buildings or refurbishments are, or will be, occurring? Spatial experts could design a range of flexible new configurations with, for example, some fixed and moveable stages, mezzanines, a range of moveable furniture, computers and other technologies. Interior finishes could be ‘handsome but generic’.

Experts, for example spatial and furniture designers and education advisors, could work with teachers and their students to experience, experiment with, and re-configure the spaces to suit the newly acquired pedagogies.

Collaboration

As a result of her experience gained through working with staff, architects, and students as schools are built or refurbished, Featherston believes that decisions about all the elements of the physical environment, built space, furnishings and loose items, must grow out of a shared vision of educational philosophy and pedagogical practice.

“Two portable classrooms were joined and set up to roughly simulate the proportions of the various spaces”

Dr Susan Wilks

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Currently, built space, furnishings and loose items are considered separately and are the responsibility of separate agencies.11

When contemplating any new building development, both communication and collaboration are required between:

• teachers within and between schools,
• teachers with architects, refurbishment and education spaces experts,
• architects and education spaces experts with departments of education facilities managers, and
• all the above groups with students and parents.

Resistance may come from parents if they think the new curriculum models and spaces will jeopardise their child’s learning and achievement in any way. At an information session at School C (a primary school), the principal revealed the plans of a refurbishment to parents. The voiced concerns were connected with 1) the noise of open spaces impeding concentration, 2) a feeling of loss associated with the replacement of ‘normal’ classrooms and 3) a desire that the new spaces would be integrated with the school’s curriculum. These were all legitimate concerns that required addressing. An ongoing process of consulting and informing the community about the benefits of adopting the new pedagogies and spaces with an emphasis on their complementarity is important.

It is also important that both parents and teachers know that ‘traditional’ teaching models, for example direct teaching, will not continue to be supported. An environment planned for contemporary pedagogy may include settings/places for large and small group direct instruction together with a diversity of additional settings, but it will not necessarily enable concurrent class group instructional sessions involving all the students. Unless the staff is committed to working in a different way they will find new spatial designs frustrating. The principals of both School A and School C have encouraged staff members who are not happy with the changes seek jobs elsewhere.

A NEW WAY OF THINKING ABOUT FACTORS BLOCKING CHANGE

David Perkins (http://pzweb.harvard.edu/PIs/DP.htm) defined knowledge that emanates from another culture or discourse, or where there is no apparent organizing principle, as ‘troublesome knowledge’ for learners. He believed this may be the case for different reasons, but the kind of troublesome knowledge that change agents in schools are dealing with when they ask teachers to conceptualise spaces, design desired teaching spaces, or ‘read’ plans for meaning, could be seen as what Perkins described as ‘alien’ knowledge.

11. Personal communication with Mary Featherston, Featherston Design, 29/9/08
This is knowledge that comes from a perspective that conflicts with one’s own perspective. Teachers facing such knowledge are experiencing a conceptual gap. Perkins believes that sometimes the learner does not even realise the knowledge is foreign. His thoughts have influenced other theorists who have coined the term ‘threshold concepts’. This term is frequently used in contemporary teacher education. Perkins was focusing on the learner and, in the context of new pedagogies and educational spaces, the teachers are the learners.

The vocabulary and ways of representation used by architects, facilities experts, acoustic engineers and builders are foreign to teachers and vice versa. Once this point is recognised, change agents can focus on ways of dealing with threshold concepts. In order to grasp a threshold concept, one requires both an ontological and conceptual shift. Once the concept is understood it is likely to be remembered and the learner can make connections previously obscured.

The process of acquisition of new knowledge or practice puts the learner in an uncomfortable emotional space. Meyer and Land call this ‘liminal space’, an unstable space in which the learner oscillates between what is known and what is emergent knowledge.

It may help the professionals leading the change process to better understand why teachers facing shifts to cross-disciplinary, student centred, problem based modes of teaching and learning AND new spaces are anxious.

Cousin provided some principles associated with threshold concept mastery about which the people driving changes to school learning spaces could be mindful of (paraphrased below).

1. Sympathetically listen to expressed opinions, misunderstandings and uncertainties.
2. Make visible the learner confusion and encourage the sharing of feelings.
3. Recognise that there is no easy passage in learning but rather ‘messy journeys back, forth and across conceptual terrain’.
4. Understand that the journey can be exhilarating but might represent a shift in identity or a sense of loss.

The following could be added. It is important to allow time for:
5. Learning the new vocabulary (eg purging, offset, intermediate space) and ways of reading spaces (plans, orthographic diagrams etc) that will be encountered.
6. Inventing activities that involve immersion in and reference to all the relevant fields of architecture, building and provision of facilities. For example:

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a. Give criteria against which the teachers can make judgments about a space and/or design.

b. Provide groups with a scaled grid on which they place scaled furniture etc for a specified learning space (eg those in IKEA’s kitchen section). There are websites that have been specially designed for teachers to facilitate such activities around educational spaces. Some websites assist thinking about arrangement of furniture.16

7. Provide professional reading by educational space and pedagogy experts.17

8. Bring in guests to talk about previous building developments, furniture design, acoustics, the brief, design process etc.

9. Use resources like that provided by the Usable Buildings Trust as a prompt for brainstorming ways of designing suitable spaces for the users.18

10. Schedule a design and procurement schedule to enable staff and interested community members to visit exciting educational spaces.

CONCLUSION

No-one can mandate change. If it involves initiatives about HOW rather than WHAT people teach then they must be involved because it entails the foundations of their practice. Changing WHERE they teach shakes the foundations even further. We need to offer as many opportunities as possible for people to adapt to and embrace changes to their pedagogies and spaces.

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Learning Spaces

BROADMEADOWS PRIMARY SCHOOL

The School forms part of the Broadmeadows Schools Regeneration Project, which aims to give local students the best possible education, skills and qualifications for a bright future in a disadvantaged area. To achieve this, the merging of some schools was seen as an advantage, in order to better share resources. All the schools’ new facilities have been designed with a strong educational basis with the aim of linking new ways of teaching to innovative spaces.

CONTEXT OF THE PROJECT

The school shares the new site with one of Hume Central Secondary College’s Year 7–9 campuses, but will remain separate.

The primary school is organised around a variety of independent buildings that hold age appropriate learning centres.

The School’s teachers will update how they teach. Literacy and numeracy will remain central to every student’s learning, but as it is now known that each student learns differently, teachers will achieve outcomes in these and other areas through teaching methods tailored to suit individual students. This will allow students to learn at their own pace and within their own learning style which means they are more likely to stay interested in learning for longer.
PEDAGOGY AND SPACE

Educators now understand that not all children learn in the same way. Learners receive and process information in a range of ways and no one way of learning is assumed to be better than another. Sometimes learners utilise a range of learning methods.

Updated teaching practice aims to help teachers identify how each child learns best and create a learning program to cater to the way each child learns.

This has spatial implications. The design of the new school has opened up the traditional classroom to provide bigger open learning spaces. The school has:

- quiet reading areas
- areas for discussion groups
- wet areas for hands-on activities, such as art and science
- technology areas with laptops and internet access.

Several teachers work as teams in each learning space to guide students through their learning.

A stronger focus on student well-being has also had spatial implications. New schools, such as this one, pay particular attention to design of toilet facilities and locker areas. Known as bullying zones, toilet facilities and lockers now tend to be split into smaller groups and located near learning spaces.

REGENERATION

Broadmeadows is considered one of the most disadvantaged areas in Victoria. The regeneration project focuses on education as the avenue to overcome the many hurdles that population in this area encounters for improvement, encouraging the students to stay at school to Year 12 with better academic results and offering opportunities for life-long learning.

To achieve this two main avenues have been chosen:

- The provision of modern facilities available for community-wide use
- The update of the teaching methods to better support the students.

The two have been merged in a coherent approach to design which is based on a series of pedagogical principles (such as personalised learning) and which involves a flexible approach to the learning spaces and the provision of a diversity of learning environments. To achieve this within the budget and available resources some of the schools have been merged with shared new campuses and facilities.
LINKING PEDAGOGY AND ARCHITECTURE

Camberwell Girls Grammar. VIC
External view
Architect: Hayball
Image: Chris Matterson
IF I WERE TO SOUND A HUMBLE NOTE OF WARNING, IT IS THAT PARTIAL STANDARDISATION IS POSSIBLE, BUT NOT FULL STANDARDISATION, AS COMMUNITIES WANT TO RESPOND TO THEIR PARTICULAR ENVIRONMENTS AND ALSO WANT A SUSTAINABLE APPROACH.

EDITORS’ PREAMBLE: Ty Goddard is Director of the British Council for School Environments. In late 2008, Ty came to Australia for some months contributing his expertise to the Smart Green Schools’ team but also visiting schools and speaking with educators and designers. In this interview, Ty brings an outsider’s perspective on school design in Australia and talks about some of the similarities and contrasts between initiatives in the UK and Europe.

INTERVIEW: July 28, 2009

TG: Ty Goddard, Director, British Council for Schools Environments

TAKE 8 Let’s begin by asking you why you came to Australia for some months?

TG I came a couple of times for other purposes and saw some Wollongong Schools and some in Melbourne and also spoke to some state government people working in the area of school design. I was particularly interested in the visioning and some of the preparation work that was going into the thinking about building new schools. I was then invited to speak at the Australian Council of Education Facility Planners International, CEFPI, event in June 2008 which further pricked my interest in the sense that there was some amazing thinking going on. Then I got this wonderful invitation to join the Smart Green Schools, SGS, group for five months to learn a lot and contribute something and generally find out how deep and broad the thinking was.

A note in passing—Mao apparently once said you can get too far ahead of your peers. SGS gave me an opportunity to engage with innovative practitioners including teachers, students, architect and academics.

TAKE 8 What did you learn in Australia and were there surprises?

TG I learnt a great deal. The Smart Green School involvement gave me an insight into academic workings which were far removed from ‘ivory tower’ thinking. The research was trying to empower school communities themselves to step back and think how to make schools more sustainable, it was giving them, literally, the monitoring tools to do that job and it was also working with school communities around pedagogy first, so it was attempting to negotiate, co-create or co-design with school communities. But it kept a keen eye on what was happening and what should happen in terms of teaching and learning. The team spent time with school communities. I remember visiting one school for a day with you as part of the Smart Green Schools team. We all spent a day listening while the teachers worked with consultant academics to rethink the curriculum approach in that school. Obviously, when you begin that process of finding out what teachers want to teach and what learners want to learn, you want to find out whether these curriculum changes have an impact on space and so you have to look at how the spaces might be changed as well.
TAKE 8 What did you observe more broadly as happening in Australia around school design?

TG That was interesting. In terms of the conversations I was able to have I realised there were a lot of similar challenges. School estates or the fabric of the schools had been under-invested for years. There was a sense that people were very much attempting to think through what 21st-century teaching and learning should look like and this was then an opportunity for a new look at schools and schooling. There was a sense of joy that government was finally investing in schools, and this had parallels with what had happened in the UK from 1998 onwards with the slightly older new Labour government and Australia with a newer new Labor government and both had decided, very wisely to invest in schools and schooling. The challenges were the same in both countries. Parallels were compelling and meant that we had to have a common language between teachers, engineers, builders, policy makers etc to work in unison to the benefit of teachers and learners. It means we have to work much better together at creating new teaching spaces for teachers and students. It is not about creating architectural icons and follies but about harnessing the fantastic capabilities in each country to be at the service of teachers and learners.

TAKE 8 One of the concerns here about the enormous influx of funds through the BER is that it is more about getting builders working rather than getting the best possible outcome for schools. Designs have to be shovel-ready quickly. What has it been like in the UK?

TG One of the great opportunities in Australia was the cross-country ‘roadshow’ across Australia with Kenn Fisher and we touched a number of Australian cities at the time of the BER announcement. It was increasingly apparent that there was a concern of the participants that this welcome money, this fantastic overdue investment might primarily facilitate templates or standardised cookie-cutter approaches for schools without sensitivity to site, or the purpose of the educators. This would not be optimal for the individual nature of the school communities. It has been shown over time that the crucial success factors in school design are educated clients who know what they are doing and know the range of options possible; the time for designers and clients to spend with each other; and the testing of options as well as the engagement of those real consumers, and I mean by that the teachers and the learners. An imposed standardised school design may not fit the curriculum approach for a particular school and will not be owned by or understood by the clients. If I were to sound a humble note of warning, it is that partial standardisation is possible, but not full standardisation, as communities want to respond to their particular environments and also want a sustainable approach.

TAKE 8 We are not yet sure whether BER will be a lost opportunity or a great outcome—only time will tell.

TG Australian newspapers wrote about the issues being raised by teacher unions around not engaging teachers and students in a meaningful way—lack of engagement will result in poorer outcomes. It is clear that if you don’t involve teachers and pupils in meaningful ways you lose an important opportunity. For example Kenn and I spoke on ABC local radio with a bureaucrat who was responsible for rolling out BER in South Australia. He did not once mention teaching, learning or education in a half-hour interview with us and him. You can be shovel-ready very speedily but thinking is precious. That thinking about space and how to use it is a key factor. Clearly the rewards are much better when design is collaborative and engaging with teachers and students.

TAKE 8 The Wooranna Park project with Mary Featherston was an extensive consultative approach over four years, but can we actually continue this approach across all of our school redevelopments?

TG As we become more fluent in engaging in a common language which we can share, it is likely that we may be able to shorten the engagement process. Some policy makers worry that consultation is time wasting, expectation raising and delaying and costly, but in fact if it is done well it can only help the process. What I learnt about Wooranna was that leadership and engagement of staff is crucial. It was almost breathtaking what could be done in an ‘old shell’—it is flexible and almost an oasis in some respects. There was little about the building itself that was architecturally exciting. Everything I saw inside, in observing the school, seemed to be purposeful.
The furniture, fittings and equipment became really important to how the school could function. Increasingly, we will see good quality furniture and equipment will be more and more important.

Another fantastic example was Bethany—completely age appropriate with homely spaces in the early years with more independent learning later, spaces ideally suited to group learning, spaces that had been thought through. Space was integral to that leadership’s vision, and it included furniture and equipment. The pace of change in terms of learning technology is dazzling, for example from PC to laptop to handheld. More mobile seems to be the way—it would be crazy to see rows and rows of students using handhelds. It is about the alignment. I welcome the profound approach in system wide change in the Catholic Education Office which was uplifting.

TAKE 8  Furniture seems to be left to the last minute and is rushed. Might one say that the furniture and fittings are as important if not more important than the building?

TG  The catalogues of furniture available often stifle what is going on in schools. Some of the most successful spaces in the UK are looking at taking ‘New Line Learning’ office furniture as a model for their own requirements. I am thinking about a particular school in Kent which uses furniture which is very different to the catalogues normally used. In successful schools in Denmark the furniture is often customised with the teachers so it becomes more appropriate. We are on that journey in UK and you are also on that way in Australia. It is not only ergonomics, but you can also flip and change very quickly in an environment if you have agile furniture. We are beginning to see more and more suppliers looking at this approach.

TAKE 8  Is there professional development where teachers can be exposed to these approaches?

TG  We have just been doing a Great Schools Inquiry across the UK and have been taking evidence about learning, curriculum, pedagogy and teaching—how young people learn in the 21st century. We need teacher training that looks at this 21st-century-approach in the use of display in the schools. There is Kenn’s phrase about the vocabulary and understanding of the ‘pedagogy of space’, for example, Reggio which has space as the third teacher.

TAKE 8  In Australia we don’t have the equivalent body as the British Council for School Environments—although we do have CEFPI but this group doesn’t engage as much with the professional professional development of teachers.

TG  There is a willingness to change but less opportunity to be exposed to alternatives. We are a 400-strong association of suppliers, schools and counties. We are trying to get a common language across all of these stakeholders. We have done quite a number of study tours across Europe and also the UK—Australia is a bit too far at this stage, but it might happen. The more we skill up the client the better the outcomes we will get when they work with designers.

“The pace of change in terms of learning technology is dazzling, for example from PC to laptop to handheld. More mobile seems to be the way—it would be crazy to see rows and rows of students using handhelds. It is about the alignment.”

Ty Goddard
The British Council for School Environments, BCSE, November event will be a World Learning Environments Conference and will be held at Moseley. Moseley is the most recent and effective centre for learning—these new centres of learning are trying to create a different way of delivery not only for curriculum but also for education and learning for students. Through events and publications we try to publicise alternative ways of learning and teaching.

TAKE 8 Moseley sounds like it is more than just a school, but is also for a community.

TG Most of us understand schools because we all went there but many of us carry a massive amount of emotional baggage about what a school looks like—we seem to want to create ‘new old schools’. My admiration for Moseley is about the vision to really deliver a first-class education for the new age of students into the future. It is about the bravery of political leadership—it is easy to recreate misty visions of the past versus recreating schooling and learning which is more relevant to the 21st century. It is not about throwing out everything from the past, but asking whether they are equipped for the challenges of the future. Can they take the richness of that community and take that school in its journey but also use that public building for its community as a positive addition where some of those facilities can be shared on the weekends rather than being locked away? There are other schools in Birmingham and Manchester which are looking at building, delivering and learning in different ways.

TAKE 8 Are there any particularly interesting schools which you have seen connecting into the community?

TG Extended schools are a major improvement—it is part of a core offer in the way schools are being procured. Not all of the billions of pounds is meant for complete new builds. About half is meant for refurbishment and remodelling. Again the skills and thinking need to be shared—we recently held a conference on this in Nottingham. It is particularly important for sustainability. It is important to reuse and re-engineer existing schools to ensure we can adapt to the 21st Century. Our BCSE school ‘makeovers’ involved getting the right people together to rethink existing schools—we have been able to adapt Victorian era schools with high ceilings by using small mezzanines for small group work, more air and light, people creating ‘home bases’ or schools within schools in these separate buildings. We are looking at schools of the late 1800s and re-engineering these for the 21st century.

TAKE 8 What are some of the trends you are noticing in the UK school environments?

TG Some of the new trends in the UK which clearly came up on the recent BCSE award winners are a drive towards sustainable schools that can ‘act’ and be turned inside
out so that pupils and others can see that the workings of the use and operations of the building can be learning itself. This includes a real drive towards personalized learning—teaching and learning that is appropriate to that person. There is an interest in ‘human-scale’ education—big is not necessarily best—schools within schools. Similarly, there should be spaces that enable teachers to be able to do their jobs—schools as workplaces. Staff rooms where teachers can relax, places where they can mark assignments. This includes spaces for meetings of a wide range of sizes and uses including multi-media presentations. You have to talk seriously and properly about engaging sustainably—you have to create schools WITH people and not FOR people

TAKE 8 Have the changes been led by government, educators or designers?

TG A really good question, they are often not led by educators but most often led by designers. We do need to engage a sense of partnership and striving for mutual aid. I don’t think that change will come from one individual agent but a range of people working together.

TAKE 8 Even if the leadership team is proactive in the design process there is still shock by teachers around personalised learning, team-based teaching etc.

TG We need to get our message in the faculties of education. We think that there is a high level of understanding by practitioners, but the faculties and teachers colleges are still teaching a 20th-century model.

TAKE 8 In Australia, it is probably correct to say that the spaces for informal learning are not as well-funded as the core teaching spaces. Is there an emphasis on informal learning in the UK?

TG I think we need to take a whole campus approach to space, not just the buildings. Students want spaces similar to adults to relax and play and eat. There has to be a link between quality food and quality dining spaces—you can’t funnel them through in 30 minutes in a factory model rather than as a dining experience. It is about the management and leadership of space and getting it all aligned. It does take time to change cultures, but we can’t afford to stay where we are. It is not about classrooms versus open plan. It is about spaces that young people deserve, and it is about spaces for the 21st century not the 19th century. We are not throwing everything out—we are keeping what is good and attempting to provide spaces which can support media-rich learning. We have to protect and nurture as well.

TAKE 8 There in an increasing interest in Year 9 as a pivotal moment in a student’s education. Many private schools and some government schools are trying to give students different experiences when they reach Year 9. Some students go to wilderness camps or a city camp to experience a different form of education. For example, Wangaratta High School in Victoria has a separate campus for their Year 9 students located in the township. The department in Victoria has funded three rural residential leadership schools for successful students to live and learn for one term. Certainly this is common for private schools in Australia. You may remember Prince Charles attending Geelong Grammar’s Timbertop campus over forty years ago. Is this attention to Year 9 something Australia has taken from the UK?

TG I don’t know whether it is out of the UK, but there is a sense of age-appropriate learning. In the transition from primary to secondary, the dip in attainment is quite incredible. We go from fantastic intimate understandable environments and we thrust them into almost ‘brutalised’ environments with packs of books. We looked at home bases for year 7 and how you engage with students as they grow. Experiential learning and engaged learning seems to be growing, with sport becoming important eg ‘playing for success’ where there are 150 learning centres in sports clubs. Geelong Grammar and Timbertop are more immersive for a term, whereas the emerging models seem to be shorter term. Pastoral care and off-site experience has always been an important part of the private school experience. It is critical to understand how to nurture wellbeing in the school environment. Let’s face it we have looked at this for years in the office workplace, and in our homes, why can’t we do this in our schools?
This paper begins with a reminder of the scope and potential of the £45 billion Building Schools for the Future, BSF, program as it relates to the experience of the key players, the students, staff and local communities. The elements listed are taken from a number of schemes that have received praise and recognition.

The second section, the Complex Domain of School Transformation, attempts to locate some of the educational thinking, dilemmas and confusion that sometimes bedevil the communications that surround ‘transformation’ and the difficulties frequently encountered in closing the gap between the rhetoric of aspiration and innovation compared with the convention and safety of reality. The third section sketches some of the emerging educational models that are currently being explored in schools.

BUILDING SCHOOLS FOR THE FUTURE

At the heart of Building Schools for the Future program is the aim of transforming education. BSF investment will ensure that staff, teachers and a wide range of other educators are given the tools to deliver transformation in education so that standards at all schools improve at a greater rate far than previously expected.

This will be achieved by:

• Improving flexibility of teaching for greater personalised learning
• Providing an environment in which to develop and diversify learning and teaching strategies in line with the varied needs of learners, and offer greater choice
• Ensuring enhanced ICT facilities and equipment
• Designing schools to aid the development of a culture of respect, pride, and wellbeing
• Facilitating a strategic, coordinated and collaborative approach to vocational education provision and a range of choices/pathways 14–19.

Specifically for parents and students, the BSF transformation aims to:

• Enable all students to reach their full potential in knowledge, understanding and skills against others of the same age nationally and in relation to their capabilities
• Tailor the curriculum on offer and personalise the whole school experience to ensure every student achieves the highest standards possible
• Improve transition to secondary school and promote a sense of continuity, progression, belonging and identity
• Narrow the gap in the outcomes for vulnerable and underachieving children and young people
• Maximise the use of ICT to promote confident e-learning and teaching
• Create a campus for learning to host a wide curriculum with more choice and a larger range of out-of-hours opportunities with strong links to other centres of learning/partners, including libraries, museums, galleries, higher education, businesses, leisure centres places of worship to bring about an improvement in attendance and behaviour, giving better chances to students but also reducing crime and anti-social behaviour
• Offer greater choice for the local community through the Extended Schools Initiative
• Develop the role of young people as citizens to support community cohesion

For teachers and school management, the BSF transformation aims to:

• Encourage schools to look at new models for leadership and management, including how they develop links with the local community
• Build innovative, flexible, sustainable, state of the art facilities for staff and students
• Support the sharing of excellence and specialist knowledge across the family of local schools
• Develop a strategy to ensure the area can recruit and retain teachers of the highest quality
• Develop the skills of non-teaching staff to give teachers adequate time to plan, review and organise individualised learning opportunities for students
• Focus on individualised continuous professional development and coordinated training and support within and between schools.

For special educational needs, SEN, provision, the BSF transformation aims to:

• Deliver a strong inclusion strategy and its support for students with special educational needs and disabilities as a strength.
• Provide real opportunities for improvement through:
  – future provision of special education based on the principle of inclusion and integration with mainstream schools where possible
  – wider access to learning for students with SEN and physical disabilities including provision within mainstream schools where this meets individual learning needs
  – school designs that incorporate specialist learning centres for those students who need additional support
• Focus on individualised continuous professional development and coordinated training and support within and between schools.

For special educational needs, SEN, provision, the BSF transformation aims to:

• Ensure that all schools meet the requirements of the Disability Discrimination Act, DDA. This means that buildings, facilities and resources will be easily and safely accessible by all users.

“AT THE HEART OF BUILDING SCHOOLS FOR THE FUTURE PROGRAM IS THE AIM OF TRANSFORMING EDUCATION.”

Mike Davies
The Complex Domain of School Transformation

Most ‘reforming’ initiatives produced so far this century by policy makers and ‘think tanks’ have ‘transformation’ at their heart. For example, the Department of Children, Schools and Families, DCSF, publication ‘The 21st Century School: a Transformation in Education’ and Futurelab’s ‘Transforming schools for the future’ were both written to stimulate discussion and debate around the transformational aims of both BSF and the Primary Capital Program, PCP.

In a foreword to the Futurelab report, Lord Puttnam talks of finding alternative and more fitting solutions to the educational needs of the future and calls for ‘bravery’ in challenging assumptions and breaking free from traditional, institutionalised ways of thinking. This is an important battle cry as reference to ‘Building’ in Building Schools for the Future has too often been taken too literally as meaning new bricks and mortar when in reality it is much more to do with building new opportunities, life chances and futures for young people and communities.

This key concern is recognised by the London Borough of Camden when they write:

BSF is not simply a construction programme, it is part of a range of changes which will transform secondary learning for Camden’s children and young people.

This was not sufficiently recognised in the early part of the BSF program. The rhetoric of ‘transformation’ has always been championed but it was rarely clarified and anchored in a sustained raft of initiatives that would lead to greater student engagement, community cohesion and improved learning outcomes. This lack of focus was well illustrated in a report by the politically right of centre think-tank Policy Exchange:

BSF is not just a “bricks and mortar programme” and that the buildings programme should act as a “catalyst” for wider scale “educational transformation”. Ministers and departmental representatives have attempted to define “educational transformation” many times, yet its definition still remains unclear.

The lack of consensus on the purposes of ‘transformation’ has led to an increasingly polarised debate about the impact of BSF. In their second annual report PriceWaterhouseCoopers commented:

In the case of open BSF schools, there is no evidence to date suggesting that the design of new buildings, including flexible teaching areas, has significantly contributed to changing pedagogy and practice.

Some might ask whether changing pedagogy was the intention, a vacuum exploited in another comment from Policy Exchange:

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Mike Davies
... the Government’s bold statements, encapsulated in the ‘Building Schools for the Future’ title, have invited people to look at the rebuilding with different eyes. What is a 21st century school supposed to look like? Does transforming a school mean anything more than putting in good IT?

Such a void may in part be due to the lack of consensus of the purpose, the aims and ways forward and the strategies or means for education in this new century. Schools and their communities have competing and contested perspectives of ‘transformation’ and how best to serve their students in making sense of their current lives, developing their talents and helping in the process of individuals working towards a more secure, prosperous and sustainable future. Some of the competing elements of the debate are illustrated in Figure 1.

The way a school responds to the above elements can be described with four to five organisational drivers (if we count assessment and outcomes but this is so intractable that it is beyond the scope of this paper, each interdependent and determined by the school’s interpretation of its values and vision (Figure 2).

One of the elements, the curriculum, presents a wide variety of definitions and interpretations of what is ‘worthwhile’. The ‘taken for granted’ subject-based curriculum of the late 19th century and 20th century is increasingly being challenged. Its long tradition is illustrated in the continuity shown below with the percentages relating to approximate time given to each ‘subject’ (Figure 3).

<table>
<thead>
<tr>
<th><strong>COMPARISON OF 1904 AND 1988 CURRICULUM ARRANGEMENTS</strong></th>
<th><strong>1904 REGULATIONS</strong></th>
<th><strong>1988 NATIONAL CURRICULUM</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>13%</td>
<td>English</td>
</tr>
<tr>
<td>Mathematics</td>
<td>13%</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Sciences</td>
<td>10%</td>
<td>Combined Sciences</td>
</tr>
<tr>
<td>Other language(s)</td>
<td>11–15%</td>
<td>Modern language(s)</td>
</tr>
<tr>
<td>Housewifery</td>
<td>5%</td>
<td>History</td>
</tr>
<tr>
<td>Manual work</td>
<td>5%</td>
<td>Geography</td>
</tr>
<tr>
<td>History</td>
<td>13%</td>
<td>Art</td>
</tr>
<tr>
<td>Geography</td>
<td>13%</td>
<td>Music</td>
</tr>
<tr>
<td>Drawing</td>
<td>5%</td>
<td>Physical Education</td>
</tr>
<tr>
<td>Singing</td>
<td>5%</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 3:** Evolving Curriculum Foci in 19th Century

Based on Ross, Curriculum Construction and Critique, 2000

However the needs of a post industrial society, the demands of students empowered by a technological age, the disengagement and alienation of many young people from a curriculum imposed on them and one that seems to articulate poorly with the world they experience and the needs they have, has meant that during the early years of this century new typologies of curriculum have begun to emerge.

These are often skills based, emphasising lifelong learning, employability and citizenship. A report by the current Chief Inspector of Schools\(^7\) set out a range of ideas:

- Being able to communicate orally at a high level
- Reliability, punctuality and perseverance
- Knowing how to work with others in a team
- Knowing how to evaluate information critically
- Taking responsibility for, and being able to manage, one’s own learning and developing the habits of effective learning
- Knowing how to work independently without close supervision
- Being confident and able to investigate problems and find solutions
- Being resilient in the face of difficulties
- Being creative, inventive, enterprising and entrepreneurial.

There are similar compilations such as the RSA, Royal Society for the Encouragement of Arts, Manufactures and Commerce, ‘Opening Minds\(^8\)’ and the QCA, Qualifications and Curriculum Development Agency,\(^9\) framework for describing personal, learning and thinking skills, PLTS, that applies to all young people aged 11–19 and comprises six groups:

- Independent enquirers
- Creative thinkers
- Reflective learners
- Team workers
- Self-managers
- Effective participants.

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Whether the foundation stone of a school’s approach to its curriculum plan is through a subject-based approach, whether that is through single subjects, such as history, or a group of subjects arranged in a faculty or cross subject team, such as humanities, comprising history, geography, citizenship and religious education, or an integrated theme with the various contributing factors, such as ‘faster, stronger, higher’ bringing maths, science, technology and sport together, will have a distinct bearing on the eventual footprint of the school of their choice. It will impact directly on issues of adjacencies and resource provision.

What the arrangements elaborated above have in common is that they presuppose a curriculum that is largely external to the learner and that is ‘delivered’ to them—a transmission of culture model. The alternative, a more negotiated or co-constructed model, calls for far more radical change. What is distinctive about this model is that it embodies the concept of the young person as a competent and active learner in their own right, able to make their own distinctive contribution to the educational process.

The way the curriculum is conceived, planned, organised and experienced is becoming increasingly diffuse and complex. Figure 4, based on work developed by ‘Futurelab’, sets the spectrum as a set of choices or preferences. Which quartile a local authority or school is working towards will have considerable impact on the preferred designs, services and furnishings.

A school might passionately advocate one particular model or it might combine a number of approaches across a half-term or year. There are clearly implications for student and staff organisation, use of time, access to resources, distribution of facilities, variety of spaces—emphasis given to presenting, mentoring, sharing etc.

As new and remodelled schools are completed no one model is emerging as dominant. There are some strong themes such as the development of Schools within Schools; a greater emphasis on design playing a significant role in supporting the ethos of the school through care over colour, texture and social spaces; the incorporation of ideas that model sustainability, agility and variety; and a much greater use of the external landscape as a resource for learning.
It is also possible to trace some emerging trends, especially a move from:

- Subjects to pedagogy to learning
- External and delivered to co-constructed and negotiated
- Classrooms to home bases to learning commons
- Schools to learning hubs and community centres

These trends represent some very significant signs of a realignment of what it means to be a learner at a place called school in the early decades of this century. In essence they are about:

- Reframing boundaries and affinities—of what and how and where we learn
- Redefining power and control—of knowledge, of access, of association—and who decides
- Re-culturing relationships and building cohesive communities—promoting identity, belonging, wellbeing.

The above illustrations show how a range of different schools might organise the curriculum. They are all ‘subject based’, ranging on the left from a faculty arrangement, with rooms associated with a particular subject all contiguous, to a mix of subject areas including the incorporation of a practical space to avoid the traditional separation of ‘practical’ and ‘non practical’ subjects, and a set of adjacencies that might be found in a School within School model.

The graphic on the right of the box incorporates the idea that some learning will be at another centre in the community such as another school or place of work.

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**Figure 6:**
Models of Curriculum Organisation Within Schools

**“...SIGNS OF A REALIGNMENT OF WHAT IT MEANS TO BE A LEARNER AT A PLACE CALLED A SCHOOL”**

Mike Davies
<table>
<thead>
<tr>
<th><strong>CURRICULUM ORGANISATION</strong></th>
<th><strong>STUDENT ORGANISATION</strong></th>
<th><strong>STAFF ORGANISATION</strong></th>
<th><strong>PEDAGOGY</strong></th>
<th><strong>Routines</strong></th>
<th><strong>Locations</strong></th>
<th><strong>SCHOOL WITHIN A SCHOOL</strong></th>
<th><strong>SCHOOL WITHIN A SCHOOL</strong></th>
<th><strong>VILLAGE WITHIN A VILLAGE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Faculty</strong></td>
<td><strong>Faculty</strong></td>
<td><strong>Pastoral</strong></td>
<td><strong>Pastoral</strong></td>
<td><strong>Pastoral</strong></td>
<td><strong>Competences + experiences + functional skills</strong></td>
<td><strong>Competences + experiences + functional skills</strong></td>
<td><strong>Competences + experiences + functional skills</strong></td>
<td></td>
</tr>
<tr>
<td>Single subject</td>
<td>Single subject</td>
<td>Grouped subjects</td>
<td>Grouped subjects</td>
<td>Cross curriculum</td>
<td>Competences + experiences + functional skills</td>
<td>Competences + experiences + functional skills</td>
<td>Competences + experiences + functional skills</td>
<td></td>
</tr>
<tr>
<td>Village within a village</td>
<td>Village within a village</td>
<td>Village within a village</td>
<td>Village within a village</td>
<td>Village within a village</td>
<td>Village within a village</td>
<td>Village within a village</td>
<td>Village within a village</td>
<td>Village within a village</td>
</tr>
</tbody>
</table>

**Figure 7:**
Practices and Processes Involved in School Organisational Models

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**EMERGING EDUCATIONAL MODELS**

Some of the practices and processes frequently associated with each of these models are set out in Figures 7 and 8. The different emphasis will require a range of built environments and furnishings.

Additionally, as there is no agreed ‘best’ model, agility, especially the ability to change and adapt over time is vital.

Another way of showing this range and the commonly associated elements is through the continuum below. The migration from left to right not only represents the move to more student centred, respectful and engaging ways of learning and organising but also illustrates the increasing complexity of less rigid, certain and hierarchical contemporary developments.

The next page begins to locate current trends in a curriculum less dominated by the traditional subject frame.
The curriculum areas are shown as MIST, maths, IT, science and technology, APE, the Arts and PE, and HUMS, humanities.

The diagram below is adapted from ‘Learning Futures: Next Practice in Learning and Teaching’, published by the Paul Hamlyn Foundation in 2008.\(^\text{10}\) It grew out of a previous Hamlyn funded project, ‘Musical Futures’\(^\text{11}\), which was aimed at encouraging more young people in school to get involved in music by taking a much more contemporary and technology-rich approach than traditionally found in schools.

Project schools reported a huge surge of interest in music. As a result of this success—shown by the engagement and enthusiasm of students, the newly defined relationships between the learner and the teacher, the embracing of a wide range of contexts and educators outside of the school, the opportunities to learn and share success in new ways—the new, wider ranging project was launched.

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It has a focus on reform and transformation. It, too, is concerned with engagement—relevance to the learner, negotiated with them and co-constructed—and with integration and the contexts and process of learning and scaffolding and leading of learning through secure relationships.

This is another example of the 21st century realignment of the educational process as something ‘done with’ rather than ‘done to’. Schools built to ‘deliver’ and built around the needs of the adults will not satisfy the new expectations and demands of a more ‘Inside-Out’ approach, enhanced by rich technology and media.

This next model illustrates the trend and thinking developed in the descriptions outlined above, of a move to a more learner driven and student centred approach. It is located in pedagogy rather than subjects and reflects an ‘Inside-Out’ philosophy with the learning environment providing students access to resources, materials and facilities to support their individual and collaborative enquiries. It is a true ‘third teacher’.

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Figure 9: Learning Futures: Next Practice in Learning and Teaching
A fusion of these two approaches lies at the heart and recommendations of Project Faraday\textsuperscript{12}, where vibrant, challenging environments support learning in the sciences. What is vital in the selection and choices a school makes is that all elements—the organisation, curriculum structure, the pedagogy, the approaches to staff and student groups, the use of time and the ethos all cohere and that there is a strong synergy with the design solutions.

The chart above is an attempt to draw the threads of a number of subject led formats together. In summary, it is possible to trace a move from school as factory, with a number of independent assembly lines running in parallel to deliver subject knowledge and understanding, to school as community, with a number of small learning groups of staff and students, engaged in research and holistic problem based learning both on and off site:
In relation to the development of institutional arrangements, it is possible to trace the same movement or trend—a shift from left to right as illustrated in the arrangements shown in Figure 12.

Plotting CURRICULUM and PEDAGOGY alongside RELATIONSHIPS and their implications for building design it is possible to see a number of coherent patterns emerge:

There is no one to one correlation between the axes as the diagram suggests but these are the most frequently found and established pairings and are a strong echo of the ideas shown on the previous page.
What is difficult to plot on the chart is what is termed ‘Mediated Specialist’ on the previous page. Essentially, this refers to a set of curriculum experiences normally associated with a highly resourced and practical area of experience such as science or the arts, and for other areas of the curriculum to be experienced through the activities associated with the practical area, for example, global warming, an integrated, cross-curriculum theme mediated through a set of experiences based around the sciences. It is possible on the chart to see this as a hybrid of the ‘homebase’ and ‘learning studio’ or ‘learning common’.

CONCLUSIONS

FutureLab teasingly suggested a number of possibilities for the future. The list below is a reworking of some of their ideas and a reminder that education and its demands are not static, that flexibility is about how design can support the evolution of curriculum, how we can maximise learning, as better understanding of the brain intensifies, how the built environment can help build esteem and community and further moves to engage and democratise both formal and informal learning.

SO WHAT IF...

- Learning groups weren’t organised by chronological age?
- Most learning was collaborative?
- Students could learn from remote experts using digital technologies?
- Students were regularly involved in co-constructing their work?
- Resources were organised to maximise learner control?
- The focus was on environments, where learners felt comfortable?
- Time was related to task in need, either on site or beyond?

To repeat the comments made earlier, these ideas are another example of the 21st century realignment of the educational process as something quite ‘done with’ rather than ‘done to’.

Again schools built to deliver and built around the needs of the adults will not satisfy the new expectations and demands of a more inside-outside approach, enhanced by rich technology and media.

It is our confidence and capacity to interpret this and seize the opportunity that holds so much promise for future generations of young people and their communities.
The Australian Science & Mathematics School (ASMS) is a public school for senior secondary students in Years 10–12 and, as its name suggests, has a special focus on science and mathematics. It is a unique and innovative school for many reasons and is deeply engaged in re-shaping the schooling experience for its students and developing a refreshed science and mathematics educational program suitable for young people in the 21st century.

The ASMS’s location within the Flinders University Campus extends opportunities. The School capitalises upon relationships with other educational institutional facilities, businesses and industry so as to provide learning experiences in the workplace, community and university.

The ASMS curriculum is developed within a series of “BIG IDEAS” rather than traditional subjects which maximises opportunities for interdisciplinary learning. This approach has repercussions for the timetable. The timetable is constructed with longer blocks of time instead of the typical fifty minute periods allocated to subject-based learning.

Learning is achieved in a highly collaborative setting, where interaction between students and educators is prevalent. The ASMS personalises learning opportunities for its students through: inquiry-based pedagogies; applications of leading edge technologies; and through engaging a comprehensive curriculum that is presented through an interdisciplinary framework by multi-disciplinary teams of educators.

Spatially, learning occurs in the learning commons which are flexible learning spaces that can accommodate different size groups of students. Workstations, data projectors and speaker systems in the learning commons allow

**Australian Science and Maths School**

The design of the school’s learning and physical environments is based on pivotal beliefs about student-focused teaching and learning, lifelong learning, the relevance of science and mathematics to the world’s future, the interconnectedness of knowledge, and the importance of human communication in all its forms.
students to access a lecture, discuss ideas as a class or work in small groups depending on the task at hand. Staff work areas open off the learning commons.

The ASMS focus is on fulfilling the potential of its students through engaging each student in planning, reviewing, reflecting and re-shaping their learning. Both individuality and collaboration are equally valued. Special attention is given to rigorous, leading edge science and mathematics and inquiry, collaboration, problem-solving and authentic assessment drive the teaching and learning activities. Students have a range of spatial settings to choose from to achieve these learning goals.

Science, control technology, human movement, and audio-visual studios are specialised learning areas connected to and visible from the learning commons. They have been equipped with the latest learning tools. With classrooms replaced by learning commons and adjacent studio environments, this school looks more like a university or workplace setting than a traditional school.

To further foster inquiry, a multi-screen videoconference facility allows face-to-face contact with students and academics from around the world. In addition, many other facilities are accessed by joint use agreements with the University. For example, the school has not had to develop their own library and sports’ facilities as they make use of the university facilities.

**PROFESSIONAL LEARNING**

The ASMS maintains an unrelenting focus on the professional learning of all staff to strengthen valued outcomes for all learners. Professional learning takes many forms, is deeply embedded in the daily activities of staff and is the key driver of innovation, development and transformation in science and mathematics education at the ASMS. Informing professional practice with educators across SA, nationally and internationally is a priority for the ASMS.
TAKE 8 Peter, can we begin by talking about the role of the education department in the provision of education in Victoria and particularly the role of the Infrastructure Division which you manage?

PS Infrastructure is the provider of new spaces, the organisation that looks at refurbishment and the organisation that manages innovation in infrastructure delivery. It also has a role in the state budget provisions and the Economic Stimulus package. We maintain building stock as well. We look after the lifecycle of educational facilities from the time we nominate an area where we need a new school, purchase the land, build the new school, maintain the new school until we dispose of the site when it closes.

TAKE 8 What kinds of people do you have working in the Infrastructure Division?

PS Everybody from property planning people and demographers. We have architects, engineers, contract administrators, financial people and a whole range of different groups. We also bring in people with the skills that we need at a particular time.

TAKE 8 To an outsider, the DEECD seems a complex body with many different divisions. How does the Infrastructure Division relate to some of those other sections and when do you tap into their expertise?

PS All this time we have to be very much linked into the Innovation and Next Practice area. We have to link into the regions and our stakeholders and our clients; the 1,600 schools.

EDITORS’ PREAMBLE: Educators, designers, education departments and governments support innovation in school design in a variety of interconnected ways. Peter Stewart describes a key moment for Victorian schools when the state government committed to renew or rebuild every state school over a ten year period. This meant the Victorian education department was able to plan for longer terms innovation which hadn’t been possible in the past when budgets were normally from year to year. The commitment of state government funds was eclipsed earlier this year with the Federal government’s economic stimulus package. Peter describes the impact of that spending commitment and the development of templates for school facilities as a way of getting documents quickly to tender. Other points discussed in this interview include ICT, ESD and the role of research

INTERVIEW: July 31, 2009

PS: Peter Stewart, General Manager, Infrastructure Division, Economic Stimulus Plan Team, Department of Education and Early Childhood Development

1 Department of Education and Early Childhood Development (Victoria)

2 This refers to the Federal funding initiative called ‘Building the Education Revolution (BER)’. The BER initiative was announced by the Australian Federal Government in February 2009.
We deal with those schools through the regions almost every day. We deal with the other offices such as Darrel Fraser’s Office of Government School Education everyday because things like information technology innovation are a critical part of what they are currently driving. We are trying to make sure the infrastructure we provide supports that and we talk with other areas such as our IT section that works on provision standards. Therefore, we work across all the areas from our clients in the schools into the policy and delivery area. You are right, it is very complex.

TAKE 8 What is the relationship between the department and the decisions that government make? How do the two influence each other?

PS The state government’s Labor Financial Statement was probably the most important document at the last election, which set out the pathway for the following four years. It guaranteed a minimum spend on infrastructure, which was very important for us. It gave us certainty for the next four years and set out a fairly strong commitment to renew or rebuild every school in the state over the next 10 years. It gave us an entry into a longer term planning and innovation strain which we hadn’t had in the past. In the past, budgets have normally been year to year. There was no certainty of funding and so it was a lot harder to build in a longer term innovation plan in the way we are doing now in Infrastructure. That has all been eclipsed in the last few months by the Economic Stimulus Plan which brought our state commitment of $1.83 billion over 4 years up to over $4 billion because there is now $2.5 billion to be spent in 2.5 years. That will touch every school in the state, particularly primary schools. We have 1,400 projects with significant value in most primary and specialist schools.

TAKE 8 The Economic Stimulus Plan must have had an enormous impact for the department. You had been working methodically through a process of gradual change and then the sudden influx of money could mean that perhaps there is not time for designers, educators, and the department to work together.

PS I don’t think it was as hard for us because we had been working on a number of projects for a number of years, so we probably have a five-year pedigree in the area.
By the time Building the Education Revolution, BER, was announced, all it did was to bring forward the work we would have done in the future. It has been very good for us. It has given us the extra capital to now do what we would have liked to have done over maybe a more extended period. Based on previous work we have now produced 33 different design templates. The templates, in our minds, and in the minds of others, are representing best-practice designs. We are now able to take a concept and put it into practice. That means that almost every school will have an innovative facility which means the whole role of professional development in schools, the whole role of monitoring the successes if you like of that design will be much easier because we will have hundreds of case studies out there. It also means we don’t have to think about an incremental professional design process. We can roll that out across the state because we know that in two years there will be 1,400 new library and learning centres and multipurpose spaces.

TAKE 8 That anticipates another question. The relationship between space and pedagogy, one would think is hand in glove. One would hope that the learning spaces accommodate the teaching methods perfectly. What you are suggesting though is that the innovative learning spaces are built and the teaching must therefore fit into those spaces. Is the innovative teaching already happening or are you anticipating that the innovative learning spaces will actually start to demand that teachers think differently about the way they practice?

PS The spaces can be traditional and they can be innovative. They are designed to be flexible enough to be able to be closed up if a school preferred to move more slowly in terms of introducing new methods of teaching. It also allows a school that is already part way down the path to use those spaces for whatever they like—large group spaces or small group spaces. But you are right, it is an exceptionally large workforce. The workforce will have to undergo a whole range of professional development training to be able to best use those spaces and some people will be more comfortable in the new spaces. So the spaces have to flexible enough to allow for both.

TAKE8 Some would argue that the template design is a midway solution if we compare them with the Australian Science and Math’s School which has no classrooms. Could the teaching methods that are used over there be precluded by being able to divide back into classroom size spaces?

PS It could be. But what you are talking about is one school which has a particular cohort of students. What we are talking about is rolling out the design templates across a range of regional and metropolitan areas and different community groups that have different expectations about what a school is. You have to create a space that can cope with the variety of expectations of the school's community as opposed to creating a one-off school where you are almost selecting students for their attendance at the school. This is a general rollout of spaces across all schools. There is a difference between the two. We have the examples of the South Australian model in John Monash or in the select entry but again, it is drawing a particular cohort of students who are comfortable in those spaces and parents who are happy to have students in different spaces. But if you are talking about replicating that in 1,300 or 1,400 new primary schools there are a range of new issues that you have to deal with which would almost prevent them from being rolled out en masse. But maybe in five or ten years we will be there.

4 The John Monash Science School is a specialist school to be linked with Monash University, Melbourne, Australia.
TAKE 8 Originally when schools were first being delivered, policy was being driven by two aspects—teaching methods and quality assurance and accountability. From the 1960s there were other social drivers for equal access to education by disadvantaged groups or other minority groups. From the seventies economic drivers have become more important. What do you see as the factors which are currently driving change in school design?

PS The fundamental factor driving change is school improvement. There has been a nation-wide focus on education outcomes, and the economic drivers probably steer that in part. We want a well-educated workforce. This means getting the best out of the spaces so that students learn and the best out of delivering education into communities. We have moved away from the individual school into the concept of the network. We have around seventy regional network leaders who are working on school improvement in networks of 20 to 25 schools. They are focused on the network rather than individual schools and the pathways between early education into primary school through secondary school and into tertiary.

TAKE 8 That suggests that schools are shifting towards being community resources, particularly in relation to lifelong learning.

PS You can see that community use of school facilities has gone up markedly in the past four or five years. We have hundreds and hundreds of joint-use agreements which mean that communities are using our facilities. We quite often build a community gymnasium and that is used out of hours by sporting clubs. We have at Broadmeadows, for example, places where the public come in and use libraries and they can use computer spaces for learning as well. We are seeing more examples of schools becoming community hubs and providing a range of services outside of traditional primary or secondary schools.

TAKE 8 Is the opposite happening also where the school is using what is effectively a shared community facility? An example in South Australia is Mawson Lakes Primary School where they share a resource centre with the University of South Australia and the local community.

PS That is happening, but in Victoria we tend to focus on looking at the land and the available resources. Schools have traditionally had rather large sites and it is good for the school to be a community hub. We would like our schools to be used more frequently out of hours. We won’t have to move down the path as in some of the other states where vandalism has caused them to put up 2.4 metre fences around the outside perimeter. Most of our schools are very open.

TAKE 8 In the United States and in the UK the fences are not just about vandalism but are about a perceived security issue for students. Is that going to become more of an issue in Australia, do you think?

PS We will try to resist it and we will try to make sure that we put in place other mechanisms to ensure the risk to students on-site is minimised. We have been successful. If you look around our schools, you will see that most schools are fairly open and are inviting. The way that the design is being rolled out now, we are putting community facilities on the edge to try and encourage people to come in. If you look at our PPP schools you will see that they all have a community flavour; they all have gymnasiums and some of them have early learning centres. They are designed so that we can bring the community into those spaces.

5 Public Private Partnership schools. These are similar to PFI schools in the UK and PB schools in the US.
TAKE 8 Thinking about what happened in the seventies and eighties, one of the big differences is students’ access to information through computers. ICT is having a big impact on teaching methods and also on the design of school.

PS ICT has certainly had an impact on even just the standard infrastructure that you need to put into the backbone of the schools, the size of servers, the server provision, the hardwiring and the wireless networking but it is also evolving in itself because the devices themselves are changing. There is far more freedom from being tethered to a fixed connection for the network. Wireless networks are critical and are being used through the schools. We have gone well above what our normal provisions for IT are in our schools to ensure the each of our BER design templates has a higher level of IT provisions. One of the barriers we are trying to remove is the fact that we have a limited number of computer plug-in points and a limited number of computers that can connect wirelessly. Government is looking at a ratio of one to one but it may be greater than one to one if community needs are included.

TAKE 8 We have spoken about the provision of building and provision of ICT but what we haven’t spoken about the provision of informal learning within the school environments such as the school playground and school facilities for students to work in collegiate ways which are not so teacher directed. That is an area of growing interest and research and has spatial implications. Has the department in Victoria addressed those issues of informal learning particularly in the playground and how the playground might support the students more fully across their school?

PS I think we have in part but not in total. We have done a lot of work in the last four to five years on buildings and I think we are now moving outside the doors. There has always been a natural plan for indoor/outdoor areas and we have a number of covered outdoor learning areas under way. I think it is more a focus on how all spaces will be used rather than the individual outdoor learning areas which are a substitute for indoor learning areas.

“WE HAVE DONE A LOT OF WORK IN THE LAST FOUR TO FIVE YEARS ON BUILDINGS AND I THINK WE ARE NOW MOVING OUTSIDE THE DOORS.”

Peter Stewart
TAKE 8 You have been a supporter of research and we have been beneficiaries of that with two Australian Research Council Linkage Grants in which the department has been a partner. Why have you been a supporter of research, particularly when the research happens over such a long time, such as the ARC process, and is very different to a consultancy?

PS I think we have an obligation in serving the government to be drivers of new research. When I joined here four and bit years ago, it would have been very easy to have adopted what we had and to continue it forward. Interestingly enough, the documents that I saw, which demonstrated our facilities provision, were probably ones that I had seen much earlier. They hadn’t changed greatly. There hadn’t been much of a reflection on how well those spaces worked and what the requirements were going forward for those spaces. It was also four or five years ago that there was more thinking about pedagogy and space particularly through Europe and the UK with the amount of investment into education. Also people like Prakash Nair were driving people down the path of considering change. All of those innovators have enabled us to consider the future, bearing in mind these facilities are going to be there for 30 to 40 years.

TAKE 8 You have partly answered the question about why Australia is considered to be an innovator in learning spaces but also in methods of teaching.

PS There are a number of people who have looked at spaces, such as Kenn Fisher. You could do something as simple as a post-occupancy evaluation but all that does is look at the building as built versus the teaching as is. What we wanted to do with the research was to look forward rather than backwards. The post-occupancy evaluation approach is an incrementally improving approach and what we needed to make was the discontinuous step or big step from where we were to where we needed to be. The design processes that we got involved in were all about unlocking the thoughts about continuing what was already there and examining what sort of spaces could be there. How could we move forward with the changes in pedagogy that were occurring? If there are changes in pedagogy that were not supported by spaces, then they would have great difficulty in introducing those spaces. We saw in a number of schools that they were actually pulling out the walls in some of the older buildings. They were experimenting or playing with space themselves. We had to provide spaces, which were flexible enough to close up or open up. The other thing I notice is that we tend to have cycles of investment and we are in that new cycle of investment into school provision. With that new cycle, it is important or incumbent on us that we are building the sorts of facilities we need for the future.
Things like introducing substantial improvement in terms of environmentally sustainable design, ESD, or IT are critical as part of that. IT is probably the more difficult one because that is moving so quickly. Whatever we provide today is out of date in a year or two. With ESD we are setting up fundamental building blocks for students and therefore for the community in the long term.

**TAKE 8** Can you go into more detail about ESD setting up fundamental building blocks?

**PS** I am considering the reduced use of air-conditioning, introducing natural light which improves learning, looking at key ventilation levels through the spaces, looking at ways in which we might innovate to not require the use of gas or electricity for heating. We have some examples where we are using in-ground warming of the air. Looking at water harvesting, we are driving thinking into how the harvested water is best used. We are putting it into the building rather than in the field. In each of the BER design templates we are going to have an LCD screen which will show the performance of the building at different times of the day. Students will begin to understand the relationship between the design and the environment they are enjoying every day. Photovoltaic cells and solar hot water are now the expectations of students which they will take home and will probably embed in their own home lives.

**TAKE 8** Peter, we haven’t spoken about the furnishing of the BER spaces. Is that part of the BER package?

**PS** We are commencing another piece of research on the furniture side and talking with a university and getting sponsorship from a cooperative research centre. We will be doing some detailed research work on the types of furniture that we need in the spaces, the combinations and the flexibility within the design of those pieces of furniture. That group will also include some manufacturers. I am not sure that going out to the market place at the moment will provide all of the furniture that we need for our new spaces. Given we have BER, we can probably go out and buy large numbers of pieces of equipment and furniture for those schools. Over the next two years, 1,300 or 1,400 schools will receive new innovative furniture and equipment that will go into those spaces.

**TAKE 8** We have spoken about BER. It has been an amazing year—in many ways exciting but also confronting because of the rate of expansion. Our text is focused on both teachers and architects and we are trying to communicate to both groups. As a conclusion, would there be any pieces of advice that you would give either group or comments about this moment in time?

**PS** There is almost a tension with the rollout of BER and the interests of architects in that BER came out with guidelines that talked about templates which would suggest standardised design. We have not tried to replicate the same design across 1,300 sites. What we have come up with is a range of templates that are going to be customised for particular sites but in the period we have to roll these out, the level of customisation is restricted. We have to take them from announcement to tender within a month or two. Architects cannot react that quickly. If we had an architectural profession which could do a lot of the design development in a very intense period of discussion with clients and systems in place to be able to develop the documents for tender very quickly, we would have used architects exclusively. What we have had to do is pick a middle ground where we know we have good innovative spaces, so we have had to produce flexible designs. We couldn’t roll out 1,300 individual designs nor would it make sense. We have to work with the profession to come up with some core design templates for the future which we can then use as launching platforms for the customisation for the community. We are talking about a change in how we might be delivering our facilities into the future from the individual one-off designs into a series of bases which we will customise and make useful for the community. There is an interesting discussion and tension there. We need to work with the architectural profession to ensure that we have clients that are comfortable, a design process which is reactive and able to produce high-quality designs very quickly, and that match the innovation that can be brought in with the use of architects in these buildings.
Recent adoption of progressive pedagogies in schools has led to innovation in the design of learning environments. In many ways such innovation mirrors that of the open learning movement of the 1970s.

In this paper, past experiences of open plan classrooms are explored and lessons learned during the 1970s are revisited. In addition, influences on contemporary school design are discussed and trends regarding recent spatial changes are presented. Research findings are discussed concerning the impacts and implications of ‘open’ school architecture and the following question is addressed: ‘What lessons from the 1970s experience of open classroom design and occupation can inform current school design and use?’

In order to address student’s individual learning needs, school-based education is becoming differentiated and personalised. As a result, educators are calling for learning environments that offer a range of modern contexts for learning.

Learning environments are now required to support teachers and students working together in a variety of group sizes and learning modalities to develop the students’ personal and social competencies and prepare them for a lifetime of learning.

Lifelong learning skills may be fostered through students working with greater independence and self-regulation. In order for this to occur, fundamental changes to traditional school architecture are required.

In the concluding comments to this paper, suggestions are made regarding how a successful transition from traditional classrooms to contemporary learning spaces may be achieved through education, collaboration and design.
Open plan schools: the 1970s experience—

Recent innovation in school building design in Australia has much in common with the open plan schools movement of the 1970s. During the late 1960s and the 1970s many open plan schools were constructed in Australia\(^1\), \(^2\), as well as in other countries such as the United States, Great Britain, Israel\(^3\), and Canada\(^4\). This movement was influenced significantly by the work of the Educational Facilities Laboratories in the United States. This research organisation operated from 1958 until 1986 and is attributed with developing and popularising the concept of the open plan schools.\(^5\)

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Educational and social reforms drove this wave of innovation, with academics and educational bureaucrats calling for new pedagogical practices and spaces which would enable experiential and individualised learning⁶. These reforms were influenced by the work of educational philosophers such as Dewey⁷ and Friere⁸. Dewey advocated experiential inquiry based learning that was connected to student’s interests and their lives beyond school. Friere promoted the democratisation of education and advocated the breakdown in the traditional teacher-student relationship in favour of a reciprocal arrangement in which all members of a learning community acted as both teacher and learner. At the same time, the prescriptive curriculum was being reviewed and a more flexible, school-created, curriculum was being endorsed.

The typical open plan classrooms of the 1970s had spaces that catered for large cohorts of students and team teaching approaches. A variety of activity settings were present, including general learning space, withdrawal spaces, wet areas, quiet areas and covered outside work spaces. These classrooms accommodated a range of group sizes and a variety of learning experiences.

New furniture designs were devised to accompany open school architecture, with mobile dividers, acoustic screens, chalkboards and tables all introduced to facilitate flexible social arrangements².

These spatial changes were intended to support teachers in shaping pedagogical practice. Within these classrooms, it was expected that students and teachers would work together in a cooperative and collegiate manner. It was intended that students would learn across a variety of settings and be granted some choice regarding the activities in which they engaged².

However, by the mid 1980s open plan school architecture had fallen from grace and the traditional ‘cells and bells’ factory model had returned to favour. In evaluating this reversion to the traditional model, Gump⁹ reported that the education programs conducted in open plan schools often did not match the intentions of the architecture. He suggested that educators did not take advantage of the potential of the spaces to ‘provide a variety of groupings, activities, individualisation of instruction, and most basically, maximization of pupils’ choices in obtaining their own education’⁹. Brogden¹⁰ reported similar findings and suggested open plan schools failed because teaching methodologies did not keep pace with innovation in school design. He attributed this to the conservatism of teachers and the propensity to failure of centrally imposed ideas.

In response to this mismatch of space and practice, schools frequently resorted to modifying open plan classrooms by creating more walled-in spaces and returning to traditional teaching practices⁹.

“However, by the mid 1980s open plan school architecture had fallen from grace and the traditional ‘cells and bells’ factory model had returned to favour.”

Ben Cleveland
Ken Woodman

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The following research regarding the social and academic impacts of open plan school architecture on students reveal a number of inconclusive and sometimes contradictory findings.

Through researching students’ social responses to open plan classrooms, Traub, Weiss and Fisher found that students in suburban open plan schools showed greater autonomy, more liking for school, and more positive attitudes towards themselves than students in traditional classrooms. However, these findings were not consistent for students in inner-city open plan schools. Also, it was found by Gump that highly able students demonstrated higher self-esteem, while less able students showed lower self-esteem in open plan environments.

With regard to student academic performance, McPartland and Epstein found no significant difference in academic outcomes between students who attended open schools and those who attended schools with traditional settings. However, the findings of Beck contradict those of McPartland and Epstein—at least upon initial examination. Beck found that students in open schools scored lower on basic skills tests than students in traditional classrooms. In the analysis of this study, however, Beck concluded that these research findings were confounded due to the way in which open plan facilities were imposed on school communities without adequate preparation and support being provided for the teachers working in them.

Further to this, Rodwell reported that some teachers in open plan schools became confused in their educational role due to the pedagogical and spatial changes. Beck suggested that open plan schools were not operating under ideal circumstances and that with better support for staff the open school movement may have been more successful.

**CURRENT INFLUENCES ON SCHOOL ARCHITECTURE**

The physical spaces in schools are currently changing in response to a number of factors. These include the following:

- Educators are looking to update pedagogies in response new understandings about how students learn.
- Information and communications technologies (ICT) are becoming essential tools for education and need to be integrated into school buildings.
- Environmentalists, and the wider community, are promoting the advantages of constructing buildings with sustainable features and recycling existing buildings.
- Community groups are seeking to use school facilities for a variety of social and educational purposes.
- The concept of space is changing to incorporate the social meanings that people associate with physical environments.

These influences on school architecture are explored below.

**PEDAGOGICAL CHANGE**

In the 21st Century, evolving educational philosophies and pedagogies are again driving the need for innovation in school design. Many schools are seeking to personalise the learning experience for students so that they may develop their individual potential. Personalisation may address students’ cognitive styles, learning strategies and their preferences for learning in particular environments.

Educators are seeking to engage students in learning that is collaborative, involves deeper thinking, and addresses multiple intelligences, so that students may develop strategies for life-long learning.

Improved conceptual and physical connections between learning settings and the wider world are also becoming common in schools. A focus on the critical analysis of real world situations and events is influencing pedagogical practices. The time spent by students synthesising and analysing subject matter is being given an ever-greater weighting in schools in preference to didactic knowledge transfer.

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In examining this shift, Zyngier emphasized the need for improved connectedness within school communities and between schools and the wider community. He argued that pedagogical settings within which students are encouraged to think critically are of utmost importance. Fisher concluded that there are spatial implications related to these concepts. He suggested that spatial arrangements can influence the social power structures found in schools and that such structures can have a significant impact on the development of pedagogies.

In response to these issues, Lippman recommended that learning environments should be designed as integrated systems that afford individual, one-to-one, small group, and large group activity settings. In addition, he suggested that students are more likely to appropriate knowledge for themselves and share their understandings with others when provided with environments that allow for a flow of activity.

INFORMATION AND COMMUNICATION TECHNOLOGIES

The desire to appropriately integrate ICT into schools is placing pressure on existing school architecture. School buildings are now being required to accommodate a multitude of new technologies including desktop and laptop computers, interactive whiteboards, data-logging equipment, and a variety of handheld devices.

Zandvliet and Fraser found that careful consideration of pedagogical requirements, rather than technical requirements, was essential for the successful design of technology aided learning environments. In particular, they found that spaces needed to facilitate the movement of teachers, so that they could access and assist students as required. In addition, Thompson found that there was a need for the inclusion of spaces situated away from computers where students can plan computer aided tasks prior to commencing work at the computer. Based on pedagogical requirements, she recommended that computer-aided learning environments should include spaces for specific tasks, such as face-to-face lessons or class meetings, planning group work, carrying out group work, distance learning, and self-paced or individual work.

ECOLOGICAL SUSTAINABILITY

In response to concerns over environmental issues, school buildings are now being constructed with ecologically sustainable design features. Both passive and active design principles are being implemented. Passive design features include orientation, ventilation, daylight and thermal mass, while active design features include solar and wind power generation, solar hot water, and water recycling. Passive design features not only reduce carbon emissions but also improve internal environmental conditions such as air quality, temperature, acoustics and daylight levels.

Improvements to these internal environmental conditions have been shown to directly improve student learning. Literature reviews by Fisher\textsuperscript{23} and Schnieder\textsuperscript{18} reported that students can perform mental tasks better at moderate temperatures and humidity levels, and that poor room ventilation leads to increased health problems and a reduction in students’ ability to concentrate. In addition, these studies showed good acoustics and adequate lighting to be essential for good student performance, with natural lighting providing important psychological and physiological benefits. Finally, they found that good air quality was correlated with reduced absenteeism.

In 2008 a voluntary environmental assessment tool, Green Star—Education, was released to evaluate educational facilities [24], and see Hes in this journal]. This assessment tool rates the environmental attributes of new and refurbished educational facilities and provides a comparative star rating for the development. The Green Star—Education tool considers both building and management attributes, including how the building itself can be used as a learning resource for students. The creation of this assessment tool indicates support from government towards ecologically sustainable development in schools.

**COMMUNITY INVOLVEMENT**

Members of school communities are increasingly being invited to contribute to the design of new school buildings through community consultation during the design process\textsuperscript{25}. By consulting stakeholders, invaluable insights into a school’s culture may be gained which can inform the design.

Also, partnerships between the public and private sectors have encouraged community usage. In some cases, schools are using existing buildings within the local community to fulfil needs for additional space. Such arrangements are further reinforcing the relationships between schools and their local neighbourhoods\textsuperscript{26}.

Traditionally, school buildings have been used for limited hours during the day and for a limited number of days during the year. Outside these times school buildings have remained substantially vacant. Recently, however, the wider community is beginning to utilise educational facilities such as classrooms, gyms, halls and libraries during extended hours for both educational and non-educational purposes\textsuperscript{27}. Furthermore, ‘extended schools’ are providing additional services to communities\textsuperscript{28}. Service facilities being used by the wider community include family support and health agencies, community drop-in centres, early years learning centres and specialist learning spaces. As well as benefiting community groups, a shared approach to the use of school facilities can provide funds to the schools through the rental of school infrastructure.

![St Leonards College, Cornish Campus, VIC Northern Facade with Solar Flues](Image: FSMA)

**“BY CONSULTING STAKEHOLDERS, INVALUABLE INSIGHTS INTO A SCHOOL’S CULTURE MAY BE GAINED WHICH CAN INFORM THE DESIGN.”**

Ben Cleveland
Ken Woodman

\textsuperscript{23} Fisher, K., Building Better Outcomes: The Impact of School Infrastructure on Student Outcomes and Behaviour, Commonwealth Department for Education Training and Youth Affairs, Editor. 2001.


\textsuperscript{26} Specter, S., Creating Schools and Strengthening Communities through Adaptive Reuse. 2003, National Clearinghouse for Educational Facilities: Washington DC.

\textsuperscript{27} Victorian State Government, Schools as Community Facilities, Department of Education and Training, Editor. 2005, School Resources Division and Strategic Policy and Planning Division: Melbourne.

PERCEPTIONS OF SPACE

Theorists, including Massey, are currently reassessing the concept of ‘space’. Space is no longer being considered as just a physical enclosure but as a social product created through interactions of both the physical and the social. With this concept, Massey asserts that space is constantly under construction and is always being recreated.

McGregor has applied this concept of space to schools. She describes the spatiality of schools as the social and physical interrelations and interactions of students, teachers, learning spaces and objects. Furthermore, McGregor notes that these interrelations go beyond the classroom walls into the wider community in a network of people and objects across space and through time. This creates a dynamic concept of the learning space, moving from the idea of a ‘static container’ into an active and vibrant network of social interrelations and interactions.

Adaptable structures may be reconfigured to satisfy significant changes in long-term use through loose fit design. Flexibility may support a diversity of group sizes and learning uses through the manipulation of elements such as operable walls and furniture. Learning environments may become agile, or polyvalent, by responding directly to immediate teaching and learning needs through spatial appropriation.

In response to changing pedagogies, learning environments are supporting fluid movement of students and teachers between spaces. Improved understandings of the connections between pedagogy and space are driving the creation of school facilities that feature a range of learning settings. Such settings provide for a variety of group sizes and activities, and are being interlinked to allow for fluid movement between them.

In many instances, the size of learning environments has grown in order to accommodate larger student cohorts and team teaching approaches. Fluid environments have aided the personalisation of student learning by supporting a more egalitarian learning environment within which the teacher acts more as a guide than as the centre of all power and knowledge. In these spaces, teachers are able to move around to assist students and are no longer shackled to a desk at the front of the class.

Teachers are becoming partners in the students’ learning experience and students are increasingly being able to interact more freely, allowing for the natural human process of knowledge exchange. In these environments there is improved equity in the power relations between teachers and students, as both give and receive knowledge.

The scale of schools is also being reconsidered and smaller learning communities are being favoured. This approach is backed by research in America which has shown that high schools catering for 600–900 students provide the highest literacy and numeracy results while also providing social equity. In Australia, some larger high schools are being divided into smaller learning communities within the overall institution. The creation of small autonomous communities is intended to support better interpersonal relationships and foster an improved sense of belonging in students and teachers.

“Teachers are becoming partners in the students’ learning experience and students are increasingly being able to interact more freely.”

Ben Cleveland
Ken Woodman

CONCLUDING COMMENTS

The question posed earlier was ‘What lessons from the 1970s experience of open classroom design and occupation can inform current school design and use?’ This paper illustrates that the influences that drove school design in the 1970s are similar to those that are currently driving school design today. In order to prevent the failures of the 1970s being repeated, it is suggested here that three major issues need to be addressed: education, collaboration and design.

Firstly, teachers and extended school communities require education regarding contemporary pedagogies and spaces. Comprehensive in-school professional education programmes are required to assist teachers to better understand progressive pedagogies and the associated spatial implications: where possible these should be initiated prior to the creation of new learning spaces. As found by researchers of the 1970s experience, it is wrong to assume that changes to school architecture will lead teachers to adopt new pedagogical practises. Armed with enhanced pedagogical and spatial understandings, teachers can subsequently make informed contributions to the design of learning environments, and make best use of these new environments once built.

In addition, parents and the wider community require education regarding changes to contemporary schooling. Thorough explanations of contemporary educational practices and associated school designs are required to ensure ongoing community support.

In order to reduce instances of mismatch between design and use, teachers and students require spatial education when initially occupying innovative learning environments. This support is required so that they may gain understandings of the facilities and subsequently utilise the potential of their new environments. Education of this type is likely to reduce anxiety for teachers and the likelihood that spaces will need to be modified in the future.

Secondly, collaboration between government, educators, design professionals and the extended school communities is required in order to achieve a successful shift to new pedagogical and spatial models in schools. The bureaucratic imposition of fundamentally different educational and architectural concepts without adequate understanding by teachers and the wider community should be avoided. During any design process a collaborative approach is more likely to garner support and foster ownership. Such collaboration is subsequently likely in buildings that satisfy the multiple needs of stakeholders.

Finally, the design of new learning environments should support contemporary educational philosophies and practices. Spaces are needed that enable multimodal communication between teachers and students, and between students and...
students. A constant focus at the ‘front’ of the class is no longer required. Improved integration of information and communication technology will assist students to work more independently and with greater self-regulation. These measures will support the development of students’ personal and social competencies and preparing them for a lifetime of learning. Learning spaces that accommodate a variety of spatial settings, and the fluid movement of students and teachers from one setting to another, will facilitate the use of a range of contexts for learning.

Ecologically sustainable design will provide appropriate internal conditions whilst reducing impacts on the environment.

Moreover, environmental factors including thermal comfort, air quality, lighting and importantly acoustics will assist students to achieve their academic potential through improved personal comfort.

The designs of today’s contemporary learning spaces have many similarities to open plan classrooms of the 1970s. There is a risk that today’s spaces will suffer the same fate as the open plan classroom. To ensure that modern learning environments do not fail, stakeholders need to address the critical issues of education, collaboration and design.
Prologue—Snapshots of campus life on three continents.

Snapshot one:
Within a late seventeenth-century European campus, students move about on bicycle and on foot between historic buildings and across lawns and public spaces dotted with captivating public art. There is a sense of living in an era when the motor car was unknown and students were unhurried in their lives. Yet, closer inspection reveals that the cross-campus travelling is necessitated by the long, narrow dimension of the campus and the distance between key locations. In this beautiful setting there are insufficient places, indoor or outdoor, where students and staff can gather informally to interact in ways that are vital for a thriving learning community.

Snapshot two:
The university is one of Australia’s most prestigious and several of its buildings reflect early attempts to reproduce the ambience of historic European institutions. A recent refurbishment of a central external courtyard has been completed and new seating installed for public use. However, occupants must precariously balance books, newspapers, computers, drinks and food as there is no bench or table. In particular, it is difficult for students and staff to use the university’s wireless network or other learning materials in the absence of suitable furniture despite the institution’s commitment to informal learning.

Snapshot three:
The building is immediately recognisable as the work of one of the world’s great celebrity architects. It gains the North American institution enormous attention in both architectural and educational circles and features an internal ‘street’ to promote serendipitous encounters. In sharp juxtaposition to the amazing form of the building and the informal spaces created within it, the adjacent classrooms simply reproduce traditional, teacher-led learning environments offering nothing that suggests a commitment to improved pedagogy.

These snapshots capture the diversity of the experience of campus life and frame the discussion which follows. They address aspects relating to the built and natural environments, travel across the campus, the occupation of select social spaces internally and externally, and the challenge of integrating the use of new technologies into the campus setting.
They also portray the lost opportunities to make the campus a more engaging environment where staff, students and visitors can interact with each other to form a dynamic, robust and evolving learning community.

INTRODUCTION

The role of the university campus as a ‘place of learning’ is presently under challenge on a number of fronts. The growing adoption of more student centred learning practices exposes the general poor quality and narrow range of formal classroom types and informal learning environments. Universally, there is an increasing need for a wider mix of spatial types where students can take greater responsibility for their learning, collaborate with peers, and work in more diverse ways according to personal preference and the changing demands of their academic programs.¹

In addition, the introduction of a ‘mass higher education’ system with its increased student participation, along with the growth in international student numbers on many campuses—see Scott² for an account of the origins of this paradigmatic shift in university populations—has put a further strain on the capacity of the existing, traditional classroom infrastructure in many institutions. The change in the composition of the student population has also resulted in a larger number of students needing to maintain employment, which has led to a reduction in time spent on campus by many individuals. There is less opportunity for students to form strong bonds with fellow students and staff or to build a personal connection with the campus itself. The situation is compounded by decades of financial neglect. A tour of most campuses would immediately reveal the massive gulf separating the promotional slogans and the fine ambitions of institutional mission statements and the daily reality of campus life for a vast number of students and staff.

The depleted physical fabric of universities is evidenced by the fact that only a relatively small percentage of classrooms at any university could be classified as ‘new generation’ learning environments—the kinds of contemporary settings required to support more student-centred approaches. The overwhelming bulk of present-day classrooms have changed little—apart from the obvious inclusion of new presentation technologies—in terms of their educational orientation towards didactic, teacher directed approaches.

A recent audit of the quality of building stock at Australia’s research-intensive ‘Group of Eight’ universities, presented an alarming situation.³ The audit found that more than half of the total Go8 stock of building infrastructure was constructed between 1940 and 1980 and has reached, or is reaching, the end of its economic life. These facilities cannot be repaired and need to be completely replaced. Based on indices used by facilities managers the audit

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found that 60 percent of buildings on Go8 campuses failed to meet modern building and relevant statutory standards. It was estimated that the cost of compliance would be about $800 million.

If the campus is meant to demonstrate the "high ideals of learning through the physical fabric", what does the composition of the formal learning facilities and the general physical condition of our universities say about the kind of education that is being pursued within them?  

DEVELOPING THE CAMPUS FOR COURSE RELATED ‘LEARNING’ —

Current efforts to improve the quality of the campus as a place of learning are driven ostensibly by an understanding of ‘learning’ within the university context as a curriculum based experience. This largely results from higher education’s increasingly narrow role as the accreditation gateway into numerous professions as it has generally moved away from the idea of providing a broad, liberal education. From this perspective the key to making the campus a more effective place of learning is to provide suitable classrooms where improved teaching and learning approaches can be undertaken. As many universities—as well as the architects and other consultants ordinarily involved in serving the institutions in construction projects—have little or no experience of ‘new generation’ classrooms, there has been considerable interest in any emerging examples which might point the higher education sector in the right direction.

(I) ATTEMPTS TO DEVELOP ‘NEW GENERATION’ CLASSROOMS —

Universities are held to be research driven institutions and the generator of new knowledge for the wider community. Over the past four decades there has been a plethora of research into student learning in higher education, and the unfolding discourse in this field (Biggs; Jaques; Laurillard; Marton et al; Marton & Saljo; Prosser and Trigwell; Ramsden) has substantially advanced our knowledge of what constitutes effective teaching and learning. However, universities have rarely drawn on this body of material to guide strategic improvements in their own pedagogical practice. This neglect has also impeded the development of ‘new generation’ formal classrooms to support the shift to more student centred learning approaches.

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Where such ‘new generation’ classrooms have emerged expressly to improve the quality of student learning, a number of critical design elements relating to improved pedagogical practice are apparent. Although these classrooms may vary in many ways, they commonly reduce the total class size, are arranged to foster small-group collaborative learning as the primary use, and promote the teacher as facilitator rather than as content ‘presenter’. Many of these new classrooms are intended to complement, rather than fully replace, existing traditional classrooms where larger class sizes and more didactic instructional approaches are common.

The most radical designs challenge the notion of the teacher as the focal point of the classroom by deliberately orienting the room away from a single presentational point and providing students with audiovisual and information technology to increase student choice and control in the learning process. In many cases, custom-built furniture and fittings have been created (as opposed to purchasing standard institutional furniture) which further emphasises the unique nature of the setting. Other examples incorporate a variety of settings in a single space, enabling students to select their working arrangement according to personal preference or changing need throughout the duration of a class. Typically, new generation classrooms are designed on the basis of a more generous occupant-space ratio which has several educational consequences apart from an increased comfort factor. First, the relative spaciousness increases the emphasis on active, small-group learning as presentational approaches are not mandatory and activity takes place in the ‘space’ between settings. Secondly, greater movement by the teacher and students within the room is possible with the likelihood that there will be more peer-to-peer learning as students interact widely in the setting to learn with, and from, each other. Thirdly, there is generally an emphasis on enabling a wider range of learning experiences—delivering knowledge; applying knowledge; creating knowledge; communicating knowledge; knowledge for decision making through the adaptability of the physical environment and the range of learning resources and media available within it.

In addition, some universities face the ongoing logistical demands of large cohorts which generally require the retention of lecture-style teaching methods and therefore a number of institutions are seeking to improve the traditional lecture setting. This is being done by various means, including increasing transparency—allowing views into and out of the setting—and natural light into the theatre through the introduction of windows to overcome the ‘black box’ sensation. Lawson contends that the benefits of providing windows are far-reaching and that enabling the occupant to view the transition of the external, natural world—to see changes in the weather and the passage of time measured by the movement of the sun—is vital to the individual’s health and wellbeing. Lecture theatres have also been created which enable more student-student interactivity and active learning either through the use of new collaborative technologies or by more radical physical designs which create opportunities for the convenient transition into small-group learning.

The curriculum changes in many universities intended to promote more student centred approaches also place further demands on the broader campus setting to provide a more responsive environment to meet the expanding needs of students.

It is important to recognise that the recent surge in the development of non-classroom, informal learning environments is largely being undertaken within the same curriculum driven paradigm which is responsible for the new generation classrooms. Viewed in this narrow, functionalist way, informal learning is construed as activity undertaken by students outside the classroom and without the direct involvement of the teacher, but which is related to the formal course requirements. It typically includes pre-reading class material, individual and group assignment work, and the completion of assessment tasks.

One major response by universities has been to create learning centres. Three broad stages in the development of the ‘learning centre’ as a strategic response by universities can be identified. First, it involved the transformation of the existing library to include greater space for socially based, collaborative learning and particularly the creation of ‘information technology zones’. The outcome for many university libraries has been a continuing struggle to balance often sharply conflicting demands, for example, space for quiet, personal learning and for active, collaborative learning on strictly limited floor space.

Secondly, universities sought to respond to the students’ insatiable appetite for information technology (IT) and the growing emphasis on IT in the learning process, by creating stand-alone IT-hubs or ‘information commons’. Typically, these centres became crowded computer barns driven by the intention of maximising student computer access at the expense of the quality of the learning experience and also promoted individual, rather than collaborative, computer use.

More recently, the ‘learning centre’ was transformed into the ‘learning commons’ when universities recognised the need to address a wider range of student needs and learning styles whilst stressing the efficiency in co-locating services and resources in a single site.

Often such projects were informed by design strategies employed in non-educational projects such as shopping malls, restaurants and bars as well as bookstores where coffee zones have been incorporated to create attractive social spaces. A commonly recognised benchmark in learning commons design is the Saltire Centre at Caledonian University, Glasgow which combines a major library facility with a mix of environments for social and learning related activity.\textsuperscript{19}

Significantly, the ‘learning commons’ strategy has fundamental implications for the long-term development of the campus as learning environment. From a planning perspective, large centralised facilities of this kind that concentrate multiple services and amenity into a single location, often impede the development of various, smaller facilities and sites across the campus—a problem compounded on geographically spread sites where access to a central facility can be problematic for many potential users. In terms of user comfort, large-scale facilities of any kind which produce congestion—shopping malls, hotels, airports—can deter attendance by some possible users and detract from the experience of others.\textsuperscript{20} From a pedagogical perspective, there is a massive contradiction in the institution’s centralised, ‘formal’ control of ‘informal learning’ which is meant to be student centred—through the concentration of effort and resources into a single facility at the expense of developing multiple sites—regardless of the economic rationale for the centralised delivery of key services.\textsuperscript{21}

In contrast to the one-stop shop strategy of the mega learning commons, a smaller-scale, precinct based approach can be found in The University of Melbourne’s Eastern Precinct, developed by the author in association with Cox Architects. Based around one of several university libraries, this project creates a major campus hub by refurbishing and linking existing buildings and external settings in order to enliven a tired and neglected area, but not at the expense of other areas of the campus. The new precinct is located on a perimeter of the campus where it is intended to serve as a key point of entry and welcome to the campus. It was planned to complement the immediate existing buildings and amenity as well as the natural environment whilst working in conjunction on a wider campus scale with other library and social spaces including the large student refectory.

The project was informed by the rich discourse on the phenomenology of ‘place’ \textsuperscript{22} 23 and particularly Heidegger’s primary concern with ‘being’, ‘dwelling’ and the ‘situatedness’ of experience—see Malpas\textsuperscript{24} for a comprehensive account of what he terms Heidegger’s ‘topology’. The project commenced by addressing questions such as: What does it mean to ‘be’ present on campus?

\textit{“MORE RECENTLY, THE ‘LEARNING CENTRE’ WAS TRANSFORMED INTO THE ‘LEARNING COMMONS’”}

Associate Professor Peter Jamieson

What kinds of sensory stimulus can the campus provide the learner and staff member? How can the campus provide occupants with intimate, personal places? How can the campus attract and retain occupants, given the presence of attractive social settings in close proximity to the university, so that a critical mass is achieved for the formation of an effective learning community?

The design team sought to create a series of complementary internal chambers and external areas to enable collaborative learning and social interaction to occur across a learning landscape. Importantly, those settings that reside outside the library itself are not under direct staff control and convey an even greater sense of being ‘de-institutionalised’ and ‘owned’ by the occupants. The design team identified a large community of international students living adjacent to the campus in commercial residential towers as potential key occupants of a site and therefore aimed to create domestic-style amenity-gardens, lounges, private settings—given that cohort’s specific needs.

Another conscious design goal was to create a ‘journey’ for the occupants through unique physical forms incorporating custom-built fittings (rather than mass produced furniture wherever possible) and to enable views beyond, across and between the immediate setting—partially to reinforce the relationship with nearby natural environments—and explicitly to acknowledge the importance of ‘people watching’ as a primary social activity. The designers aimed to produce a sense of ‘arrival’ at particular settings in order to heighten the individual’s experience of the physical environment, whilst simultaneously creating various degrees of seclusion or public exposure for individuals or groups.

The design approach also sought to heighten the occupants’ awareness of their environment through the use of a rich palette of materials and colour, offering a range of seating types, creating variations in the height of settings across the precinct landscape, and through a more dramatic use of light fittings to provide the texture and contrast often missing from institutional facilities. Underpinning this approach to the design process was an idea of learning as personal enrichment—extending beyond intellectual activity and involving the individual in rich sensory contact with their environment in order to address Bloomer and Moore’s contention that:

What is missing from our dwellings today are the potential transactions between body, imagination, and environment.

It is the idea that learning in a university campus might involve more than participation in course related activity—albeit that this process is now being improved by being located in new generation classrooms or enhanced informal settings—that provokes the reconceptualisation of the campus as a place of learning.

**SEEING ‘LEARNING’ AS A EXPERIENTIAL, SENSORY-RICH DEVELOPMENT PROCESS**

The concept of the university as a unique place of learning has been lost over the past century as institutions have grown in complexity (and physical size) to comprise an estate of ‘facilities’ to meet a vast array of (often competing) needs.28

According to Edwards:

There is an implicit compact in higher education which transcends the necessary functionalism of teaching, research and administration. To be truly a university there is a contract with learning (as against teaching), with a sense of a community of scholars…It is a place, identifiable as such through built fabric and urban space, which express these higher aspirations. Given this view the university is more than a collection of functionally rational buildings…”29

“THE CONCEPT OF THE UNIVERSITY AS A UNIQUE PLACE OF LEARNING HAS BEEN LOST OVER THE PAST CENTURY.”

Associate Professor Peter Jamieson

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28 Edwards, University Architecture 29 Edwards, University Architecture, p.36
It is this sense of ‘place’ that must be reclaimed if the campus is to be more than a collection of classrooms, information technology centres, laboratories, libraries, student refectory, offices, coffee shops and car parks. The campus must be an environment which allows the individual student to make sense of the world and their place in it, and enable the formation of communities which are the essential to individual and collective development.

The solution to improving the current state of the university campus as a learning environment logically precedes an architectural or campus planning response. Presently, such initiatives within universities tend to focus on the use of new technologies and the possibilities for linking with individuals and resources beyond the physical boundaries of the campus. Telecommunications technology is increasingly deployed to overcome the tyranny of distance and virtual learning environments commonly exist to complement the face-to-face experience allowing students to access course materials and communication systems. Arguably, in many respects these initiatives further undermine expectations about the need to develop more comprehensively the extant campus setting.

Fundamentally, universities need to rethink what it means to ‘learn’ and to ‘teach’ and how it might ‘take place’ within the campus setting. Or from Heidegger’s more challenging perspective, we might well ask, ‘What does it mean to be in the place of the campus?’ In this sense, we should turn our attention from ‘learning’, as well as teaching and research, to the much larger question of how we ‘live’ our lives on campus and how we might foster a more complete, richer experience in every sense? This raises critical questions about the campus as a place that facilitates ‘life’.

“IT IS THIS SENSE OF ‘PLACE’ THAT MUST BE RECLAIMED”

Associate Professor Peter Jamieson

Recently, whilst visiting Oxford University the author encountered a spontaneous performance by a street marching band which paraded through the city and eventually concluded its performance in a public square. It was surprising, colourful, fun, exciting and engaging. In order to ensure that similarly spontaneous experiences take place on our university campuses we need a suitable physical environment, but also must create a community which grants ‘permission’ to live in certain ways. Presently on many contemporary campuses, an unexpected encounter with a marching band or some other kind of performance art might just as likely create a sense of disbelief and confusion rather than stimulate engagement in the activity.

Given the opportunity, students (and staff) may very easily create all kinds of engaging and personally meaningful places within the campus. The University of Hong Kong clings to the side of a steep incline providing wonderful views over the harbour. On the roof of a building there is a large open plaza which provides an entrance into the student refectory and which features a large totem-like structure painted in a garish orange-red colour. On closer inspection, it becomes clear that this is a public sculpture depicting the agony of individuals curled tightly in a mass of writhing bodies. It is a memorial to the many people killed in the Tiananmen Square uprising in 1989 and has become a special, sacred place on the campus for students.

Learning in its broadest sense involves challenge, stimulation, discovery, uncertainty, excitement, communication, collaboration and reflection; it is not restricted to a formal institutional curriculum. It is about the transformation of the individual, rather than simply their professional accreditation, and according to it involves the ‘head, the heart, and the gut’. A billboard viewed recently by the author from a train window on the approach to Cambridge University (U.K.) declared: ‘You can learn at home ... you can learn anywhere’. This is increasingly true with the growth of information technology and telecommunications media in all aspects of society internationally. In this context, there is an urgent need to understand, articulate and reclaim the distinctive role of the campus as a place of learning in the richest possible sense.

The refurbishment of the Year 5 & 6 Unit was undertaken with the intention of creating a more stimulating and challenging schooling experience for the students—an experience that the existing traditional classrooms were thought to inhibit. The philosophy that drove the project was one that identified with the concepts of inquiry learning, community, and the democratization of the learning situation.

Context of the Project

This case study is included to show the transformation of a traditional classroom setting in an historic building into a more fluid learning environment allowing for team teaching. The refurbishment of the Year 5 & 6 Unit was undertaken with the intention of creating a more stimulating and challenging schooling experience for the students—an experience that the existing traditional classrooms were thought to inhibit. The philosophy that drove the project was one that identified with the concepts of inquiry learning, community, and the democratization of the learning situation.

The objective of the project was to create a dynamic learning setting in which 75 students and three teachers could work together on projects that were of relevance to the students’ lives. There was also a strong emphasis on ensuring the ongoing development of the student’s high level literacy and numeracy skills, and the use of ICT.
At its most basic, the refurbishment involved interconnecting three traditional classrooms with large glass panelled sliding doors. In addition, extra spaces were ‘borrowed’ with the creation of a study space in a wide hallway to the south and the linking into the space used by the out-of-school hours program. A shared teacher space for the three team members opens off the student learning zones. This staff area was considered essential for bringing the teachers together so that they could work collaboratively.

All of these works were required to be sensitive to the heritage protected 1880s building.

PEDAGOGY AND SPACE

The learning environment can take on a number of different forms to support a range of pedagogical approaches.

At the beginning of each day, students meet with their home group teacher in groups of 25. These meetings take place in acoustically isolated instructional areas. At other times the whole cohort meet together to discuss matters pertaining to everyone (Instruction Area 2) or to watch audio visual presentations (Instruction Area 1). These large cohort meetings are enabled by the easy relocation of mobile furnishings – chairs, ottomans and storage units on wheels.

At other times, students work closely with one teacher (not necessarily their home group teacher) in tutorial settings. These tutorials can take place in a range of zones, including in front of the interactive white board (Instruction Area 1), situated on tables and chairs (Instructional Area 3), sitting on the raised platform (Instruction Area 2) and in the multi-purpose western room (Instruction Area 4).

Student directed activities, including small group collaborative tasks, take place in a range of locations – with the students able to choose their preferred environment. The areas most favoured are the raised platform, the north easterly corner (marked on the plan as ‘individual learning’) and the small group learning space that was previously considered the hallway.

The learning environment supports as-needed computer use and is equipped for mobile computing. The glass panelled doors enable teachers to supervise the students during self-directed activities. A sense of community has been achieved while maintaining isolated areas for small group discussions and quiet individual work.

CONNECTEDNESS

The school is focused on developing strong relationships within the school community as well as links between the school and the local neighborhood. To this end, students work on lengthy projects that have significant ‘real world’ contexts. Such connectedness is enhanced by the dynamic physical environment. The knowledge and experiences that the students bring with them to school are valued and the opportunities for sharing these understandings are many. Thus, the learning environment supports a collaborative approach to education. Easy access to web-based and physical resources enables the students to pursue their learning without the need for constant teacher instruction.
The Mawson Centre, SA
External view
Architect: MGT Canberra Architects and Russell & Yelland Architects
Image: Delfin Land Lease
Good design is not something you can add on at a later stage. It needs to be there from the very outset.

Editors’ Preamble: In this interview we hear about the role of the Office of the Government Architect. The interview captures some of the dilemmas and possibilities inherent in the recent methods adopted in Australia for the design and development of school buildings. The use of Public Private Partnerships, PPPs, to procure schools is relatively new to Australia. Using this method, a developer contracts with the government to supply and manage schools over a 25-year period. The other initiative currently impacting on schools across Australia is the economic stimulus package announced by the federal government earlier this year. Called Building the Education Revolution or BER, this initiative has required each state to implement template designs to ensure ‘shovel ready’ projects are quickly developed as the government focuses on avoiding a recession by injecting funds into the economy.

Interview: August 11, 2009

GL: Geoffrey London, Government Architect
JC: Jennifer Calzini, Principal Policy Officer, Office of the Victorian Government Architect, Department of Premier and Cabinet.

Take 8

The Office of the Government Architect is just a few years old in Victoria. Can you please explain the role?

GL
There are several strands to the role. One is to provide leadership for government in terms of architectural design and to act as the voice for architecture. In doing that we take on an advisory role and an advocacy role. We help develop processes and we put out publications and develop policy. So that’s the role in broad terms. In supporting design excellence in schools we’re involved with an annual competition that rewards best design in the education department across a whole range of school types—the Minister’s School Design Awards. We sit on panels for the selection of architects or selection of PPP bids and Jennifer is involved with a range of education committees as a design advocate.

JC
The Building Futures group which is now finished was a steering committee I was involved on. We work with the Infrastructure Investment Advisory Committee that the department runs which meets monthly. We have partnered with the University of Melbourne on research programs like Smart Green Schools.

GL
It has to be said that the stimulus package process has altered the nature of the input we are able to give. When the process started I expressed concern about the threat of us losing a number of the initiatives, particularly in sustainability that had been introduced into school design. The person in charge of delivering the stimulus package in Victoria made a point of ensuring that I was briefed about the templates that had been developed here and I have earlier been made aware of the templates that came out of NSW. My view is that the templates that have been developed here are more flexible and more responsive to current educational needs. The templates in NSW had been in place for some time whereas ours have been developed only recently.
TAKE 8 We need to talk about the Building the Education Revolution, BER, initiative but you’ve raised the issue of the buildings fitting with current educational methods. That relationship between the two would seem to be quite important. How can architects and educators work together so that architects understand what current thinking is in terms of pedagogy but that teachers understand the power of space to support learning?

GL I would have thought that the Council of Education Facility Planners International, CEFPI, provides a reasonable forum for that to occur. Its focus on design for education through conferences around the subject, research papers and general sharing of information is progressive and professional. There is a danger if a few education specialists hold all the information and decline to share, but that doesn’t seem to be happening. But the whole Public Private Partnership, PPP, process does threaten sharing of information. I imagine that the PPP bidders will develop proposals with their preferred architects and that competitive pressure may inhibit the desire to share in quite the same way.

TAKE 8 You’ve raised two issues—one is the BER initiative and the other is the PPP process. I sense that you are saying that you have some reservations about both processes interrupting the potential for Victoria to provide good learning spaces?

GL The potential remains. If we understand what threats there may be to good design I think you can counteract them in the PPP process. For example you can ensure that the documents are well worded. Jennifer and another one of our staff members were involved with some of the early processes and there was a design review as part of the exercise. To get good architects doing the work, you’ve got to have the wording right and the expressions of interest right. You’ve got to cue those who are bidding, those who are putting the bids forward, that they are not going to be considered unless there is really good design that is totally in line with educational ambition.

JC And the bidders teamed up with educators. That happened in the PPP process for eleven new schools before the BER started. So I think these recent processes might have threatened innovative design if the right skills and understanding were not enlisted. The designs that resulted are progressive.
TAKE 8  I had a little bit of involvement in the early stages of the South Australian PPP and the thing that excited me about the PPP’s potential was the possibility to think about the 25-year life of the building, to think of commercial uses as well as community uses of the schools, potential partnerships. The possible downside was that the confidentiality of the competitive process did not allow the users to work collaboratively with the designers during the design process.

GL  Which is further exacerbated by the stimulus package where the capacity to work closely with the school community is seriously diminished. At the announcement of the BER, one of the first things the office did was to put out copies of a CABE document from the UK called The Cost of Bad Design. It’s one thing to argue the benefits of good design but for many that’s an article of faith whereas if you point to the hard evidence of cost implications of bad design decisions, people might sit up and take notice. And that’s one of the other useful things that the Council for Architecture and the Built Environment, CABE, is doing in attempting to produce evidence based research that demonstrates the quantifiable benefits of good design in education.

TAKE 8  But CABE’s research into their partnerships for schools process revealed that those partnerships didn’t necessarily mean that the designs were bad but they did tend to find an over-representation of the poorer schools within the partnerships process.

GL  It’s possible to identify potential problems in any procurement process and I think the key is to understand what they are and to put in place barriers or hurdles that ensure that those potential problems don’t get realised; to put in place, in the process of selection, necessary components that will overcome those potential problems. This may include signalling the need for quality design in the EOI process and ensuring design reviews form part of the bid process.

We’ve all been around enough PPPs to understand where you can lose control of the design so you put in place new small elements or checkpoints into the processes—that deflect that potential for problems.

TAKE 8  We’re swapping between the PPPs and BER. They’re very different animals. And I’m hearing from you that you have a sense that you have actually been able to be quite proactive in the PPP processes that we’ve started doing here.

GL  Certainly Jennifer and Shelley were active. I came on board as the most recent and successful PPPs were being resolved.

JC  We were able to review the bid design component at the expression of interest stage and make a recommendation and then we attended the four shortlisted teams’ presentations so yes, we did have some influence.

TAKE 8  My understanding is that the template designs that had been designed for the BER process were learnt from the PPP process.

JC  They evolved out of the PPP process. The timing was right and I think there was an opportunity seen by the department to use the PPP work as a platform to take off with the BER work. That was advantageous.

TAKE 8  Perhaps sometimes educators are blind to the potential of space. Perhaps there tends to be a spatial illiteracy that teachers have.

GL  There is a general societal spatial illiteracy that is certainly not confined to educators.
TAKE 8 Although recently, at least in some sectors, the community has started to understand the power of design. Marketing for housing, for example, is a notable area where I think developers use good design for its market appeal—not project housing necessarily—but certainly apartment buildings. Schools are symbolic of what our community thinks about education, so I guess a very basic question is does more money need to be spent on schools?

GL Jennifer and I were discussing this earlier and while more money committed to schools would be welcome, it's not necessarily the answer to better designed schools. We need to get better designers involved. You can have two secondary education buildings built next door to each other, one has been designed really well by good designers with the same budgetary constraints and it's infinitely better than the one next door. And the only real difference is the skill of the designer, the way they've worked in with the school community, the school principal's input—it's not necessarily the budget. That's not to say we should not be spending more money. But a key factor is design skill.

TAKE 8 So choosing the best people for the project is crucial.

JC We visited the Victorian College of the Arts secondary school and walking around the corridors afterwards I thought this is what a school should be like. How could we expect a school to be any different? This needed to be the norm. The corridors were not like corridors, they were spaces with seating, with places to meet and places to overlook. It was a fantastic facility. The students weren’t there but you could just imagine how they would use these spaces. Then you compare that to a traditional school and the corridors have lines of lockers and you think you could never go back to that. So it’s about what we expect schools to be and how we value the people in them and what they do in them. That’s the first thing. Then there are the designers who can achieve that and, of course, the money to support that as well.

TAKE 8 School designs do need to support and value the occupants but there are also other drivers. In the seventies policies were centred on social equity. By the nineties the drivers were more likely to be economic. What do you see as the forces driving the design of learning spaces currently?

JC I suppose the first thing that comes to mind is that we need to be able to do more than one thing at a time in a learning environment. So rather than have that single focus, task or teacher we now are able to really do many things at once and combine things, project based, and so that has implications for the kinds of spaces that we need to provide. It used to be that each student had a relationship with one single teacher. Now we are talking about students having access to more than one teacher with team-teaching experiences. That is having a huge influence on the way we are looking at learning spaces and how we expect people to learn.

TAKE 8 There is a different kind of architecture or spatial implications coming out of new knowledge about education. One of the things we have been observing through our research is that teachers and students have become so used to the classroom that it can be difficult to visualise working in different ways in different spaces. The new pedagogies have been around for a long time but it seems there is resistance to taking them on because it means total transformation of the way they’re working particularly in secondary schools. Often primary teachers work in groups and have a range of spaces but some secondary teachers are really struggling and when some of them get into the new spaces they try to change them back to what they’re used to. We do hear of teachers using bookcases and furniture to convert some new open-plan spaces back down into classrooms. Are we currently repeating the seventies and eighties?

JC I think that you had a question as well: “what comes first—the pedagogy or the architecture”. It is an interesting question because I’d like to say that architecture doesn’t necessarily precede the pedagogy but can offer opportunities. If teachers are presented with a new space, they may think, how can I use this? How will I teach in this?
TAKE 8  Do architects or, indeed, the Office of the Government Architect then have a role and responsibility to support educators with new space, to help educate educators about the potential of the new spaces?

JC  I think architects have a role to communicate about space and what it can offer and I think architects might be willing to support educators if given an opportunity rather than wait for the educators to have it all figured out in terms of what they need. So that’s what it means about working together. It’s not really one or the other.

GL  You do find that most architects would be only too happy to sit down and talk about the possible modes of use of spaces and design because you never really get the opportunity to translate all possible uses into a post-occupancy manual. You leave those open ended possibilities dormant in the space so it’s almost a post-occupancy architect evaluation that is needed rather than a user evaluation.

TAKE 8  I wonder whether there would an argument for processes to shift slightly where architects are perhaps working more proactively with the educators as the spaces are being furnished. It seems that the architects provide at times the shell and then the furnishing happens with some other package of money.

GL  It would be a really interesting program to introduce to new schools after the space has been occupied for a while. The architects could come back and speak about the classrooms and say, for example, ‘What I was thinking about when I designed this space is that the sun is coming in here which means this and the door is in that corner to allow this to happen’ and explain the room.

The idea of not just providing an instrument for education but allowing the architecture itself to educate is a potential that is probably not explored as well as it might be. You need someone to help you read it because it is a new language for most people.
TAKE 8 We’ve been talking about a culture change as we shift from one kind of learning which is perhaps a more didactic form of teacher-led, classroom based learning into some other kind that you brought up—team based, project based learning. Information and computer technologies have had a big impact on that change. Research perhaps also has the potential to help inform both designers and educators about this field. You’ve been supporting research. Could you speak about what research would be of value in terms of long-term culture change, not necessarily just the research you’ve been supporting so far?

JC I think what you’ve just mentioned, Geoffrey, which is looking at post-occupancy use, looking at how buildings are used. That would be useful research. I like the work that is being done by Ken Woodman—a PhD student associated with the Smart Green Schools project. Ken is mapping what actually goes on in classrooms by drawing where people walk—so mapping how they use the space—and that is very useful analysis. That kind of research, seeing how things actually get used, and learning from that is interesting. Feeding this back to the teachers and asking teachers what they notice about movement and the lack of movement in this case by the students is very interesting. It could be that it’s perfectly fine that students are not moving because perhaps they are getting people to interact verbally for example. But it’s still interesting to see the pattern of movement.

GL It’s also the extent to which you are able to test new school design propositions. To what extent are they able to be tested against the assumptions that are made in terms of what’s happening? I don’t know how familiar you are with the Pebble Project in the US. It’s to do with health care. There are probably a number of parallels. The Pebble Project comprises a group of healthcare advisers, architects, administrators, senior medics who all joined together and are finding that good design leads to better therapeutic outcomes. They demonstrated this by providing a series of case studies documented with objective data—so it’s evidence-based material—much like what CABE does but with a higher level of detail. Placements of windows for views, fresh air as windows can be opened. Their argument is that, as a result of good quality design, you shorten patients’ stays in hospital, achieve higher retention of staff because they are working in an environment they take pride in and get pleasure from, an environment that is easy to find your way around so you don’t get lost in endless artificially lit corridors. All of these factors add up to substantial savings in the running of healthcare facilities. That is now well documented. It would be wonderful to do the equivalent for education—to demonstrate you are able to learn better in a well-designed environment.

Jennifer Calzini
JC That's something our office has found—we know that if you can get the quantitative research and link it to the dollars then you are going to have a pretty strong argument. It's a tangible argument which is easy for people to see.

GL I think you can measure quality too.

TAKE 8 The interviews that we've been doing for TAKE 8 have been mostly focused on work being done by architects and educators in Victoria. Do you see other states working in parallel to Victoria on similar issues or do you see major differences occurring in different states in terms of the design of learning spaces?

GL NSW has been working with templates for a longer time. It would be really interesting to see what that's done to the learning processes there. CEFPI is very alive and well in Western Australia and there are some very good architectural practices there that do specialise in schools. I've been advised that more dollars are spent on educational facilities per student in WA.

JC I suppose the thing about templates is that templates by themselves might not necessarily be a bad thing. The quality of the template and its ability to be customised, appropriated and adapted by schools is the key thing.

GL I'd be really interested to see the extent to which this process which has been introduced by the stimulus package might actually become the dominant process in the department and I'd be interested to test the extent to which they thought there are advantages emerging and what might stick or remain in place after the stimulus package ends and what effect that might have on the educational process.

TAKE 8 It's such an interesting time of flux in the design of schools particularly with the number of facilities that are being built so quickly under the BER initiative. It will be interesting to see what impact BER has on schools and whether educators see it as entirely positive or whether they have reservations.

GL Another big issue that emerges is timing and the incredibly short period of time for design. Whenever we've challenged issues around that, the response has been that the stimulus package is about jobs and the desire to get jobs happening on the ground as quickly as possible.

TAKE 8 Are there key pieces of advice that you might give educators, designers, education bureaucrats or government working at this time?

GL I would reiterate a point we made earlier. Make sure that in all the documentation that goes out that you demand really good design outcomes. From day one when the first document goes out, you need to signal that design is the key element. This is an absolutely critical part of the selection process and without good design you won't get selected as the winning bid.

JC That is a really important point which is probably more general than just to do with learning spaces. It's the advice from our office because what we have found is that the earlier you can set the right expectation the more chance you have of getting great meaningful space.

GL And equally if you don't set those expectations from the beginning and the wrong people are appointed it's almost impossible to fix it. Good design is not something you can add on at a later stage. It needs to be there from the very outset.
Over the last four decades the educational component of government initiated but developer delivered urban developments1 in Australia have seen a gradual shift from the provision of ‘schools’ to the delivery of ‘education services for all’ in a community. Such examples include:

- New forms of collaboration between schools and early childhood education and care providers (Mawson Lakes SA, Caroline Springs VIC);
- New forms of collaboration between government and non-government schools and local government (Golden Grove SA, Caroline Springs VIC, Forest Lake QLD);
- Close attention to the contribution of education services to the development and maintenance of social connectedness in communities (Golden Grove SA, Mawson Lakes SA, Caroline Springs VIC, Springfield Lakes QLD);
- Close attention to the connection between education provisions and economic needs and opportunities in a community (Ropes Crossing NSW, Caroline Springs VIC);
- New forms of collaboration between schools and tertiary education and training providers (Varsity Lakes QLD, Mawson Lakes SA, Caroline Springs VIC); and the

1 The four urban developments explored in this article are the creations of Delfin Lend Lease. Delfin is a developer of master planned urban communities with some 30 projects in Australia, each at various stages of development from start-up to completion. The company’s goal is to create communities that not only cater for the residential needs of people, but are vibrant and sustainable—economically, socially and environmentally.

Editors’ Preamble: In this paper Stan Salagaras elaborates on the partnership which he helped broker for the sharing of an innovative learning facility built at the heart of the new Mawson Lakes housing and community development. Called the Mawson Centre, the facility was developed on land provided by Delfin Lend Lease with support from a significant state government grant. The facility is owned and managed in a partnership between the University of South Australia, the City of Salisbury and the Department of Education and Children’s Services. Students from the nearby primary school have space to use the community library and resource centre and come in contact with the university students including trainee teachers who are co-located on site.

This paper shows the interests of a development firm align with community interests in a model for the provision of shared educational facilities. As Public-Private Partnership schools begin to be developed across several Australian states, there will be more partnerships between schools, local councils and a range of other government and commercial providers.
Establishment of a focal point within the community for education services management, coordination and delivery (Mawson Lakes SA, Caroline Springs VIC).

New service delivery models, to meet the needs of people moving into the communities aim to deliver more and better educational services within existing funding arrangements. This approach has produced innovative educational solutions which have improved the quality of facilities, enhanced their cost efficiency and broadened the scope of learning and services available to students.

A key objective of this approach is to increase the critical mass of facilities, increase community use after hours and to enhance lifelong learning opportunities for these communities. Some of the South Australian examples—West Lakes, Golden Grove and Mawson Lakes—illustrate many of these features.

WEST LAKES


Key objectives for this development included the creation of a sense of belonging, greener open spaces, fully planned communities, quality housing options, business prosperity, attention to detail and respect for the environment.

Despite excellent partnerships with state and local government and flexibility of the planning framework, West Lakes was inhibited to some degree by traditional models and thinking related to education and community planning which existed in the 1970s and 1980s. The prevailing view of government at the time was to wait until a community was established before determining the nature and extent of education and community facilities required. For example, it was standard practice not to consider public schooling until there were at least 250 school-aged children in a community. Families moving into new communities had to take their children to nearby schools in surrounding suburbs.

Consequently, from an education and community perspective, West Lakes failed to deliver any innovations. While a school was originally planned for West Lakes, this was never built because the education department considered the surrounding schools had sufficient surplus capacity to cope with the educational needs of school age children in the West Lakes community. Furthermore, no provisions were made for post-school training, adult or community education.

“A GRADUAL SHIFT FROM THE PROVISION OF ‘SCHOOLS’ TO THE DELIVERY OF ‘EDUCATION SERVICES FOR ALL’ IN A COMMUNITY”

Dr Stan Salagaras

2 Delfin Property Group West Lakes: A Story Worth Telling, Adelaide.
Golden Grove (1984–2003) is a 1,230 hectare site 22 kilometres north-east of Adelaide. This was the first joint venture between a government agency (the South Australian government’s SA Urban Lands Trust, SAULT, and a private property development company, Delfin.3 Many of the initiatives implemented continue to shape urban community development planning across Australia. The Golden Grove development provided a planning framework for:

- Improving the lifestyles of people living in new communities on the fringes of cities;
- Providing shared public and private education and community facilities of a high standard, when required by the community;
- Enhancing the natural landscape of a region through the design of individual villages and their surrounds; and
- Building a strong social inclusion agenda, including public housing, public and private schools and welcome events for new residents.

The early provision of community facilities, including a district town centre and a comprehensive range of public and private schools sharing facilities was revolutionary at the time. Led by SAULT—now the Land Management Corporation—a process was put in place with the government and the non-government sector to develop a community planning document.

This document, the first of its kind, provided the timing and framework for the provision of social, health, education and community facilities. It required a special vision and an innovative financial model which included the joint venture funding and the provision of community facilities so that schools, transport, retail and recreational amenity could be provided up front and as required.

Prior to Golden Grove, education facilities had typically been provided in new regional areas by the government, with private schools arriving after the area matured. This made planning for regional facilities difficult and led to less than optimum opportunities for the student community. For these reasons a combined Education Services Planning Committee was formed to consider innovative approaches to shared education and community facilities based on more efficient use of such facilities, less land uptake and greater value for no additional cost.

Five educational sites were selected—four for primary education and one for secondary. In each location there was at least one government and one non-government school, together with community service providers and community recreational facilities. Interim facilities were provided by the joint venture to facilitate the early provision of education services and schools were encouraged to share facilities—including ovals, staff rooms, tuck shops, libraries and community sporting facilities.

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The highlight is the internationally recognised shared secondary/community complex which provides education services for some 2,500 students from three secondary schools—a government, an Anglican-Uniting Church and a Catholic College. While operating as separate entities the schools are joined together by walkways and share an extensive range of specialist education facilities for senior students including a single library, science laboratories, technology facilities, music and drama suites as well as quality home economics facilities and art studio service rooms.

The schools also share with the community indoor sporting facilities and the performing arts theatre in the adjacent multipurpose community centre, which is owned and managed by the local council. All of these facilities are more elaborate than any of the schools could build alone.

Further collaboration has now occurred with the schools sharing resources and teachers to provide year 11 and year 12 students across all three schools with a broader range of curriculum offerings.

**MAWSON LAKES**

The latest such project in South Australia is Mawson Lakes (1998–2010). This 620 hectare greenfields site 12 kilometres north of Adelaide builds on to the achievements of Golden Grove with a vision to create a fully integrated socially, environmentally and economically sustainable 21st-century urban community. Established in proximity to an existing state supported technology park and the University of South Australia’s northern campus it is a true mixed use development with residential villages, town centre, business enterprises, retail, educational and community facilities, landscaped neighbourhood parks and meeting places.

Education has been a key element in the success of Mawson Lakes with a wide range of accessible and seamless educational services—formal as well as informal—which provide for the continued learning and development for people of all ages from birth to retirement. It has provided a strong foundation for social cohesion and community integration through an coordinated approach to education service delivery.

The focus on creating a learning community supports the building of the community’s social capital by:

- Addressing the learning needs of the whole community;
- Making optimal use of new information and communications technologies;
- Developing partnerships between education, business and community groups;
Mawson Lakes provides the opportunity for learning for anyone, at anytime and anyplace. One of the key vehicles through which this is being achieved is the Mawson Centre—a state-of-the-art, innovative learning, cultural and community facility in the heart of the town centre. The centre is owned and managed by the University of South Australia, the City of Salisbury and the Department of Education and Children’s Services on land provided by the developers and with the support of a significant grant from the South Australian government—a truly collaborative partnership.

It provides access to education and training services for:

- Students at pre-school, primary, secondary and university levels;
- Residents interested in adult and community education programs;
- Workers and businesses looking at developing their skills and capacities;
- The many people from the surrounding communities who come to Mawson Lakes to learn.

Mawson Lakes has provided several important lessons about the role of education services in community creation. These include:

1. Adopting a ‘services-delivery operating model’ driven by the educational and training needs of learners in the community, by the demands of emerging industries and by the opportunities new technologies provide—not by the building of facilities, as is usually the case in new communities.

2. Adopting a fine-grain model of education by developing ‘the entire community as a school’—not ‘the school as self-contained community’. With access to 21st century technology communities can learn in a variety of places, schools, university, work, home, town centres, neighbourhoods or elsewhere, so a network of multiple learning settings needs to be created which maximise these opportunities.

3. Establishing learning partnerships/alliances and new resource models between state and local government, private and public education providers, non-government service providers, business and community organisations to underpin a community’s learning needs. A key strategy to facilitate coordinated planning and delivery of services to new communities has been the secondment of education and community officers from state government authorities.

“EDUCATION IS A CRITICAL ELEMENT IN SUSTAINING NEW COMMUNITIES.”

Dr Stan Salagaras
4. Recognising that education is not just a service but is a business crucial to the success and economic sustainability of communities. Education creates employment opportunities and provides vocational and job training for school leavers or the unemployed.

5. Recognising that educational services need to have the built-in capacity to grow and develop—they cannot remain static. They need to be ‘fitted with’ those elements required to provide quality educational services for today and, at the same time, be flexible and able to deliver educational services into the future.

EDUCATION SERVICES IN THE 21ST CENTURY

Education is a critical element in sustaining new communities. The approach summarised above represents a significant change in the way education services are delivered. We live in an era characterised by change—change is occurring faster, more dramatically and less predictably than ever before. But what is clear is that successful communities in the 21st century will have a diverse economy, strong links with knowledge-based organisations and a well-educated workforce.

The immense changes occurring in our society impact on our schools and educational institutions, forcing us to reconsider the way education services are being delivered.

These 21st century educational models for the knowledge society are supported by such academics as Professor Barry McGaw, past CEO of the OECD Education Directorate and a globally respected education policy expert, together with a group of other eminent Australian leaders. They are also based on some earlier work by the OECD Centre for Effective Learning Environments (formerly the Program on Educational Building) which is summarised in ‘Under One Roof’. Delfin has examined its own practical experience and taken into account the growing global consensus about education expressed by groups such as the OECD, Tony Blair’s government in the UK, CEFPI, the Council for Educational Facility Planning International, in the USA, and commissioned independent research in a number of universities.

Gradually a new education services model has evolved which, not surprisingly, differs from the education service model appropriate 50 years ago and still operating today.

THE EDUCATION SERVICES MODEL\(^6\) HAS THE FOLLOWING CHARACTERISTICS:

1. A service that meets the diverse and changing needs for every person, organisation and enterprise in the community

The model proposes that no one provider can meet the diverse and changing needs for education in any 21st century community. Multiple providers will continue to exist and new providers may emerge. Collaboration, joint ventures and formal partnerships between education providers at all levels and across sectors will ensure the high degree of coordination necessary to cater for community learning needs and close the gaps that would otherwise exist in the range of services needed. Education will be promoted as a core element of the life of the community through a year-round learning program with events and celebrations of learning.

2. A service that contributes to the sustainable economic development of the local community

Education is a business in its own right making direct economic contributions to the community, providing jobs and creating wealth. The model proposes an education service that contributes to the economic sustainability of the local community at various levels. At a personal level every member of the community will have access to education and information services aimed at increasing individual employability through the acquisition of appropriate knowledge, skills and understandings. At the enterprise level every business—from small, home-based enterprises to global corporations—will have access to high-quality education and information services. Close partnerships between business and education will help ensure that gaps in education are identified and closed.

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3. A service that contributes to the social connectedness of the community

The model proposes that education service providers work to build all forms of social capital. While retaining the distinctive identities that enable individual providers to continue to build strong social capital among their students, they will also cooperate in ways that gives students rich connections with others outside the more limited environment of their own providers. This will create opportunities for stronger ‘bridging’ social capital to be built in communities. Beyond this connection between education providers and employers, engagement of the local community and socio-cultural events will be promoted and delivered to build a sense of belonging, a shared experience and social cohesion.

To enable these characteristics to be developed and sustained, the new model will also require the following enabling characteristics:

4. A form of governance that enables the community to shape the education service that fits its needs

The model requires a form of governance that enables the community to shape the education service that fits its needs. Communities need an education agency, for example a local education council, to take an overall view of the community’s education service needs with the power to negotiate with potential providers. The council can coordinate local community education services across a range of providers, including public, partly publicly funded and private providers. It will be accountable:

“The social, economic and environmental sustainability of communities depends fundamentally on stronger education, training and community services that are responsive and accessible to all.”

Dr Stan Salagaras
• To the local community and local business for the range and quality of service provision, forward planning and measurement of outcomes; and

• To central authorities, including the ministers responsible for the range and quality of education services, local government and relevant systemic authorities.

5. Resource arrangements that ensure efficient, high-quality provision

Finally, the model requires a new set of resource arrangements shaped at the community level to maximise the efficiency and quality of service provision. This can be achieved if communities:

• Define the existing or likely provision of education services, based upon the extant conventional planning models;

• Estimate likely local demand for education services;

• Identify gaps that would be unlikely to be met via conventional provisions; and

• Determine how the savings in capital and recurrent expenditure might be deployed.

It should be noted that this paper only provides a brief overview of the new education services model. More detail exists including the measurement criteria for determining whether the model delivers the improved outcomes sought. Some aspects of the new model have already been implemented in communities over the past 20 years, notably Mawson Lakes and Caroline Springs. The complete model will be trialled in Australian communities over the next few years.

CONCLUSIONS

These developments have shown that people prefer to live in communities where they can access quality education and community services where the focus has been on creating the foundation to enable the social capital of a community to grow. The social, economic and environmental sustainability of communities depends fundamentally on stronger education, training and community services that are responsive and accessible to all.

The delivery of education services has evolved since the early creation of the West Lakes community, where education was not a core consideration, to Golden Grove with its innovative shared school model, to the 21st century Mawson Lakes with its focus on integrated education services for all.

The new education services model not only meets the diverse and changing characteristics of every person, organisation and enterprise in the community, but also contributes to the sustainable economic development and social connectedness of the local community. This approach represents a significant change in the way in which education services are delivered, but this is the way of the future if we are to attain the aspiration of improved social, education and community outcomes for a 21st century knowledge-based society.
The well-known English author GK Chesterton once wrote: ‘Education was the soul of a society, as it passes from one generation to another.’ This is still relevant to the soul and purpose of education today.

Within the Australian school educational framework there are three distinct and separate educational authorities. This separation reaches back to the early days of our nation and to this day these authorities maintain their independence and virtual isolation from each other with little contact, but akin geographically. These authorities are the state government, the Catholic education sector and independent school authorities.

There are small but significant signs that these barriers and the aspirational educational goalposts are shifting. The non-government schools have fought hard for their survival and independence since they wished to cater for their families of young people, with special religious customs and heritage, whatever they may be. These schools have been retained as ‘citadels of learning’ with a strong cultural, historical and family focus.

Within this sector many of the independent—primarily the non-Catholic and Protestant schools—have blossomed as elite schools and this is reflected in their high fee structure. Most independent schools are located in major cities or towns with the highest concentration in the eastern suburbs of the city of Melbourne. Many of these schools will testify to having produced a prime minister, a state governor, a premier, many members of parliament, elite sports people and leaders in industry.

Catholic primary schools are often located next to the local Catholic parish church. Their financial survival has often been threatened. Successive governments have endeavoured to shift the Catholic primary schools into the government domain to avoid propping up a religious regime. From the earlier days the Catholic sector has always wanted their own

BRIDGING SCHOOL CULTURES: DESIGNING SHARED RESOURCE SCHOOLS

EDITORS’ PREAMBLE: Max Chester has designed schools over many years for diverse client groups. This paper begins with an interpretation of the various school sectors and their funding relationships with government bodies. He describes an intense personal learning experience as he undertook his first commission for an Islamic school. While Max advocates that government funding should support choice between government and private school systems, he also sees advantages in local schools from different sectors sharing resources with each other and their communities. The Australian government pilot program to fund shared educational facilities between local schools is an initiative which Max has been exploring with a range of client groups. He describes the barriers but also notes that the financial incentives may help develop bridges between diverse school cultures leading to more respectful and tolerant communities.

MAX CHESTER
Director
Max Chester Architects
religion to be taught in their own schools, even at their own expense. The non-Catholic independent schools now do not cater as they once did in earlier days for a wide socioeconomic cross-section of children. There are also a few highly rated Catholic and Jewish schools, together with newer Islamic and other denominational schools. These independent schools generally come under the collective umbrella of State Associations of Independent Schools.

The Association of Independent Schools Victoria (AISV) was established in 1949. Membership of AISV is voluntary and is open to all registered non-government schools in Victoria. More than 200 schools belong to AISV. AISV is a member of the Independent Schools Council of Australia, the national organisation of state associations. The AISV therefore represents a select number of independent non-Catholic schools, Catholic schools that are not part of the Catholic Education Office, Jewish colleges and Islamic colleges. The association offers a wide range of services, which integrate the various streams of educational sectors for their mutual benefit. There are at this time no ‘elite’ Islamic schools. The early Islamic schools of the 1950s were basically weekend schools where parents could send their children to the local mosque for a basic local religious education. The first Islamic school in Australia was King Khalid Islamic College, now named the Australian International Academy, in Coburg, established in 1983.

King Khalid Islamic College was the first Islamic college I worked on, as an architect. The understanding and appreciation of the Islamic faith has been a steep personal learning curve; an interpretation of their needs required an adjustment in my religious psyche, for an architect who was educated in design through the mystique of the great gothic Christian churches of Europe.

A deeper understanding of the ways of Islam—to address the various attitudes, chords and differences in the faith—had to be developed to ensure that they could still be compatible with our Western building regulations. Other Islamic schools have now been established in Victoria, New South Wales, Queensland and South Australia. These schools— all registered independent schools—rely on the Australian government for funding resources and of course survival. Generally the Islamic schools only educate a small number of Islamic children and the majority still go to local state schools.

Some Islamic parents also send their children to local Catholic schools, as some of these schools provide a single sex environment and perhaps a ‘moral’ or religious educational back drop. The incorporation of the Islamic colleges into the Independent School Associations, which acted as block grant authorities for the Commonwealth government, presented Islamic schools with the opportunity to open their doors to the wider world. Thus the government was able to channel controlled resource funds into this new section of religious schools.

2. Association of Independent Schools Victoria, Information handouts

The Local Schools Working Together Pilot Program

The Local Schools Working Together (LSWT) pilot program (the Program) is an important element of the Australian Government’s Education Revolution. The Program will provide $62.5 million over three funding years towards the construction of approximately 25 shared educational facilities.

The aim of the Program is to encourage government, Catholic and independent schools to work together to develop shared educational facilities which will broaden the benefit of government expenditure on capital infrastructure. Shared facilities will create new opportunities for students who might otherwise be denied access to the range of facilities enjoyed at better resourced schools. The theme of the LSWT program is ‘schools in partnership to achieve educational excellence and equity’.

The partnership theme may also extend to third parties such as local councils or businesses where the projects may feature broader community benefit. Projects involving community partnerships should maintain a primary focus on improved educational outcomes.


Department of Education, Employment and Workplace Relations
Accessed August 12, 2009
INDEPENDENT SCHOOL FUNDING AND EVOLUTION

The financial status and survival of independent schools changed dramatically in the early 1970s. The Catholic school system, in particular, had survived for more than 100 years but was threatened with the growing community need for a better education platform to give their children increased opportunity in the emerging prosperous world. The secondary schools were under tremendous strain, coping with the increased numbers of Catholic children.

Commonwealth government grants started to flow, initially with recurrent grants, and then capital grants, for science blocks and libraries. The most dramatic change in funding occurred during the Whitlam government when the Australian Schools Commission was formed, chaired by the educational economist Professor Peter Karmel.

The 1973 Karmel Report changed the whole fabric of educational financial resources. Yet this new broad-stream funding did not assist in bridging cultures and neither did it lead to the efficient use of shared resources:

The Karmel Report gave rise to a period of vigorous public debate on a range of associated issues such as the legitimacy of government funding of non-government schools. It also led to acrimonious argument within the Catholic sector about needs-based and per capita funding, involving people at all levels of the Church. Some protagonists for State Aid wanted whatever funding was available distributed equally among students in non-government schools. Others took the view that the funding should be provided according to the needs of individual students.

The report provided the basis for a shared use of financial resources but not as yet cultural and physical. The outcome was a trend towards more freedom of choice by parents within school systems. The bright children in the poorer parts of the city could start to have access to quality schools, as buildings and teachers started to improve.

The Islamic schools go about their work to cater for the diversity of their own national groups. Their academic results have improved significantly. The children became more self-assured in their daily activities. They were also more forthright which appeared to be a reflection of their increased pride in their schools. They are more articulate and certainly more confident as they stood to speak on their feet, and they presented well. They are less shy and always courteous. This change in the schoolyard was clearly evident reflecting the improvement in independent education.

Within this context, however, Lutheran schools have been at the forefront in sharing

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resources. Lutheran schools, principals and staff have sought over the years to relate to their community. Some of the ways in which there have been partnerships and relationships with the local community include:

• Sharing of teachers, especially specialist teachers—music and language
• Coordinated sporting competitions
• Sharing of facilities—trade and specialist areas, assembly halls, sporting facilities and clubs
• Local principal associations and subject group meetings
• Often there are common bus runs

These three sectors remained forthright in their ideological endeavours, separately pursuing their historical ambitions and low-lying sectarianism, with little, if any, educational contact with their adjoining neighbours. But they remained highly recognisable physically and geographically. This system evolved predominantly independently of each other but perhaps failed in achieving a wider community use of resources and a mutual understanding.

The growing central source of funding had one defined aim—a better universal independent education and sharing of resources for all. But there appeared to be limits to this aspiration, as there seemed to be barriers to achieving a shared educational prosperity that could bring them together.

To better integrate these sectors there needs to be:

• An appreciation of their individual faiths, religious or secular
• A removal of hostility and misunderstanding
• An understanding of economic and practical realities
• Better integration for a richer democratic community

There were some early examples of bridging school cultures and integration of resources but these often occurred through the agency of a unique or special opportunity and were not part of general government funding policy. In the 1970s library buildings funded by the Commonwealth government were sometimes shared between state and Catholic primary schools.

SHARING OF FACILITIES BETWEEN SCHOOLS

Libraries are an excellent category for shared resources. The number of the clientele—that is the pupils, and sometimes community—determines the overall approximate size. The designs for libraries in the early days of the Commonwealth Schools Commission were sponsored by an advisory committee including representatives from state and independent schools systems and thus an early sharing of human resources was possible.

Science laboratories are another early concept of design and resources availability to secondary schools, again sponsored by the Commonwealth Schools Commission with its representatives representing the various school systems. Other examples of shared facilities evolved although these were not popular or common. These included:

• Administration facilities—not particularly successful
• Performing arts—these are expensive facilities, often sponsored by a local council. These generally are successful
• Before and after school care—some of these examples are working well
• Halls and gymnasiums—these are satisfactory if independent access is available
• Trade training—there are excellent examples at secondary colleges of this expensive facility, at state and independent institutes, with ease of access essential. The colleges should desirably be within walking distance from each other as the trade courses can be an all important part of the school curriculum in this technical age.
We are now on the threshold of an exciting Department of Education, Employment and Workplace Relations, DEEWR, project—the Local Schools Working Together Pilot Program, which formed part of the new Commonwealth government’s May budget of 2008. The aim of this pilot program is to fund approximately 25 projects across Australia that display innovative collaborations between schools and other partners and to address and share infrastructure needs that are not met by existing facilities. It is envisaged that both government and non-government schools, working in partnership, could be the recipients of funding under this program. Some $62.5 million is being made available over three years.\footnote{7}

The main emphasis is to be educational and could cover infrastructure projects facilities, such as gymnasiums, performance arts centres, libraries, and facilities for teaching language, science or music. Partners will be invited to participate with local government and state and independent school associations.

The aim of the program is to encourage government, Catholic and independent schools to work together to develop shared educational facilities that will broaden the benefit of government expenditure on capital infrastructure. Shared facilities will create new opportunities for students who might not otherwise have access to such facilities. The theme of the program is ‘schools in partnership to achieve educational excellence and equity.’\footnote{8}

The partnership theme will also extend to third parties such as local councils or businesses where the projects may feature broader community benefit.\footnote{9}

The main aim, as stated in the Local Schools Working Together program is to pool resources and sharing the cost of maintaining infrastructure.

\textit{Bethany Catholic Primary School Classroom Block, completed 2008.}

The independent classroom, has now given way to the shared learning environment, where children work individually or in groups.

\textit{Architect: Max Chester & Associates
Image: Max Chester & Associates}

\footnote{7} Rudd K. and Smith, S. 2007, \textit{New Directions for our Schools.} Department of Employment, Education and Workplace Relations, Australian Labor Party.

\footnote{8} Rudd K. and Smith, S. 2007, \textit{New Directions for our Schools.} Department of Employment, Education and Workplace Relations, Australian Labor Party.

\footnote{9} Rudd K. and Smith, S. 2007. \textit{New Directions for our Schools.}
The greatest potential for this sharing of resources lies in combining some of the facilities of government and non-government schools in the same area. Despite any apparent or suggested differences these schools may have in the values or philosophies they espouse, expensive facilities can be shared with financial savings and tangible benefits to the school, the community and the nation.  

A past example in Australia of Local Schools Working Together is the Golden Grove experiment in South Australia—refer to the article ‘Integrated Educational Services’ in this journal. It has been running successfully for more than 15 years—with a government, a Catholic, and a joint Anglican/Uniting Church secondary school all operating from the same site.

The campus shares specialist facilities, including:

- Six science laboratories
- Four networked computing laboratories
- Two computer aided design rooms
- Two electronics laboratories
- One multi-media computer room
- A computerised keyboard laboratory for music composition
- Two music studios and fourteen associated practice rooms
- Wood, metal, plastic and auto teaching areas
- Two food and two fabric craft laboratories
- A senior school library linked to satellite libraries in each of the junior schools

The three schools have their own campuses, philosophies, identities, buildings and management, but share some specialist buildings and sporting and cultural facilities. As a result, the schools have been able to afford outstanding facilities—far better than the schools could possibly aspire to if they were acting alone. There is a range of outstanding expertise that would be unlikely in schools of comparable size acting independently. A shared relationship with a government school, in particular, can only assist to make these schools overall more attractive and open to assessment by different family choices of their core school selection.

This project which would not normally be attractive educationally, economically or perhaps socially, due to:

- possible limited or restricted use
- other priorities
- obvious capital costs
- planning difficulties
- better facilities elsewhere
- potential concern at placing the school on a hierarchical platform away from the local community and providing a specialised facility which may appear pretentious

This will enable, perhaps for the first time in its history, a school or college to venture out to discover another local school, open the gate, enter, and meet the school principal and staff. It can then make contact with the local council and explain and sell the project and seek their endorsement. It is then necessary or concurrently to seek guidance from their educational authority, whether state or private.

A number of principals are apprehensive or vague about committing their school financially, legally, administratively or even morally. There has been a sense of remoteness, pride and perhaps even resentment at dealing with another school with a different faith, uneven social or economic standing and size. School principals do recognise a special leadership role in their pursuit of involving, or convincing, another local school or schools to take the risk to pursue this historic program for their mutual benefit.

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10 Rudd K. and Smith, S. 2007, New Directions for our Schools. 11 Rudd K. and Smith, S. 2007, New Directions for our Schools.
“SOMETIMES THE CONCEPT OF LOCAL SCHOOLS WORKING TOGETHER FELL INTO PLACE QUITE READILY IN THAT THE POTENTIAL SCHOOLS WERE NEXT DOOR, OR WITHIN EASY WALKING DISTANCE.”

Max Chester

CHOICE OF PROJECT—LOCAL SCHOOLS WORKING TOGETHER

The concept of Local Schools Working Together encouraged some more visionary schools with Commonwealth money available to open their doors for the overall betterment of the schools and the community. Responses from local councils have been positive—they can see the potential of a project for improved integration in their communities.

Projects pursued included a swimming pool; a gymnasium and multipurpose hall; a horticultural and agricultural area with specialised classroom; a sporting track and sports facilities; performing arts centres. Some councils offered support and encouraged community use. In some cases special school needs, particularly religious in nature, could be catered for by the program.

With the swimming pool it is hoped that one Islamic school will build the project and that it will be shared with a state TAFE college. The facility is designed to be open to the schools themselves; for swimming clubs; for Islamic requirements from the college; for outside use of local people; and for the parents of the students. Muslim women and their children do not have equal access to public swimming facilities at present and there is a demand for swimming facilities for Muslim women and their children. Controlled college swimming facilities would develop strategies and curricular programs by providing female-only sessions for Muslim women and their children.

For the multipurpose performing arts centre the opportunity arose where two schools shared a common boundary, a state primary school and a Catholic primary school. The existing hall on the state school site is in need of upgrading. The Catholic school also uses the hall for before and after school care, and both use the hall canteen. There are potentially strong community links, with local council support.

In this current developmental approach to pedagogy, there are strong moves for young people to develop self-esteem and communication skills. The facility will cover a range of curriculum options including music, drama and dance programs; debating and public speaking; special needs education; programs for gifted and talented children; and specialist language classes. Other non-core programs will include physical education and basketball; out of hours school care programmes; local industry training; and YMCA holiday programs.

Sometimes the concept of Local Schools Working Together fell into place quite readily in that the potential schools were next door, or within easy walking distance.

There already were some working relationships between the schools and so the school principals actually knew each other. A unique opportunity

A number of people submitted advice
- Mgr Tom Doyle AM, Former Director Catholic Education, Melbourne
- Andre Butler, Assistant General Manager Facilities and Infrastructure Branch, Victoria, Commonwealth Department of Employment, Education and Workplace Relations
- Megan Ioannou, Manager Facilities, Commonwealth Department of Employment, Education and Workplace Relations
- Peter Roberts, Company Secretary, Commonwealth Department of Employment, Education and Workplace Relations
existed for the architect to become involved in the bridging of school cultures in the establishment of the partnership and governance committee for the ongoing legal framework as a joint committee; supporting the building committee to encompass planning and construction; advising the management and financial committee; and advising on strategies for maintenance control.

CONCLUSIONS

As the Local Schools Working Together Pilot Program unfolds, we begin to see a vital trend in education. The sharing of resources has other benefits. The possibility of Islamic and Catholic children working together on common projects at primary and secondary level is being considered. Projects will require physical space to conceive and exercise real community outcomes which will help to break down barriers and prejudice.

The Karmel Report in 1973 ensured the survival of the three separated streams of educational systems and the Local Schools Working Together, LSWT, funding program will further enrich our complex community and democracy. These shared resources, whether they be physical spaces, software or hardware, or human skills will benefit both students and communities.

As the Department of Education, Employment and Workplace Relations reviews the Local Schools Working Together Pilot Program they will recognise the benefits to produce a significant bridge between cultures. It has to be noted, however, that there is some hesitancy in Catholic and Lutheran schools becoming too involved in sharing or bridging school cultures. A certain protective element has arisen due to their hard-won gains over many decades in ensuring their survival and unique religious character.

“These shared resources, whether they be physical spaces, software or hardware, or human skills will benefit both students and communities.”

Max Chester
MAWSON LAKES PRIMARY SCHOOL

The School forms part of a community designed with the idea that learning would become an integral part of everyday activity. The school shares its site within a new development which includes a residential area and higher education institutions. The different uses influence the masterplanning and siting of each other, to maximise the links and accessibility and for the creation of a community in which lifelong learning is supported.

CONTEXT OF THE PROJECT

The primary school is organised around a variety of collocated neighbourhood learning centres or hubs that are technologically linked to maximise student learning. Simple energy efficient techniques are incorporated into the building design, with prominent thermal chimneys helping to ventilate the buildings.

The school expands its curriculum offerings through national and international links to educational opportunities utilising online technologies.

Another aim of the school was to complement the services of DECS [e.g. School of the Future, Open Access College, the Australian Science and Mathematics School, etc] and the directions of State Government [e.g. economic development, export of education services and products] as well as having an emphasis on a greater understanding of the Aboriginal Heritage and Culture, in particular the Kaurna people.

PEDAGOGY AND SPACE

The school has been organised around four main single storey flexible learning spaces [family units] accessible from a covered spine to the west and abutting the eastern street boundary. The flexible spaces reflect the wish to provide the students with access to a range of collaborative and supportive processes to support their learning and facilitate the development of their social, emotional, physical, cognitive and creative needs [i.e. development of the whole student]. Learning is independent, interdependent and collaborative in a local, national and international context as appropriate.

The learning program is individual and flexible to adapt to each student’s needs and focuses on learning how to learn and the development of higher order thinking skills, supported by advanced technologies and the flexibility and diversity of the spaces.
Consultation with students emphasised the importance of the provision of outdoor learning courtyards, directly accessible from each unit, which in turn link to the open space going down to the creek, as well as the various landscape zones which encourage different types of outdoor play.

The buildings are making an educational statement about sustainability, being equipped with solar and thermal ventilation chimneys and other passive and active systems that express the importance of sensitive environmental design.

**LINKS TO THE COMMUNITY**

One of the school’s aims was to be the foundation for a community where learning is available for everyone, at any time, and in any place. The optimal use of advanced information and communication technologies plays an important role on the success of this idea as well as the collocation with community, cultural and higher education institutions.

The school aims to contribute to the economic sustainability of Mawson Lakes and become a catalyst and a conduit for the creation of a community, which continuously seeks to improve itself and the lifestyle of its members, developing “an enterprising learning community culture”.

Refer to the paper by Dr Stan Salagaras in this journal for a more detailed description of the partnerships developed between the school, the local council and the University of South Australia around the shared use of learning and library facilities in the community centre.
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Roofline
Architect: SunPower Design
Image: Judy Sederof

SOCIAL AND ENVIRONMENTAL SUSTAINABILITY
A striking message within this conversation is the importance of the education brief as a driver of the architecture.

EDITORS’ PREAMBLE: Dandenong High School is the amalgamation of three existing schools into a new ‘Schools within Schools’, SWIS, model opening stage 1 of 3 stages in 2009. In this interview, the principal, the architect, interior architect and ‘education architect’ unpick the process of transformation that resulted in a school model where seven matching school buildings each accommodate 300 students from Years 6 to 12. A striking message within this conversation is the importance of the education brief as a driver of the architecture. The interview reveals the complexity of the transformation process and the need for good communication and professional development with teaching staff before and after the design and construction process.

INTERVIEW: June 15, 2009

MC: Martin Culkin, Principal, Dandenong High School
RL: Richard Leonard, Architect, Hayball
MF: Mary Featherston, Interior Architect, Mary Featherston Design
JR: Julia Atkin, ‘Education Architect’, Learning By Design

TAKE 8 Three buildings out of seven have been completed and the students and teachers are beginning to experience the spaces. It doesn’t look like any other school we’ve seen. It is seven schools within one school, so as editors of TAKE 8 we are looking forward to hearing about your journey and how you have negotiated this complex process. Martin, as principal of the new school, we understand this is the first time you have been involved in the delivery of a new school.

MC Yes. We are a forerunner of a different way of doing business. It is really putting the curriculum before the design. The history is really about the provision of education in the local district where options for the students were incomplete. Redesigning the education of a district is challenging. The challenge was around developing something that would retain each school and would provide a breadth of options and enhanced student performance. They were the key ingredients. Associated with that was the department’s demand that we be innovative. We were asked to address seven or eight different areas in a particular format; one was a very elementary vision statement, some structures around how you would staff it, what the teaching and learning environment might be like, what the curriculum structures might be like, what the industrial structures might be like, what the ICT might be like—those kinds of things, and I think we could be forgiven for floundering around in the dark in those early days.

TAKE 8 What year was that?

MC That was in 2005. We were in new territory here working with three different school cultures.
TAKE 8 Please talk about the different cultures and the backgrounds of the students because Dandenong has a particularly interesting set of concerns and possibilities around its community group.

MC The broad Dandenong community is amongst the state’s most diverse. There are about 66 languages represented in this school. If you go back to the days of the three stand-alone schools, we had Dandenong High School with a population of about 1,400 students and a stable, traditional school. Doveton Secondary College came out of multiple mergers in that district over the years, closing 10 schools and had shrunk to a student population of about 170. There was Cleeland Secondary College which had about 550 students and was a school that prides itself on offering programs to particular groups, it actively recruited kids from amongst the Sudanese community for example.

TAKE 8 Richard, as architect could you please describe how this school is visually different to other schools which you have worked on?

RL I think the problem that Martin has discussed is really an enormous one, as these three very different cultures needed to be embraced in the conceptual thinking at all levels. It is stage 1, which is one-third of the entire project. As Martin well knows the full concept cannot be realised until all of the buildings are delivered because they are all so intermeshed with the methodology and with the school and the way that the school works. Cohorts of 300 students will be accommodated in each building as their home base. Each building is essentially identical, but will have its own separate character. As a model, the educational philosophies are reflected in the buildings.

TAKE 8 You have spoken about a SWIS or Schools within Schools model. Was that something that you saw, did you visit other schools in the early planning process?

MC We certainly visited schools in New Zealand and in the United Kingdom, but we didn’t see the form that we have developed. In terms of SWIS being represented within some of the literature, they do exist, but these are not autonomous schools within schools. The idea of breaking up a student population of 2,100 into a manageable, meaningful curriculum delivery unit was the driver here. Alfriston College in New Zealand had some notion of schools built around family units and we have borrowed a little bit from that.

TAKE 8 You did an overseas tour with the two other principals to look at other exemplary buildings.

MC We looked at a lot, but I am not convinced that you can pick up anything and make it immediately transferable to your own environment. You don’t provide structural solutions as the panacea of educational problems. You provide curriculum structures to have some hope of success.

TAKE 8 So you are saying you can adapt but not adopt?

MC Exactly, and you pick up ideas, but I wouldn’t just take this or that and replicate it. I don’t think any of the three of us did that. So the challenge was, what do we do now?

TAKE 8 Do we understand you chose a SWIS model because the community was horrified about a large school, so you wanted to break it down into manageable, meaningful groups and there were other ways that you could have done that. You could have grouped into levels or stages and one would see some arguments for that because perhaps there are different kinds of learning that are going on at Year 7 to what there might be at Year 12. Why did you not go down that pathway?

MC Let me just correct something. Certainly the community was horrified, but we too thought there was a better way. You can lapse into tried and true models—the junior and senior school model. We could have done that and there would have been 700 roughly in each group. That’s still far too big. What else can you do? I’ve always been interested in vertical structures, worked with them in several schools. It took a lot of debate and discussion.
TAKE 8 What is it about the vertical structures in schools that intrigues you?

MC We saw some real family learning in New Zealand schools where there were opportunities for senior students to work with younger ones; role modelling, some interactions and some cross-aged tutoring—interaction that is more representative of the real world experiences for kids rather than clustering them into lock step structures that are such a common feature in schools. Students would be in groups of 50 per year level as a meaningful size. So, we very early on wrote a curriculum map to see how you might get some stages of learning to make sense in a school. We focused our thinking around the transition at Year 7, the middle years and the later years.

TAKE 8 How did the teams of people come together? At this early stage was Richard on board as architect but perhaps not Mary or Julia?

MC That’s quite right. There were three stages. Right in the early stage, the educational rationale was certainly pre-architect. We were clarifying our thinking as best we could—terribly hard work. That was done through pretty much the leadership group of the three schools.

TAKE 8 Being?

MC Principals and curriculum representatives—not many.

JA When you are talking about how difficult that conceptual work is, I used to think it would be a hell of a lot easier to do physical exploration. If you left the shores to sail somewhere at least you have the tangibility of the ocean and the land, but when you try to conceptualise something afresh it’s incredibly hard because there’s a period of floundering and challenging. It just doesn’t emerge straight away. You have to keep chipping away, trusting that if you keep exploring together something will emerge. It’s a bit like Michelangelo, he chipped away and eventually the angel emerged.

MC That’s the pure form, this was complicated by vested interests.

MF Can I remind you of the lovely words that you had in the education rationale which were to ‘inculcate a love of learning’?

JA Even when you have that clarity about what you want, it’s getting to that tangible expression of those principles that is the hard bit. It’s not the principles themselves—that’s the easy bit.

RL I think that this is really interesting. That text was one of the earliest documents that was ever presented. In fact some of the very first documents that we have kept on file remain true to this day. So, it’s as if the principles were always clearly stated and in fact never varied. But, it has been the most complex process to work through. The master plan process took something like 18 months, but certainly for the first year we didn’t really draw, in fact, we weren’t providing an architectural service at all—it was terrific to be around that table of discussions.

MC The emergence of those words has some interesting history and one of the commitments we made was to make sure that, if we took them from somewhere, it was out of some research. What is this lodged in? Where does it come from? Will it stand up? That very early document you are referring to was the ‘coloured pages’ document.

RL Yes.

MC Do you mean the curriculum map?

MF The educational rationale?

MC No, just a document that was put together and tendered at one of those meetings on Friday morning, a very lengthy document, a multicoloured document. It was a bit of a stunt I must say.
TAKE 8  Tendered by you?

MC  It was. But it was a bit of mischief. We were trying to get something on the table that had some solid thinking around it, it didn’t belong just to individuals, it was something objective and it got ripped into by people. It was an amazing experience. I’d do it all again if I had my time over!

TAKE 8  At this stage you were pretty much working in-house but you’ve got a clear goal from the department that you should be innovative.

MC  Yes. The demand was around innovation and it was very open ended. It’s not like that now. The department did put in front of us some of the work of other architects and invited us to go and listen. Our question was, did it fit with our thinking and our local environment? The conclusion was that it didn’t.

TAKE 8  You say it’s not like that now. Do you mean because of the necessity for rapid development within the Building the Education Revolution initiative or do you think there have been other changes?

MC  I think the Regeneration Project and the Building Futures processes have come back into a bureaucratic mould. This was a one-off opportunity and I have to say that they trusted us.

JA  When you mentioned the BER—Victoria was ahead of that, they already had, from the department, the Building Futures program which was way ahead of Building the Education Revolution.

MF  I think the department are throwing the ‘new’ more widely now. 2005 was quite significant. Things have hardened up—whereas then it was opening up, now it’s closing down.

RL  Relevant to this project I think. It’s closing down in the sense of being driven by a federal government program, but I think generally that the mindset of the department is still as open and exploratory as it was back in 2005 when this project started off. There was an enormous amount of trust that the department was willing to extend to the school and the project, and in fact that caused considerable delay in the sense that we said we can’t put this project out to tender, we can’t design because we are still resolving what it is. That would cause some heartache at a fairly high level I can imagine. We couldn’t draw because we didn’t understand the project brief as the school was still going through machinations within the school, outside the school with the school community, and also at the departmental level. Across all sorts of levels a lot had to happen before reaching a point where we could say, now we have some clarity to progress as an architectural project. That would have taken at least 18 months before we got to that sort of footing.

MC  Quite true.
JA And I think that as an outsider coming in later to the process, it takes quite a lot of time for the heads to move and come together, so it would have been detrimental had you been pushed harder and faster along a time line.

RL My gut feeling is that even if we achieved the same design a year earlier, I don’t think it would have been successful in the sense that you had to go through the transformational change to reach consensus. In fact, as architects we often see situations where staff are not clear.

TAKE 8 Richard, you are suggesting that this is a design that is owned by more that the architect and the interior architect, it’s owned by a larger group of people. Something that you mentioned earlier is that you didn’t draw for a very long while. Sometimes it’s useful to have drawings that clients can respond to. Could you tell us again why you didn’t draw?

RL I think that’s a very good point and one also made at the time was: if only we had options to discuss. But in our view it wasn’t about options, it was a step before that to ask: where are we trying to head? We didn’t have a mature view of it, so our belief was that drawings would sidetrack the solution and take us off in a different direction. It was in our interest to draw but we didn’t feel confident at that stage that we were in charge of all of the facts, so it was very simple to explain that it would have been counterproductive to start throwing out options.

TAKE 8 So things change. There’s a moment when you feel you can respond, when you can draw. When do you get to that stage? Is it because external pressures become so strong that you can’t resist them any longer or is it because you finally thought you’d reached some consensus? Was it when the curriculum map was finally agreed on?

MC No, I don’t think so. I find that a very difficult question to answer.

RL I want to disagree with you in some sense. As soon as the curriculum map emerged then we had something more serious to work with. We started to analyse, how many kids are in this building at any one time, and what are they doing and what is their movement? I think one of the critical documents that quickly followed from that was your ‘Day in a Life’ where your leadership group sat down and role played four students with very different backgrounds with very different needs. This was the first time I’ve seen it done in my experience and it really put us all in a different head space to understand the building or the requirements from the students’ point of view. So I think that point was sort of the take off in being productive at a drawing board level and then things started happening. We still hit plenty of bumps along the way, and that’s when we started to say, hang on we need more expertise around the table and that’s when people like Julia and Mary started to be swept in.

TAKE 8 Julia you are very much an educator and do a lot of professional development.

JA Sometimes I actually describe myself as an ‘education architect’ doing educational design as a whole so it could be timetable, it could be curriculum, leadership—any aspect of how schools function to ensure that we are doing the best for learning. Like Richard’s firm, I don’t go around telling a school what it should be doing but rather listening deeply to what they are trying to do. I’m so overworked, so what am I doing taking this job on? Part of it was that they were persistent, but the other key thing was the Schools within Schools model. As Martin will say, it hasn’t been an easy road being involved. I’m not interested in innovation for innovation’s sake. I’m only interested in innovation if it actually delivers more fully, more richly on the basic principles that you try to deliver. One of the basic principles for me is how you create a place for human beings. If it’s a place for human beings, you need what I call a human-sized organisation. How many students have you got in Year 7 across the school Martin?

MC About 350.

JA You’ve got a group of year 7s which is not naturalistic, and it’s very hard to create a human dynamic, interaction within that. So SWIS was the vital thing that tipped me into saying I’ve got to find time to work with this group.
TAKE 8  Was this the first time there’d been this kind of endeavour in a school in Australia?

JA  This is the only one I know that has gone for that strong family sort of dynamic within a smaller structure. There are schools with ‘houses’ but not necessarily physically separate as we are getting here. Many schools I’ve worked with would have the very vital house structure going through from Year 7 to 12, and there is a lot of leadership and mentorship going on between senior year students and younger. There are those that encourage friendly competition which is how you keep unity and diversity, to build the whole school spirit, but here was the luxury of doing it within physical buildings not just conceptually. You see the physical expression of the Year 7 to 12 houses. I really see how important that is in this particular environment because of the size and also because of the multicultural attributes with many of them coming from displaced cultural community settings.

TAKE 8  You said you did not aim to overlay your own ideas; more you were keener to work with the ideas of the staff?

JA  Yes. Initially there was a lot of time with Martin, and a lot of time just soaking up the teaching and learning on all three campuses to get a bit of a sense of the school—the people and the places—because each of the campuses had their own highlights and strengths. I am a great believer in emergence; that the best idea and the best design will emerge if you have good process and openness of dialogue.

TAKE 8  So there wasn’t a point in this process where you were feeling as though there was going to be a mutiny? There must be a lot of grief as people who have taught for many years and are passionate about their teaching are now being asked to consider other ways of teaching?

MC  It’s a very confrontational concept for people, but student engagement across the three schools was marginal and was not going to improve by repeating more of the same, so we had to do something different. Turning around cultures, which for a long time have been for teachers rather than for students, is terribly difficult work and by no means has that work been fully achieved. That will be a long journey. But I think we’ve been inclusive of people and are concerned that it’s in their interest. Everybody has had the opportunity to participate and everybody has been listened to, not everybody has been agreed with, but everybody has been listened to. You have to bite the bullet and be strong about these things sometimes.

RL  It’s not necessarily a linear process is it?

ALL  Ohh Noooo!!

RL  It speeds up and slows down in accordance with what you need. This is a good time to bring Mary in because the focus groups, certainly from our experience, were the most intense that we’ve ever been involved in. I remember that day when you had just come into the process, Mary, and were being exposed to this and there was one particular teacher who said this is all terrific but I just can’t envisage what it means in three dimensions so then this is where the idea of the trial SWIS, the prototype came in.

JA  No, there was a step before that. There was a team from all three campuses. The shell was definitely designed and we were trying to get on with the interior and I realised how people couldn’t envisage it. Some people just saw standard classrooms and standard spaces and others were saying no, it could be different.

MF  You asked the different groups to think of a metaphor. One of the great privileges for me in this project, and there have been many, was being able to watch the techniques that Julia uses to get people to feel comfortable and think imaginatively. You asked each group to come up with a metaphor for the school. There was a book, a ball, a house and so there were discussions around those metaphors and then it moved on across the day from that.
The thinking of the leading group was more advanced than most of the staff at this stage. Martin, when you were away for that year your replacement said ‘Well Julia, how do you work it, do you come mid-year and run some model lessons and show people how to do it?’ My answer was no, because we were talking about getting people to the point of what pedagogy there needed to be. There wasn’t a ready-made solution, it was the inclusive thing. You have to keep going back and including another group and then another group and then another group and then they start to be advocates as well for something different.

The SWIS development team—that’s where I came in. They chose to be there. I think everyone came into it realising this is a long process and it gave them the luxury of and permission to be imaginative. And the ideas from the very beginning were very imaginative.

The early development team clarified the values and principles. We did that deliberately, the educational rationale had to come from the hearts and minds of those people involved.

When I said ‘imaginative’, I didn’t mean the design, I meant imaginative in relation to learning and teaching.

In terms of the logistics of the project is the educational rationale being resolved independently of the architectural design?

In parallel with.

And the two of you are now working with sub-groups of teachers.

It was known as the SWIS development team. We had the SWIS model but now had to actually do all the pedagogy and refine the curriculum design and work out how we get from here to there.

There was a moment in time when we had the broad building footprint design, and Mary said, ‘How can you build such a thing no-one has before? Don’t you want to try it out first?’ The department agreed to tender and build it without its internal fitout while a trial space in a prefab was developed and tested.

Richard, you talk about this as being quite a surreal moment. Eighteen months along the track and then suddenly the architect has very few lines on the page.

Yes I think this was the fork in the road for us. At this point we were being forced to go to tender, while a parallel effort was going on between Martin, Julia and Mary with a trial SWIS and pilot program happening on site.

You didn’t want to lock something into place because the pedagogy and the way it was actually going to work or could work was still emerging at the point we had to go to tender.

That’s the critical point. The ideas were opening up, it had the potential to be a very exciting process and product, and at that point, if we had said ‘We’ve got to make all the pedagogy and design decisions now, my guess was that they would have retreated into a conservative position saying ‘Ok, this is something we could live with, not something that we might develop together.’

It was a brave decision by the department to tender without internal fitout.

You could say that is the basis of good pedagogical design and good building design. I think you should always be able to answer the question as to why you designed it that way, particularly in educational settings because the resources are always limited.

And in your case you were repeating decisions that you were making seven times so they had to be good.

In our case one mistake will be seven, so we knew we had to get it right.

And that was exactly two years ago.
TAKE 8  At that stage you had already had an opportunity to test ideas with the prefabricated buildings and the interior layout really arose out of some of those early findings in the test environment.

MF  It certainly confirmed some of the pedagogical directions because the teachers were able to test ways of working, particularly to test working together.

TAKE 8  And did you have one group of students and one group of teachers working throughout a term or a year in those spaces or did a range of groups test the spaces?

MF  We had 50 Year 7s but it was pretty consistent with a small number of staff.

TAKE 8  Mary, could you introduce us to some of the different learning environments within the buildings and what the students experience was in the buildings?

MF  There are three major aspects; each of which is different to the traditional way of doing things. One is the overall organisation of space which was to provide a home for a particular community of learners. So that's the group of 50 students with three teachers. We are trying to create that home which means you want to keep it open, but you don't want it to be overwhelming. The most important thing is the individual student's sense of belonging and security. The second point is the number and the diversity of the settings which are both social and learning settings. The two were seen as inseparable. All of the discussions centred on the importance of relationships even before curriculum. So it was about social and learning settings to support a pedagogy that was also about the transdisciplinary curriculum and integrated projects. You need a wide variety of settings that form that community of learners. So that's the rationale for the configuration of the overall space and its settings.

TAKE 8  And the third point?

MF  The third point is to make sure the design fits the specific distinct nature of those settings and reflects the need of each of those kinds of experiences. For example, the needs of the child involved in wet, messy experiences are very different to a child in a community of inquiry setting. Each one is quite distinct in terms of space according to the number of participants, the kind of furnishings, the lighting, the services, the surfaces—all considered in relation to that range of experiences. It departs from the usual in that it's relatively stable. It's not a totally flexible environment. That always requires huge courage on the part of the client.

RL  I think this is also fairly counter to the departments' natural desire for flexible spaces. The process was a most rigorous approach to harvesting the information and reinterpreting the information for the teachers to see what it means in terms of physical layout. It really is a terrific process to witness, going deeply into an understanding about what their requirements are and reflecting that with very simplistic diagrams that pick up all of these little nuances and the different settings they need.

JA  Mary, you are prepared to change, suggest and challenge. Just as I'm sure you, Richard, were prepared to do in the architectural brief. I guess I did on the educational side.

MF  I'm very conscious of this in the work that I did in Wooranna Primary School. Architects would come in and say 'We've done hundreds of schools in the time you've taken to do one' and you realise that every project cannot go through this—it's not realistic. I think that projects like this and others that we are working on are crucial at this time because we are rejecting traditional forms, traditional pedagogy, and traditional architecture. We are developing something different, and it must, in my view, eventually evolve another way of doing things.
TAKE 8  Well it’s the idea, isn’t it, of the ‘early adopter’ which then influences the mainstream? It’s probably important to invest a lot of time and effort into some schools to enable and test new ways of thinking about schools.

RL  I think this is a good example of a process because we have to realise, speaking again from an architectural point of view, that every building is appropriate. With the complexities of education these days, we cannot pretend that we have the answers and that’s why as a group we’re sitting here. Ten years ago, five years ago it might have been just an architect and the principal having this discussion. Now we have people like Julia and Mary who were critical to the process.

JA  I guess the thing I would like to say is that although we agree we will evolve to another place it will be through ‘adaptation’ not ‘adoption’. The elements that have been emerging here will be responded to and adopted in other places, but you can’t short circuit the work with teachers. You just have to do the head and heart work with the teachers.

TAKE 8  Julia and Martin, Mary has described the spaces. Could you please describe what these spaces mean for education? I know some spaces will fit 16, there are some that might fit 12. Can they be divided into classrooms of 25? Do the kids move? Have you changed the timetable for example, have you needed to move to longer periods?

MC  Yes, we have and I haven’t got all the answers to that because it is still emerging. We’ve got a model at the moment and we are trying to see if it works. It’s just eight-weeks-old. We decided two years ago to go to 75-minute periods, four in the day rather than the traditional six, 50-minute periods. We went through a long debate and discussion about that and it was adopted with a view to try and evaluate it. That has been done and there was an overwhelming subscription to it.

JA  I’d like to point out the timing of the way you did things. It wasn’t overwhelming because you didn’t do everything at once. The teams had already been established, with three teachers and 50 people and they struggled in the old spaces. The team of teachers is small enough that they have informal conversations in that one big staff room about using and integrating the various spaces.

MF  There is an American study about SWIS that says they haven’t worked because they didn’t recognise the significance of having to change all of these aspects of an organisation.

JA  And it’s when you get all those things working together that you get the pay-off. You don’t just have teachers working in new spaces. If you just have the spaces and you don’t get teachers collaborating, it doesn’t work., I think the other thing that Mary is saying is that the spaces are ‘purposeful’, they are not just a big barn where you can do different things.

MF  It’s not a whimsical approach of ‘I saw this in Denmark and we’ve got to have one of those’ and one of those and one of those—which is what’s happening now.

TAKE 8  How are the students responding? What are they doing to make it their own, what are their early thoughts?

MC  Look it’s anecdotal at the moment and particularly around Year 7 and 8 students. Year 7 students are totally enamoured with the idea. There’s no doubt about that. Every conversation we have with them is about that. Year 8 students have had other experiences at school already and they have taken a little longer to warm to it. And I can’t really speak on behalf of the rest of the kids although they are very excited about what this means for the collective future for the whole school.

JA  Of all the states I work in, and I work across all the states in Australia, Victoria has the best integration of facilities, curriculum, pedagogy and innovation. They are all working towards the same end and I don’t experience that level of integration in any other state.
The new Dandenong High School merged three existing schools into one single school to optimise resource utilisation and provide greater and more varied opportunities for access to pathways to the students.

The resulting school structure has been based on a ‘schools within a school’ (SWIS) model, which combines access to facilities and resources to support a wide and diverse curriculum options that a large school can provide with appropriate human scale learning settings that allow for the establishment of relationships with teachers and peers.

The school occupies some pre-existing buildings from the Dandenong HS as well as some new buildings. These new buildings have achieved a 4 green star rating, with the belief that environmental comfort is a key factor on the improvement of learning outcomes.

A new teaching paradigm is underlying the design: the school has been designed around the idea of a collaborative approach to learning rather than just transmission of information, with the following vision: ‘to inculcate a love for learning and curiosity for enquiry’ and ‘to understand the learner and the learning process’.

The students have been clustered in multi-year level settings (SWIS Model) that each accommodates up to 300 students. Students from all six years of secondary school will be accommodated in each house along with teacher teams to provide small group tutoring of the core curriculum and support student management and welfare.
Collaborative teacher work spaces open from the learning settings. The model enables teachers to have a high degree of autonomy over the instructional program within their houses allowing for cross-disciplinary projects and lessons to occur more easily. To work well, the teachers are required to work as a team. The space design does not allow reversion back to a traditional classroom module.

Each house has 10 to 12 different learning settings, which have been purpose-designed for a determined number of users and with the required acoustic properties and resources. The settings are organised around a central resource area and supported with a series of smaller rooms. The spaces are interlinked, allowing for a fluid access, with moveable furniture to support this flexibility. ICT and connectivity to the Internet are integrated. Social spaces are provided, to further support the creation of good interpersonal relationships and the importance of informal learning.

Emphasis was placed on the translation of the school’s values into physical space. The values had been determined by the three schools’ students and staff and led a way of design in which the pedagogical ideas drove the building form. From the values, a series of pedagogical practices that would support them was identified. These pedagogical practices were organised around three main themes: relationships, curriculum and time management.

An additional layer of complexity was given with the addition of social learning and experiences, looking at both groupings of students and staff and the diversity of learning experiences.

Taking into consideration all these factors, the scope, location and design of the learning environments as well as the size of the ‘neighbourhoods’ were further defined. The process of consultation for the definition of all factors to be considered took over two years.

An unusual aspect of the process for this school, was the tendering of the design without a complete understanding of the internal layout. Because new teaching methods were being developed, a prototype space was constructed on-site during the design for testing and adjusting the brief.

THE DESIGN PROCESS

Consultation with the school community was an integral part of the design process. Extensive input came from the three schools in the form of focus groups representing different learning areas, strongly supported by a Project Group, and a local reference group. The complexity and thoroughness of the process is described in an interview within this journal.
LEARNING ENVIRONMENT DESIGN — DANDENONG HIGH SCHOOL

EDITORS’ PREAMBLE: This paper complements the accompanying interview on Dandenong High School. Mary Featherston is a design consultant specialising in the design of schools. She is known for her intensive work, with both students and teachers, to develop bespoke learning environments that support a range of learning modalities. In this paper, Mary describes her rationale for the layout adopted at Dandenong High School. She explains why spaces fluidly interconnect enabling students to move seamlessly between activities. Mary concludes with an argument for purposeful spaces in preference to flexible spaces.

The interior environment of the new buildings of Dandenong High School provides a ‘landscape’ of possibilities, where people and ideas may flow and connect. The intent of the design is to closely support and reflect the school’s beliefs about young people and learning, an example of ‘built pedagogy’.

Creating a new school involves countless decisions—what determines the choices that are made? The Education Rationale for the Dandenong Education Precinct set a vision for learning, ‘to inculcate a love for learning and curiosity for inquiry’ and ‘to understand the learner and the learning process.’

The interior design of the new buildings responds to this contemporary and collaborative approach to learning and teaching. Detailed development of the school’s vision and pedagogical practice has evolved over more than two years through a highly participatory process involving all staff and students. With support from the school and the Department of Education and Early Childhood Development, DEECD, the education design consultant undertook an action research project to link pedagogy to design of the learning environment. A prototype environment for Year 7 students was created in an existing portable classroom and provided a test bed for ideas. Design of the physical environment for the new buildings could then evolve from the ‘inside-out’ a term also used by the education consultant Julia Atkin to describe the process of building a learning culture and school ethos based on shared values and beliefs.


MARY FEATHERSTON
Featherston Design
Tight building deadlines meant that decisions about spatial configuration and fitout were required long before pedagogy had taken shape. A decision was taken by the school leaders and architect, supported by DEECD, to proceed with construction of the buildings as shells having minimal internal load bearing walls. Detailed development of internal spaces could then grow out of the school’s reconceptualised pedagogy. Evidence over many decades indicates that radical educational innovations fail when they are not ‘owned’ by the protagonists or do not have supportive physical environments.

COMMUNITY OF LEARNERS

The learning framework is based upon a collaborative approach; teacher-teacher, student-student and student-teacher.

At the heart of all development discussions was concern for the nature and quality of human relationships, especially for each student and teacher to develop a sense of belonging to a community of learners. The decision to form communities comprising 50 students with a team of three teachers generated the spatial characteristics of the interior environment.

Each floor plate comprises an assemblage of discrete settings interlinked to form a flowing space. The space invites movement and exploration and gradually unfolds to reveal a wide variety of social and learning settings. Articulating space in this way is intended to create a home base/ neighbourhood which is open and generous but not overwhelming. Most importantly, a lively convivial environment is created where friendships can be developed and where students can see their team of teachers collaborating. Teachers individually and as a team, can observe and interact with students in a variety of contexts, leading to deeper and richer relationships. Visual connection between areas enables one teacher to be wholly occupied with a group of students, as in a direct instruction session, whilst other staff facilitate where needed. Openings between settings, actual or glazed, enable all the participants to be aware of who is where and what is happening and this also encourages purposeful choice and spontaneity. Students are encouraged to develop independence and self-management in a number of ways including personal storage within learning spaces, fittings and furnishings which provide ease of access to resources and clear circulation paths for ease of movement.

Overall the space of each floor level is configured so that individuals or groups of students may be immersed in a particular experience whilst maintaining a sense of connection to the whole group. This is achieved by locating settings relative to one another and by various boundaries or enclosures around each setting, from minimal, such as a change of floor surface, change of level and items of furniture, to transparent, such as glazed panels, walls and doors, to solid such as full-height walls.

The configuration of space is non-hierarchical to support and reflect democratic relationships. It also recognises the significance of the social and emotional components of learning and the value of all forms of learning: adult or student directed, passive and experiential.

**TRANSFORMATIVE LEARNING**

Opportunities for authentic learning experiences are of utmost importance.

The school’s approach to learning and teaching respects the individuality of each student, their unique backgrounds, interests and capabilities and their need to learn individually as well as collaboratively. Inclusion of ‘specialist’ facilities within each communal home supports students’ preferred learning styles. Taken together, this approach to pedagogy led to the design of a living/learning/working environment comprising a wide variety of discrete settings: intimate and spacious, quiet and active, wet and dry, light or dark, for discussing, researching, experimenting, communicating, creating—using many expressive languages, documenting, reflecting and relaxing.

Each setting has been purposefully designed based on the optimal number of participants and the nature of the experience(s). Each has a particular size, degree of enclosure, relationship to adjoining settings, lighting, services, surfaces, furnishings and loose items. Each is designed to attract, engage and sustain engagement by providing ‘cues’ for use, by minimising distractions from adjacent activities and by placing resources at point of use. The intent is that design of the physical environment, together with periods of unbroken time, will nurture deep and transformative learning experiences.

Settings are interlinked to form a fluid space which expresses the interconnectedness of all areas of the curriculum and the dynamic, sometimes unpredictable, processes of learning. Many and varied activities occur concurrently. Connectedness of settings also enables students to stay ‘in the flow’ of a project, moving seamlessly from one experience to another—without having to wait for the next timetabled session in a remote specialist facility. The environment brings together functions which are traditionally housed separately as general purpose and specialist spaces. At ground level, staff areas and science studio spaces open to the outdoors.

Visibility and ease of access to facilities and resources also provides a constant reminder of possibilities or ‘affordances’. Integration of ICT into all areas stresses the significant relationship between learning in the real and virtual realms.
**Ambience**

Whilst the physical environment is made up of tangible things and is concerned with function and practicalities it also affects how people feel and intangible qualities such as respect were also to be expressed by the environment. The design creates an informal but sophisticated ambience as requested by the adolescent students.

Learning environments are extremely busy places full of people, movement and ‘stuff’ and there are conflicting needs between complexity and clarity—the need to provide richness and stimulation whilst also providing a calm and coherent environment. The intent here is to provide a visually and functionally harmonious ‘classic’ background, with a restricted palette of finishes and mainly neutral colours where the focus is on the students, their activities and their work. Students say they feel relaxed in the new environments and ready to learn.

Generally furniture items are of high quality and readily available, but some special items have been designed for storage/space division and relaxed seating. Student lockers were specially manufactured and are incorporated into the learning commons.

**Stability or Flexibility?**

These environments are relatively permanent rather than totally flexible. Stability means that everyone knows where things are—important in a very dynamic and unpredictable program. Teachers comment that permanent settings save time and energy which would otherwise be spent in negotiating and scene shifting. Purposefully designed environments enable the development of richness and complexity over time.

The learning environment may be conceptualised as being made up of three layers: the building shell, internal settings and loose items, resources and equipment etc. All layers need to be considered together for functional and visual integrity though they may be the responsibility of different agents. The building shell and settings are relatively permanent whilst the last layer, the resources and displays are transient and built up over time by the participants. It is this layer which expresses the identity of a particular community, reflecting their backgrounds, interests and development of ideas. This is a most significant layer in that it builds familiarity, emotional attachment and a sense of belonging.

“Opportunities for authentic learning experiences are of utmost importance”

Mary Featherston
SUSTAINABILITY FOR LEARNING ENVIRONMENTS

EDITORS' PREAMBLE: Every brief and every client anticipates that building designs will be informed by sound environmental decision making. Quantitative research, particularly from the USA, has confirmed our commonsense notion that learning improves with good lighting, ventilation and water proofing as well as thermal comfort and acoustic control. In this paper, Dominique Hes provides an introduction to and critique of the relatively new Green Star rating tool for education buildings. One of the aims of the rating tool is to provide a road map for designers and clients to help them make good environmental decisions.

Dominique concludes with a critique of the current rating tool for education and a suggestion for how to move forward even if the tool is not yet ideal.

INTRODUCTION

Schools have a significant impact on the environment through their embodied and operational use of resources and through their ability to shape young minds.

Further, school design has a significant impact on the ability of the teacher to teach and the learner to learn. Currently, there is a large investment being made in the renewal of existing schools and the design of new ones along Ecological Sustainable Design (ESD) or ‘green’ principles. But in the push to produce greener schools, it is important not to forget that these spaces need to work well pedagogically as well as ecologically; the design of schools should provide effective healthy learning spaces that use energy, water and resources efficiently. This paper briefly introduces Green Star—Education v1 and how it is used, but its main focus is on those aspects of the rating tool that relate to the provision of effective learning environments. This will lead to a suggested definition of what it might mean to create effective, ‘green’ learning environments.

Effective Learning Environments (ELEs) support teaching and learning by providing the appropriate facilities and environments to carry out learning activities. That is supporting student centred, problem based learning through the ability to use multi communication methods, engagement with knowledge in active, flexible ways and the ability to work at different scales with different sized learning groups.

To support the design and construction of effective ‘green’ learning spaces, building rating tools, guidelines and checklists have been developed in many countries. However, caution needs to be applied in their use, for the tools may not cover: ‘the social aspects of sustainability such as inclusion, participation and fair shares for all. Nor ... take account of what makes a good learning environment (for example... integration of external and internal space, flexibility of spaces for different uses, adaptability of building structure etc.).’ That is, they are only useful in as far as they facilitate the design of effective learning environments. If a ‘green’ school does not facilitate learning then the author would argue that it is not sustainable and the invested energy and resources have been wasted as the designed space is not fulfilling its function.

Yet rating tools can provide a road map that together with educator input can lead to buildings that are sustainable. The recently released Green Star—Education v1 rating tool is one such tool. It has been based on the Green Building Council of Australia’s (GBCA) experience with office building tools which were developed using the UK’s Building Research Establishment Environmental Assessment Method (BREEAM) system, and the North American Leadership in Energy and Environmental Design (LEED) system.

According to the GBCA, the Green Star rating system was created to:

- define green building by establishing a common language and standard of measurement;
- promote integrated, whole-building design;
- identify building life-cycle impacts;
- raise awareness of green building benefits;
- recognise and reward environmental leadership; and
- transform the built environment to reduce the environmental impact of development.

Green Star—Education v1 is a tool designed specifically for educational buildings because of their unique requirements and user profiles. Also, unlike the office tools, the Green Star—Education v1 tool incorporates a tailored energy calculator that assesses the designs based on their potential and predicted greenhouse gas emission in operation. It is designed as a voluntary tool and aimed at the industry-leading project. The pop-out box over outlines the tool and describes the process of using the tool.

GREEN STAR—EDUCATION V1—ELIGIBILITY, ASPECTS COVERED AND PROCEDURE

Specifically, the Green Star—Education v1 tool ‘evaluates the environmental initiatives and/or the potential environmental impact of new education facilities, and additions to and major refurbishments of existing education facilities’.

Eligibility criteria for Green Star—Education v1

Buildings primarily used for educational purposes (e.g. primary or secondary schools and university buildings, including libraries) are eligible for Green Star—Education provided that they:

1. Have the following mix of GFA (measured to exclude internal car parks):
   • A minimum of 80% of BCA Class 9b, 8 and 5 space;
   • A minimum of 50% of BCA Class 9b space; and
2. Are not any of the following:
   • Buildings with over 20% of GFA dedicated to retail food service and/or indoor swimming pool(s);
   • Libraries that are not on education campuses; or
   • Facilities primarily dedicated to childcare.

As with other Green Star tools, a spreadsheet which is freely available online, guides the user through the assessment. It is only if a project wants to publicise its use of the tool and its assessment that an official assessment is required. Though, if it is the intention of the project to make the use of Green Star publicly it is advisable to begin the assessment process from day one. Many of the assessment credits align with that of the other Green Star tools those that are specific to educational buildings are:

- [Buildings as a] Learning Resource;
- Maintainability;
- Unoccupied Areas;
- Stairs;
- Efficient External Lighting;
- Centralised Energy Systems;
- Transport Design and Planning;
- Potable Water Use in Laboratories;
- Recycled Content & Reused Products and Materials;
- Flooring;
- Joinery; and
- Loose Furniture.

To meet the conditional requirement:

The project’s predicted greenhouse gas emissions must meet the greenhouse gas emission benchmark. The Green Star—Education v1 Energy Calculator determines the benchmark for each project based on the composition of space types within each project. The conditional requirements are:

<table>
<thead>
<tr>
<th>Primary and High Schools Conditional Requirements (kgCO2-e/m²/annum)</th>
<th>Universities Conditional Requirements (kgCO2-e/m²/annum)</th>
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<tbody>
<tr>
<td>Classrooms</td>
<td>Teaching/classroom spaces</td>
</tr>
<tr>
<td>Computer and physics labs</td>
<td>Dry labs/speciality learning spaces and libraries</td>
</tr>
<tr>
<td>Office and staff rooms</td>
<td>Office/administrative spaces</td>
</tr>
<tr>
<td>Library</td>
<td>Common spaces</td>
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<tr>
<td>Common space</td>
<td>Wet labs (varies based on density of fume cupboards)</td>
</tr>
<tr>
<td>Canteen</td>
<td>Gymnasiums</td>
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<tr>
<td>Workshops</td>
<td>Car parks</td>
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<tr>
<td>Gymnasiums</td>
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<td>Car parks</td>
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The process for attaining a Green Star rating is, firstly to register with the GBCA. This incurs a cost depending on the size of the building. Next it is a matter of working through the spreadsheet to determine which criteria the project will aim for. Having a Green Star professional as part of the team will not only provide one credit, but will also ensure that the design team has someone to help them understand the level of commitment each credit will require. The documentation required is extensive and this needs to be both well understood and allowed for in the process from the beginning. Figure 1, shows the process of application. Once all the documentation has been collected it is submitted and sent to a third party panel of accredited assessors commissioned by the GBCA. It is usual for most projects to only get a fraction of the credit in the first round, thus there is a second round where they can address any feedback. Usually the reasons for this is a lack of documentation for the credits applied for, for example credits claimed for installing a large rainwater tank but it not being shown in the plans. Projects generally achieve most of the credits they have aimed for in the second round.

<table>
<thead>
<tr>
<th>APPLICANT</th>
<th>GBCA</th>
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<tr>
<td>Round 1</td>
<td></td>
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<tr>
<td>Project eligibility</td>
<td>Project registration</td>
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<tr>
<td>Round 2</td>
<td></td>
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<tr>
<td>Round 2 submission</td>
<td>Round 2 assessment</td>
</tr>
</tbody>
</table>

Figure 1: Application procedure for a Green Star certification

Finally, a Green Star rating is only given for those buildings that achieve 4 or more stars, in line with the other Green Star tools:

- 4 Star Green Star Certified Rating receives a weighted score of 45–59, this signifies ‘Best Practice’
- 5 Star Green Star Certified Rating receives a weighted score of 60–74, this signifies ‘Australian Excellence’
- 6 Star Green Star Certified Rating receives a weighted score of 75–100, this signifies ‘World Leadership’

Credits are divided over 9 categories of:

- Management—14 credits aiming to ensure a good foundation is set for the project, looks at issues of commissioning, the design and development process, documentation and future guidance;
- indoor environment quality—26 credits aiming to ensure that the indoor environment of the schools are performing optimally in relation to the air quality, lighting and pollutant;
- energy—29 points aimed at ensuring the building’s design uses the minimum amount of energy while maintaining amenity and thus generates a minimum amount of greenhouse gases;
- transport—13 credits related to how people get to the school, specifically bicycle facilities, car parks, access to public transport etc.;
- water—16 credits related to design for water efficiency and recycling;
- materials—27 credits aiming to ensure that those materials chosen for the school are low in impact;
- land use and ecology—8 credits which aims are ensuring a minimal impacts is had on land use and the environment;
- emissions—14 credits aiming to deal with issues of Legionella prevention; refrigerant choice in relation to ozone depletion, greenhouse gas emissions and leaks; water course pollution and discharge to sewer and light pollution; and,
- innovation—5 credits aimed at supporting innovation through use of new technologies, ability to go beyond the Green Star bench marks and scope.

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EFFECTIVENESS OF GREEN STAR TOOLS IN TRANSFORMING SPACES

There is only sporadic evidence of the capacity of the other Green Star tools to inform the design of better performing ESD buildings. This is due in part to the fact that there is no requirement for Green Star rated buildings to report on their performance publically. One of the main sources of information about Green Star rated buildings is the GBCA’s own reports aimed at helping to argue the business case for adopting Green Star to achieve sustainable building outcomes. While this report shows the resource and financial savings of Green Star rated buildings, it does not discuss the effectiveness of the spaces designed. Results from individual case studies, however, do highlight the impact Green Star has had on the design of effective spaces.

Council House 2, housing the City of Melbourne staff, includes natural ventilation, thermal mass and indoor air quality design strategies that have resulted in a low noise, open-plan environment filled with greenery and gentle diffuse light. Aside from reducing energy and water usage by over 70 percent, CSIRO research has also found productivity and occupant health improvements of almost 11 per cent over previous council accommodation.

40 Albert Road, a building refurbishment, resulted in energy efficient spaces saving even more energy and water than CH2 while providing occupants with high air quality, using natural ventilation and daylighting where possible.

In reviewing these examples, what is evident is that the design of buildings using ESD rating tools is better considered. By employing the Green Star tool the design outcomes were occupant-sensitive resource-efficient buildings effectively integrating aspects of the local environment such natural ventilation, light, solar collection, etc.

However, using a tool such as Green Star does not guarantee a more sustainable building. Research done in Australia and internationally points to the operation of the facility and the behaviour of the occupants as central to determining the effectiveness of the design.

For schools this means how well the school is operated and maintained and the systems in place for training staff and students is as crucial as is the design of the space itself.

ASPECTS OF GREEN STAR THAT SUPPORT DESIGN OF EFFECTIVE LEARNING SPACES

Many of the aspects covered by Green Star—Education v1 are related to potential building performance and not to the creation of effective learning spaces. From the

research discussed below lighting, ventilation and water proofing have the highest impact on learning effectiveness, followed by providing adequate thermal comfort and minimising acoustic problems. The remainder of this paper outlines these aspects of learning spaces design, citing why they are important outlining the relevant Green Star credits associated with them.

LIGHTING
The Heschong Mahone Group\(^\text{14}\) showed that the effects from the introduction of controlled natural daylight to classrooms, along with allowing views to the outdoors, resulted in an increase in student achievement of 26 per cent. In addition, Shum Miller\(^\text{15}\) showed that daylight in classrooms can have an impact on reducing illness, absenteeism and an improvement in student behaviour. Daylighting strategies are most effective when the user can control heat gain and the amount of light and glare. If possible design should make use of indirect light either by allowing light in from the south (for the southern hemisphere, north for the northern hemisphere) or bouncing it in through light shelves. Light shelves will increase the distance natural light will travel into, and may illuminate a space by an extra 25 per cent.

In recognition of this Green Star—Education v1 provides six credits related to windows and daylight. ‘IEQ 4—Daylight’ provides the bulk of the credits and is related to providing a two per cent daylight factor over as much of the floor plate as possible. ‘IEQ 11—Daylight Glare Control’ provides one credit where it is demonstrated that glare has been adequately dealt with while ‘IEQ 14—External Views’ which provides one credit if 60 per cent of a nominated area has direct line of sight to views.

Significant savings on operational lighting costs can be achieved through effective natural and artificial lighting. For example, it is not necessary to have uniform lighting across an entire classroom, varying the lighting allows for the highlighting of spaces and the differentiation of activities and will lead to energy saving\(^\text{16}\).

Long-term savings can be achieved through the future proofing of function through design for retrofitting by using different luminaries, diffusers or adaptive switching strategies. Green Star ‘IEQ-12—High Frequency Ballasts’ and ‘IEQ-13—Electric Lighting Levels’ provide one credit each in relation to artificial light levels and IEQ, under Energy ‘Ene-4—Lighting Zoning’ provides a further credit.

AIR QUALITY AND VENTILATION
The link between respiratory illnesses such as asthma and mould has been thoroughly demonstrated in medical research.\(^\text{17}\) Mould commonly occurs in poorly water proofed and ventilated buildings. A significant percentage of absenteeism in schools is due to asthma-related illnesses. Cox-Ganser et al.\(^\text{18}\) found that in the US between 1994 and 1996 asthma led to 14 million days of school loss—an average of 3.4 school days per child. Thus effective green learning spaces must be designed to ensure that areas where mould typically occurs are eliminated. According to Edwards:

...it appears evident that those green schools which give priority to daylight and natural ventilation generally outperform other schools.\(^\text{19}\)

Within Green Star—Education v1 air quality and ventilation is covered by three credits which includes appropriate Ventilation Rates (IEQ-1) and Air Change Effectiveness (IEQ-2) and specifically through ensuring relative humidity is controlled in mechanically ventilated buildings (60 per cent relative humidity in space and 80 per cent relative humidity in ductwork) or by specifying naturally ventilated buildings (IEQ-10—Mould Prevention). Limiting the ability for moisture to build up has the added benefit limiting that aspect in the degradation of buildings, leading to longer lasting facilities and therefore a better return on financial and environmental investments.

Moisture ranks as a leading cause of structural damage, and excess moisture in a building has been associated with a variety of health problems in children and adults.\(^\text{20}\)

Richard de Dear concluded that there are productivity benefits (through the perception of comfort by building users) if the indoor temperature reflects the outdoor temperature more closely, particularly if they have control over their environment. From an operational energy perspective this means that the temperature bands do not need to be as narrow, for example 21.5+/–1°C, saving conditioning energy as well as reducing the size of plant and equipment needed. Green Star—Education v1 ‘IEQ-5—Thermal Comfort’ provides the potential for three credits to improve thermal comfort: one credit is awarded if there is adequate user control for workstation areas (note not classrooms) and a further two credits are allotted if defined standards are met of either ASHRAE or ISO7730.

**ACoustics**

Many schools aiming to integrate ESD and a more flexible approach to the use of space have large open areas to allow multiple activities and though this offers good opportunities for daylighting and cross-ventilation it often results in poor acoustic performance. Careful analysis of the potential internal and external noise levels when considering space design is crucial. Often, within the design process, the acoustic analysis is carried out too late requiring either a change in the design or expensive retrofitting. Bringing in the acoustic engineers earlier will help minimise this extra effort ensuring an integrated design minimising the chance that acoustic treatments are removed as a cost-cutting exercise. Green Star—Education v1 covers acoustics through ‘IEQ-7—Internal Noise Levels’ providing two credits.

**UNDERSTANDING THE SPACE AND LEARNING OPPORTUNITIES**

All the design strategies outlined above require not only appropriate design consideration but also an understanding by the building...
occupants of when to open windows, close blinds and turn off lights, in order to maximise its ESD performance—green building perform best if they have green occupants.23 Green Star—Education v1 approaches this through ‘Man-5—Building Guides’ which provides two credits for the development of building guides while ‘Man-10—Learning Resources’ provides one credit for fostering an understanding of the building by making it a learning resource. This mean that the resources invested into the efficient design of the building will be used by the occupants (students and teachers) for lived, tacit, learning, fulfilling one of the criteria of an ELE. Wilkinson agrees arguing that an educational space:

... should show the interconnections between natural systems and human needs where possible, making the building itself a positive factor and tool in learning about sustainability rather than just a neutral backdrop.24

GREEN STAR—EDUCATION V1 AND EFFECTIVE LEARNING ENVIRONMENTS

The Green Star—Education v1 rating tool supports the design of ‘green’ schools by providing guidance on what is considered best practice for adequately lit, ventilated, comfort, acoustically effective and resource efficient ESD buildings. However, as Green Star is primarily an ESD tool it only provides limited guidance on the design of Effective Learning Environments. Further research on how to achieve both educational and green objectives and create Effective Green Learning Environments (EGLEs) is necessary. A tentative definition of an Effective Green Learning Environment is:

... an environment that supports teaching and learning through the provision of adequately lit, ventilated, thermally comfortable and acoustically effective spaces that are resource efficient in construction and operation. Further, EGLEs provide opportunities for tacit learning through interaction, understanding and engagement with the building, systems and space.

The design of EGLEs requires the use of established strategies for the ‘green’ design of schools but also the inclusion of expertise on current pedagogical requirements from project inception. A current Australian Research Council project called ‘Smart Green Schools’ has brought together a multidisciplinary team of educators, architects and ESD experts to explore these issues.

CONCLUSION

The aim of this paper was not to provide an overview of the whole Green Star—Education v1 rating tool, but to reflect on those credits that support both more environmentally friendly building and effective learning outcomes. It is interesting to note that those credits related to more effective learning outcomes, as discussed here, only make up a small percentage of the total credits available.25 This raises the question: should a tool such as Green Star just focus on environmental performance and ignore the less quantitative issues of comfort and student performance, or is a more complex tool that includes learning effectiveness, pedagogical and curriculum aspects required? For now, ensuring the educators and students have a voice in the design alongside the use of Green Star seems to be the best way forward.

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WILLIAMSTOWN HIGH SCHOOL, BAYVIEW CAMPUS

Williamstown High School’s Year 7–9 Bayview Campus was rebuilt during 2005. In keeping with the school’s focus on educating students about sustainable living practices, the school wished to take advantage of its enviable position on Port Philip Bay and become an icon for sustainable building design in the education sector. Using a mix of light weight building materials and brick, the school was constructed to take advantage of the coastal views and the afternoon sea breezes.

CONTEXT OF THE PROJECT

The two main teaching and learning buildings are situated with a northerly orientation and are passively ventilated. The sustainable features of the buildings – low energy lighting, energy efficient gas heating, no air-conditioning—are complemented by a number of brightly coloured water tanks and a large vegetable garden. The recent addition of an extensive water treatment wetland area has further enhanced the school’s environmental credentials.

Prior to the school being rebuilt, it was under pressure to cater to more students. Since taking possession of the new buildings, the campus has expanded to cater to approximately 700 students, up from the approximately 350 students that attended the campus previously. 

PEDAGOGY AND SPACE

The learning environments are mostly traditional classrooms. The science rooms are particularly well equipped to cater to marine studies. Such learning is often directly related to the Jawbone Marine Sanctuary that is situated in front of the school.

A large open space, known as the Hub, is situated on the first floor of Building B. This was incorporated into the school’s design at a time when innovation was required to attract funding. Composed of four traditional sized classroom spaces with the walls removed, this space has allowed the school to trial inquiry learning approaches.
Large cohorts of students (50-75) have engaged in project based inquiry units—often with a sustainability focus—facilitated by between two and four teachers. Due to the space’s poor acoustics and a lack of designated activity settings, teaching and learning in this space has proven difficult. The school is currently investigating how to redesign the interior of this space to better cater to student-directed pedagogies. The loose-fit design of the building should allow for a range of options to be explored.

**LIVING SUSTAINABLY**

The ethos of the campus is very much driven by the concept of sustainability. In order to maintain a constant awareness of environmental issues amongst the school community, large TV monitors are distributed across the circulation spaces to display data including power and water usage rates. These monitors are also used to communicate with students and staff about school events.

In addition, all the school’s computers have power usage displays and reminders regarding the environmental impacts of computer use and printing – advising that only important documents should be sent to the printer.

The school is constantly seeking to further enhance the student’s connections with sustainable living practices. In 2009 a curriculum for students to learn about sustainability was launched at the school. The redesign of the Hub is being seen as a chance to further improve opportunities for incidental everyday learning about living in balance with the natural environment.
OPPORTUNITIES AND CHALLENGES

Engineering, Melbourne University, VIC
Transparency of learning
Architect: Woods Bagot
Image: Woods Bagot
SOME CONCLUDING REMARKS BY THE CO-EDITORS

TAKE 8 covers a wide range of topics and this is testament to the extraordinary complexity of school planning and design.

As Lynne Sutton notes in her interview, school transformation requires the development of an educational brief first followed by the subsequent development of the architecture. This does not necessarily reflect the Building the Educational Revolution, BER, approach that entails downloading school designs from departmental websites across Australia, allowing little time for schools to develop unique approaches to pedagogy and space.

That said, Peter Stewart advises that Victoria is ‘BER ready’, and in his opinion the Department of Education and Early Childhood Development, DEECD, has, over the past five years, positioned Victoria at the forefront of school architecture transformation globally.

A key area which we consider critically important is that of teacher professional development. The editors consider this one of the most critical factors in school transformation. Teachers in Victorian schools—which largely reflect national practice—have the opportunity to complete five days of professional development per annum.

The role of space and place in teaching and learning is not well understood. DEECD has recognised this and in its newly established Bastow Institute Of Educational Leadership ‘pedagogy and space’ will be one of 16 core curricular that intending applicants for principal positions will have to complete.

Universities are increasingly seeing pedagogy and space as critical to a 21st-century learning strategy, particularly with the advent of ‘blended learning’ that combines traditional face-to-face models with online collaborative learning on campus. Thus learning environments need to be re-engineered to accommodate these emerging learning modalities.

Universities also see informal learning in ‘third spaces’ as mission critical, a strategy that sees the remodelling and strategic re-engineering of the library and the student union of old. They are voting with their capital works budgets to create a range of such social learning spaces at Sydney University’s SciTech Library, Queensland University of Technology’s Community Building, the University of Adelaide’s Hughes Court Learning Hub redevelopment, and Melbourne University’s Learning Hub Strategy with its recently completed Educational Resource Centre hub.

Universities are also focusing on teacher professional development through their Centres of educational leadership. For example, Melbourne University hosts a one-day conference on teaching and learning through METTLE where issues such as
emerging educational technologies and innovative use of space are covered.

Other activities that fall under the concept of educational planning as well as design include the role of furnishings and layout in defining different modes of learning. Mary Featherston discusses these in her interview and paper, particularly the notion of ‘layers’. Interestingly many architects have expressed frustration at the difficulty of transformation of learning spaces. Used to working in office landscaped environments and other very flexible working spaces, they have been able to see tremendous opportunities for change in schools, further education colleges and universities. But they almost always come up against the block of the 19th-century classroom model. In some cases flexible spaces have been designed and built in schools to only be retrofitted by the school teachers themselves to recreate classrooms.

Often this is because these flexible spaces are not treated carefully for acoustic performance. A further difficulty arises in open-plan spaces if teachers continue to practice a teacher centred pedagogy rather than a learner centred approach supported by online learning and collaborative peer-to-peer learning. Venues need to be further developed to enable a dialogue between teachers and designers to develop around the importance of space in education. Ideally the conversations need to begin in the pre-services training of educators and the editors support recent initiatives by the Architects Institute of Australia, AIA, along with the Council for Educational Facilities Planning International, CEFPI, to facilitate such conversations.

The idea of civic connections and links to community has been developed most significantly in the United Kingdom through their ‘extended schools program’. In Australia, some communities and schools are better than others at achieving this. In the Broadmeadows Regeneration project the clustering of a senior college, a middle school, a primary school, an early learning centre, a special school and a TAFE college next to a sports stadium, a recreation centre, a town park and a town centre is a bold and imaginative development of civic connections.2 The education department has encouraged, indeed insisted, that designers collaborate, including urban designers, architects, and landscape architects. They have worked with town planners, social planners, placemakers and school communities to embrace this inclusive model for 21st-century sustainable learning environments.

The editors were keen to ensure that this journal illustrated good practice in implementing some of the theories and the range of approaches of the respective authors. TAKE 8 includes a number of case studies as follows:

- **The Australian Science and Mathematics School**—this illustrated the concept of learning without borders, for there are no classrooms in the building, simply learning commons and learning studios. The editors still consider this to be one of the leading 21st-century learning environments internationally. It is constantly visited by international educators, has won several awards for innovation and no less than eight teachers at the school are completing doctorates on its development.

- **Mawson Lakes Primary School**—this school shows how a school can be embedded as an integral part of the community. Also a CEFPI award winner.

- **Dandenong High School**—illustrates how three different school cultures in a compromised socio-economic regeneration area of Melbourne can come together to form a 21st-century learning community of hope.

- **Blair St P-9 School**—this illustrates many of the concepts outlined by the respective authors, including links to the outdoors, flexibly designed buildings and furniture, school home bases and learning communities.

- **North Carlton Primary School**—this is a particularly important case study as it illustrates how a heritage listed building can be sensitively converted to meet the emerging flexible demands of 21st-century learning.

- **Williamstown High School**—this school, situated on two campuses, illustrates leading edge sustainable design principles and also

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1 METTLE - Multimedia and Educational Technologies for Teaching and Learning Enhancement, The University of Melbourne.
demonstrates how an inquiry based learning model can be managed for middle school students
• Engineering 1 Collaborative Learning Centre, University of Melbourne. This case study was omitted due to space constraints but is available on request from the editors.

Whilst we have not presented a case study of this school, Canning Vale High School in Perth also shows how spaces and places can be designed to support a flexible learning approach incorporating the idea of neighbourhood clusters. It focuses on social and informal learning and the ‘public’ spaces in the school are powerfully articulated and supportive of collaborative learning.

In terms of the rapid rate of change in information technology and communications (ICT), TAKE 8 authors have focused on how ICT has enabled new forms of learning to take place.

ICTs are an integral part of both education and architecture. In education so-called Smart Boards are appearing in many classrooms but are perhaps less prevalent in flexible learning centres. The advent of broadband, wireless and mobile communications devices—notably the federal government’s ‘free laptop program’—have seen significant innovations emerge in all educational sectors. We have yet to see these innovations become mainstream, but there is significant pressure for this to happen, coming both from students and from the government’s recent National Broadband Network initiative.

Students can increasingly be considered as ‘digital natives’, where they are becoming used to instant internet access, 24/7, anywhere and anytime. Teachers have still to make use of the ubiquitous mobile phone and PDA—although some forays are occurring in nursing and computing courses. They have yet to re-engineer their curriculum for delivery in a blended mode, although once again such approaches are emerging sporadically in schools and significantly in universities with the advent of such learning management systems as Blackboard.

From an architectural perspective ICTs are increasingly critical. It is our contention that all technologies are ‘learning technologies’, and that ICTs should not be separated from built technologies. Indeed furniture, fittings and finishes should all be seen as part of learning technologies. Furthermore, the buildings themselves which house our learning environments are increasingly becoming ‘intelligent buildings’, with building management systems interpreting building performance characteristics and transmitting these through the wireless network to students providing action learning possibilities.

So sustainability takes on a wider meaning—students will understand through their curriculum projects and interacting with their learning environments that the human-technology-nature interface is interactive and relevant. Interestingly it is in Europe—notably the United Kingdom and Scandinavia—where sustainable learning communities and sustainable campuses are on the rise. http://www.yorkshireandhumber.net/esd/ (accessed 13th October, 2009). Indeed that part of the world has stolen the march on school leadership, with the UK government’s National College for School Leadership, NCCL, bringing together architects, educators, local government bureaucrats and others in a lengthy staged program to match their own £45 billion Building Schools for the Future and Primary Capital Program projects over 10 to 15 years. The British Council for School Environments, BCSE, with Ty Goddard as director, has also evolved into a powerful voice for all sectors of the school procurement delivery system, influencing government policy and assisting in developing ‘spatial literacies’ across disciplines.

Another area in which Europe is well ahead of Australia is in the area of outdoor learning. Peter Stewart of DEECD has stressed the importance of informal learning and the outdoors. Yet outdoor learning environments as they should be developed are rarely funded to the degree necessary to make them effective learning and play environments. The editors are keen to increase the focus on outdoor learning environments over coming years—through their Smart Green Schools and Future-Proofing Schools Australian Research Council grant funded projects.
EVALUATING LEARNING ENVIRONMENTS

The editors are keen to bring to the forefront the concepts of evaluation and its connection to spatial literacy. Learning environments can be loosely categorised as formal, including both theory and practice, informal, outdoor and ‘campus life’. Most evaluation, such as it is, has focused on formal ‘theory’ spaces, that is to say, classrooms. Furthermore this focus has been predominantly on the technical performance of learning spaces, rather than the pedagogical performance (Nair 2008, Sanoff 2003, HEFCE, 2006, Tombs, 2002).

A recent conference at the University of Queensland explored this theme but with few pedagogical outcomes or findings http://www.uq.edu.au/nextgenerationlearningspace/UC%20Next%20Generation%20Book.pdf#page=52 (accessed 13th October, 2009). The OECD Centre for Effective Learning Environments (Vonahefeld, 2008) has recently begun a pilot program across five countries, but once again there is not a strong focus on pedagogical outcomes http://www.oecd.org/document/1/0,3343,en_2649_35961311_42759809_1_1_1_1,00.html. The Department of Education and Early Childhood Development in Victoria has prescribed a component of the educational planning role of the seven new schools in the Broadmeadows Regeneration Project that must develop an evaluation tool to test the emerging innovative learning space designs. This has resulted in the development of a Learning Environments Evaluation Tool which focuses on evaluating how well the school designs perform against such targets as Principles of Learning and Teaching, POLT, Victorian Essential Learning Standards, VELS, and other related indicators including personalised learning (Fisher, 2008). It is currently undergoing testing as a model within a university in Australia in which the university academic plan is used as the pedagogical framework to guide the evaluation of the learning spaces on campus. It has also been tested in schools. The model is at the time of publication of this journal being further developed to include the E5 learning competency framework recently launched by DEECD.

Considerable work has been carried out primarily in the United States in their coursework doctoral programs in which up to two dozen students over time have attempted to determine a causal link between educational facility quality and condition with student test scores (Fisher, 2002, Clark, 2004 – see earlier articles by Hes and Cleveland/Woodman). Whilst these studies showed a range of improvements in test scores from two per cent to 14 per cent, the rigour and study methodologies are considered to be questionable, with too many variables unable to be fixed for accurate analysis of the key factors. There are a small number of studies which focus on the assessment of the rapidly emerging collaborative learning environment models now seen in engineering faculties across Australia, but yet again these fall short of a rigorous assessment of spatial, ICT, pedagogical and curriculum performance indicators. These collaborative centres are likely to extend into CDIO concepts (conceive, design, implement and operate—see www.cdio.org) over time to support the graduate attributes that these faculties are pursuing as part of their 21st-century learner model.

The Australian Centre for Teaching and Learning is now recognising that pedagogical and curriculum outcomes are discipline dependent and they are currently in the process of appointing advisors for some 15 different disciplines. This will build on the differentiation in learning environments we already see in Engineering, Medicine, Law, Performing Arts, Architecture, Science and so on. It may also at last see some innovation emerging in the humanities which has retained predominantly 19th-century teaching and learning models to this day. Interestingly, as noted by Geoffrey London, there has been significant work carried out in the health sector identifying the effect of the physical environment on the rate of healing of hospital patients to the extent that patient bed days have been reduced significantly by these research findings. It may be possible to leverage off this work and apply the research and evaluation methods to education.

Some work has been carried out in the UK by CABE (2006) and RIBA (2005) but yet again these tend to focus on the technical performance of educational buildings rather than the pedagogical performance of specific learning environments.

Physical learning environments have remained a largely silent topic in teacher education programs (Fisher, 2003). This is about to change with the proposal for a 25-point Learning Environments unit at Master’s level in Australia and a 30-point Master’s unit at the London Institute of Education.
It is hoped that this unit may also be taken as an elective in the Master's of Architecture, Engineering, Business and Finance programs where these students have an interest in the building of educational facilities especially through the increase in the Public Private Partnership model of procurement of educational facilities.

The advent of collaborative teaching and learning space development particularly at MIT, the University of Queensland and the University of Melbourne, coupled with the Australian Science and Mathematics School, has seen a radically different pedagogical practice emerge.

Some development has occurred in Further Education, FE, although in the theory spaces this has been limited largely to the information commons, for example, the Holmesglen Institute of TAFE. Of course the trades disciplines and hands-on approach in FE does bring a significant variation in the practical side of their pedagogical praxis.

In primary schools the concept of the integrated curriculum and collaborative learning has a long history in mainstream schools, but more particularly in the Reggio Emilia and Montessori approaches to learning.

Secondary schools, particularly in Victoria and in the Australian Science and Mathematics School in Adelaide, have seen some quite radically different learning environments emerge, all of which remain to be evaluated for their effectiveness. Another area in which evaluation is critical and is perhaps more advanced in learning environments is in the special schools sector.

Teaching practitioners have to practice radical constructivism in their praxis and are highly tuned to the impact of the physical environment and how this affects their students in various ways depending on the specific abilities of the students they are working with. Much can be learnt from this sector to inform other sectors in the area of autism, ADHD, hearing and sight difficulties, behavioural difficulties and so on.

21ST-CENTURY LEARNING ENVIRONMENTS— THE WAY FORWARD

We see this issue as the next major development in learning environments—we need to answer the question: do flexible learning environments enhance learning outcomes and, if so, in what ways? Indeed Stephen Heppel has said that learning environments have evolved from cells and bells, to adaptable to flexible. He now believes learning environments need to become agile, to be able to be moulded to the changing needs of pedagogical practice.

To achieve this we need to address the issue of spatial literacy in teacher professional development programs. We also need to address the issue of pedagogical literacy in architectural and procurement team professional development programs.

Spatial literacy can be developed in a range of ways, but we have found that the primary tools include:
- Identifying best/good practice examples
- Visiting them

• Beginning a dialogue with them
• Bringing those teachers to your own institution for collaborative workshops
• Developing a transformative curriculum/pedagogy/sustainability community approach
• Exercises mapping pedagogy and space using the above tools
• Building simple models of these spaces
• Using Second Life or similar emulators/simulators to experiment with these spaces
• Developing on the ground prototypes on your own campus
• Make good use of educational planners
• Take the Master of Learning Environments Unit!

TAKE 8 not only illustrates the innovations that are being carried out in 21st-century Learning Environments, but also what lies behind these evolutions, the complexities, the wins, the losses and the learning that goes on.

We believe that this journal will, in part, document the current state of the art in learning environment development and that this will enable us to move even further on in the spirit of continuous improvement.

Every place is a learning environment. Why should the classroom—a 19th-century model of learning—continue to rule when there are so many better places and spaces to learn in?

Glossary

The glossaries provided are not intended in any way to be comprehensive; rather they are demonstrations of how our discipline specific knowledge becomes almost like a tribal language and risks hampering effective communication. We speak in the language we know without even realising that some words do not carry meaning into other disciplines.

Some Education Terminology

Authentic Learning
allows students to study real-world ideas, problems and issues and to make connections within their learning that are meaningful to them in their present and possible future life circumstances.

Bloom’s Taxonomy (1956)
contains six levels of cognitive activity beginning with simple memorising or duplicating knowledge, then comprehension, application, analysis, synthesis and finally the most complex being, evaluation. Anderson and Krathwohl (2001) revised Bloom’s taxonomy and it is their revision that is most commonly used today. There are also Affective and Psychomotor taxonomies.

Constructivist Pedagogies
posit that there are many ways of constructing meaning and that the role of education is to develop the skills of learning in which students form conceptual understanding through experimentation and collaboration rather than teacher-led instruction.

‘Deep’ versus ‘Surface’ Approaches to Learning
are shortened versions of the terms ‘deep-holistic’ and ‘surface-atomistic’. Deep-holistic learners try to understand the context of a part within a larger structure, whereas a surface learner tends to reproduce a superficial part or segment of a larger context.

Engagement and Retention Rates
there is a federal focus on encouraging students to stay longer at school. Schools are commonly required to report on their retention rates or the number of students staying in school to year 12. Student engagement in learning seems to be correlated to retention.

Feedback Rubrics
are matrices designed to explain grading criteria in a way that links work with outcomes. They have been commonly used in middle school years and are now increasingly used at tertiary level. Given at the start of a project, they help inform how students can achieve quality work and a high mark.

Action Research
involves the researcher taking an active role as a participant implementing change while simultaneously observing the results.

Age-appropriate Learning and Teaching
uses learning techniques and content informed by understanding of child development in terms of cognitive, physical and socio-emotional growth.

Assessment versus Evaluation
Assessment is the feedback and marking given to students whereas evaluation refers to quality assurance processes to determine how well the programs are doing and what needs to improve.

Cognitive, Physical and Socio-emotional Skills
Cognition is the scientific term for the process of thought. In education cognitive skills refer to intellectual and academic skills such as mathematics, language and science. Children also develop physical skills such as dexterity and gross motor skills which help them use their bodies effectively whereas socio-emotional skills involve effective social skills.
**Formative and Summative Assessment**

Refer respectively to assessment that helps inform further work versus assessment at the conclusion of an assessment task.

**Inquiry Learning**

Is one of many terms where learning is driven more by students’ questions than teachers’ lessons. Introduced by education philosopher John Dewey, inquiry-based learning may become increasingly common with easy access to information via the internet.

**Interdisciplinary Curriculum**

Builds links between the traditional subjects of maths, the arts, science, English, histories etc. Problem-based and inquiry learning require students to draw on knowledge from different disciplines to explore concepts and answer questions. Current exit examinations tend to be subject-based rather than interdisciplinary, so most senior schools use subject-based learning.

**Learning Styles**

Are simply various approaches to learning along with an understanding that different students have preferences for particular modes of learning. Howard Gardner’s categories are widely used in schools. David Kolb categorised four types of learning: Accommodating, Converging, Diverging and Assimilating.

**Lifelong Learning**

Has been encouraged through policy by many Western governments as a desirable attribute. Learning is no longer perceived as occurring only in a school or tertiary setting prior to entering the workforce. Formal learning concentrated in the early years is no longer considered enough to sustain an individual throughout their life.

**Metacognition**

Is the ability to know about knowing or the ability to know which learning strategies are best to solve particular problems.

**New Sciences**

Include emerging areas such as nanotechnology, aquaculture, biotechnology, photonics, genomics, polymer science, robotics and communication technologies.

**Norm-Referenced Assessment**

Positions individuals in relation to the rest of a predefined population in contrast with criterion-referenced assessment which marks students against predetermined criteria.

**Pedagogy**

Is the art or profession of teaching based on principles and practice.

**Problem-Based Learning (PBL)**

Is a technique in which students collaborate on challenging and open-ended problems in small groups drawing on their experiences. Teachers take a role as facilitators encouraging students to direct their own learning processes.

**Reflective Practice**

Is effectively a form of action research in that it involves systematic self-improvement based on evidence collected during practice. For teachers, reflective practice means taking whatever coal-face evidence is available to support better teaching technique.

**Scope and Sequence**

Is where the breadth and depth and parameters of learning are outlined.

**Web 2.0**

Sites allow users to interact with others or change content in contrast with other more fixed websites providing passive viewing of information. The term refers to the cumulative changes rather than a new version of the world wide web.
**SOME DESIGN AND CONSTRUCTION TERMINOLOGY**

**As-built drawings**
measured drawings completed after construction, which record the actual built form of the building.

**Assemblies**
the specific way components are put together in wall, roof or floor to meet code requirements for fire or load ratings.

**BCA**
the Building Code of Australia is a detailed set of regulations specific to the Australian Building Industry.

**Building Fabric**
the various construction materials (roof, floor, wall, windows) used in the make-up a building which directly influence energy efficiency and aesthetics.

**Circulation routes**
intentional or unintentional paths used by people when navigating around a site or through a building.

**Composite Materials**
a carefully engineered material formed through the combination of two or more materials that differ in form or composition.

**Displacement ventilation**
used as a way of ventilating spaces and cooling occupants, the fresh air enters a space through inlets in the floor where it rises up directly past the occupant, absorbing heat, before being exhausted out through the ceiling.

**Ecospecifier**
an online knowledge base of products, materials, technologies and resources that assists designers in making informed decisions regarding the environmental performance of a space.

**Egress**
the exit paths for occupants in a building to reach a safe zone.

**ESD**
this acronym has various interpretations including environmentally sustainable development, ecologically sustainable design and education for sustainable development.

**Elevation**
elevation has a couple of meanings in construction. In design and contract drawings, this term refers to a particular form of scaled drawing which depicts the internal or external facades. Elevation can also refer to the height of a location above sea level. For example, a drawing might include elevation numbers for FFL (finished floor level) and for FCL (finished ceiling level).

**Fenestration**
the arrangement of windows in a building.

**FFE**
furniture, fittings and equipment.

**Flexibilty**
a problematic term meaning many things from ‘ease of reconfiguration’, to ‘suitable for various different purposes’.

**Footprint**
the gross first-floor or ground-floor area of a building.

**Geotechnical Report**
the soil where a building will be constructed is tested and recommendations are given that help designing the type of footings required.

**Green Buildings**
this loose term refers to buildings which have reduced impacts on the environment and healthier conditions for occupants. Green Buildings are characterised as being resource-efficient in terms of construction, operation, maintenance, occupation and demolition. Similar terms might include ‘sustainable design’, ESD design or ecological design.

**HVAC**
this is used in construction to refer to the Heating, Ventilating and Air Conditioning of a building.
IAQ AND IEQ
indoor Air Quality is a measure of the air quality, whereas Indoor Environmental Quality is a broader measure of light, heat, acoustics and general comfort levels.

MOCK-UP
a model or sample to represent what pieces of the project will ultimately look like.

ORIENTATION
refers to the way a building is positioned in relation to site features, the sun or the compass points.

PASSIVE DESIGN
an approach to design that uses natural systems, such as the sun, to heat, cool and ventilate buildings.

PERMIT DRAWINGS
drawings that are developed for lodgement with relevant authorities to gain a permit to build or renovate. Planning permit drawings and building permit drawings are the most common.

RQF
is a request by the builder for further information to resolve a specific issue during building phase.

REFLECTED CEILING PLAN
a scaled drawing that is the mirror image of the ceiling which identifies the layout of various ceiling features such as: ceiling panels, lighting, HVAC diffusers and fire sprinklers.

ROW
right of Ways are easements shown on title documents which are legally binding commitment to allow, generally, a utility (water, gas, sewer, electric, telephone) to run over or under your property.

SHOP DRAWINGS
contractors and subcontractors will give the design team drawings to show how they will comply with the intent of the construction drawings.

SWM
storm Water Management is how the rainwater will be dealt with to avoid flooding or damage to the building.

THERMAL CHIMNEY
this uses the energy from the sun to improve the natural ventilation of a building. Also referred to as a solar chimney, the air trapped inside a north-facing shaft is heated, forcing the air to naturally rise which encourages fresh, cool air to enter the space through a low positioned window.

THERMAL MASS
the ability of a material to absorb heat and store it. High-density materials such as brick, concrete and stone effectively absorb heat transferred by direct sunlight and then release that energy when the surrounding environment starts to cool down.

U-VALUES AND R-VALUES
u-values are the amount of heat transferred through a material (conduction). The lower the U-value, the slower the rate of heat flow and the better the insulating quality. R-values are the resistance of heat transfer—the higher the value the better insulation or resistance.

VALUE ENGINEERING
the design team with the contractors or sub-contractors present will discuss alternate construction, materials, assemblies and approaches in an effort to either reduce the project costs, provide shorter construction schedules, ensure better construction schedules and better performance for the same price or some combination of the above.

VOCs
volatile organic compounds or VOCs are undesirable for health and are emitted from a range of materials including acrylic carpets, paints, cleaning products, medium-density fibreboards, and adhesives.
CONTRIBUTORS

JULIA ATKIN
Julia is an independent education and learning consultant who has worked with educators in Australia and internationally. She focuses on the skills required for learning, so that they may be transferred to a variety of environments. Julia assisted staff, students and parents with the changes they were involved with as Dandenong High School was redeveloped.

MAX CHESTER
The office of Chester + Chester Pty Ltd, Architects, has developed a practice specialising in education. The practice is spread across the three educational authorities within Victoria, and in other states. In recent years, Max has undertaken extensive work in education for the Muslim community. Max was appointed a member of the Order of Australia in 2000 for his services to the community, local government and architecture.

BEN CLEVELAND
Ben is a PhD candidate in the Faculty of Architecture Building and Planning, University of Melbourne. His academic background is in education and science. He is an experienced primary and secondary school teacher. Ben’s research focus is on the design and use of learning environments which can support contemporary educational philosophies and pedagogies. He has a particular interest in supporting processes of educational innovation.

MARTIN CULKIN
A principal for 20 years, Martin has spent the past 10 years at Dandenong High School. He is interested in the link between curriculum and physical spaces and the link between physical comfort and learning outcomes. He enjoys working in a large school with its enormous ethnic diversity.

JENNIFER CALZINI
Jennifer is an architect with extensive local and international experience in the private sector and currently has a key role in the Office of the Victorian Government Architect, Department of Premier and Cabinet, as an advisor to government and an advocate for the public benefits of excellence in architecture and urban design.

MARY FEATHERSTON
Mary is a design consultant specialising in design of learning environments. The focus of her research and design practice is the relationship between contemporary pedagogy and design of the physical environment. Mary is a consultant to universities, schools, early childhood services, education departments and architects.

TY GODDARD,
Chief Executive, British Council for School Environments
Ty has responsibility for leading the British Council for School Environments; setting the long-term vision and for the development and implementation of strategy. Ty has acted as an advisor to the DfES on Extended Schools and co-location of services. Previously Ty worked as Managing Director of School Works, an organisation aiming to build better schools through consultation and participation uniting the best in the building industry with the best in education.

DOMINIQUE HES
Dominique has a mixture of science, engineering and architecture degrees. She brings a multidisciplinary approach to thinking about sustainability within broad systems. She has written several sustainability guides for the federal government. Within schools Dominique has a strong belief that buildings can teach students their sustainability secrets and thus connect the learners with their environments.
**PETER JAMIESON**  
Peter is an academic and leads the design of new generation learning environments at the University of Melbourne. He is an educator with experience in the secondary and TAFE sectors and has worked in educational development at RMIT University, Monash University and the University of Queensland.

**RICHARD LEONARD**  
Richard has more than 25 years of architectural experience in Australia and the UK. He is in charge of education and institutional projects, and is a strong advocate for the collaborative design process to integrate modern education philosophies into school facilities. Richard presides over the Victorian Chapter of the Council of Education Facilities Planners International.

**GEOFFREY LONDON,**  
**Victorian Government Architect**  
Geoffrey is the Victorian Government Architect and Professor of Architecture at The University of Western Australia. Past roles include inaugural Government Architect in Western Australia, Dean and Head of School at UWA, President of the Australian Institute of Architects (WA Chapter) and Professorial Fellow at The University of Melbourne. He has consulted on numerous architectural and urban projects and chaired many architectural design award and competition juries.

**STAN SALAGARAS**  
Stan's diverse career has spanned government, private sector, academic and community organisations. Initially, he worked as a teacher, educational administrator and researcher and completed a doctoral thesis on learning programs for intellectually handicapped children. Later, he had senior level experiences in human resource management, strategic corporate planning, educational and multicultural policy development, and growing small businesses. Currently, Stan has responsibility for delivering a range of care, education and community services in Delfin master planned communities.

**PETER STEWART**  
Peter has more than 30 years experience in the construction and education sectors. Currently, he has responsibility for the Department of Education and Early Childhood Development capital works programs include rolling out the Building Education Revolution ($2.4B), new schools, modernisations and regeneration projects; emergency services; provision planning and property management.

**LYNNE SUTTON**  
Coming from an education background, Lynne is now Manager of Leading Practice and Design at the Department of Education and Early Childhood Development. Lynne was a key person in the Leading Schools Fund, a school transformation and renewal initiative of the department, and is currently developing a support program for teachers focussed on school and teaching transformation and the effective use of new learning spaces.

**SUE WILKS**  
Susan, a teacher educator and writer of education curriculum documents and texts, is a Senior Researcher on the Smart Green Schools ARC Linkage, the University of Melbourne (2008–2010).

**KEN WOODMAN**  
Architecturally educated in the UK and USA, Ken has worked in the UK, South Africa, Canada, the USA and Australia before creating his own practice in Beechworth, Victoria in 2006. His first school building was designed in 1988 in the UK. Following migration to Australia in 1995, Ken designed primary, secondary and tertiary buildings in Victoria and New South Wales. Ken was awarded a PhD scholarship with Smart Green Schools, ARC Linkage at the University of Melbourne in 2008.
This issue is the eighth in the Australian Institute of Architects journal series, TAKE, which celebrates a new direction for the longstanding Australian Institute of Architects Sisalation Prize. Managed by the Australian Institute of Architects and sponsored by Fletcher Insulation, this prize has been awarded annually since 1956. This is an outstanding achievement, marking a long, distinguished commitment from Fletcher Insulation to the development of the architecture profession. Over the years, the prize has taken different formats: a travel scholarship, a commission to an author to write a book and, since 2001, two separate prizes to an editor and associate contributors of the Institute’s architectural journal series, TAKE.

While retaining its objective to develop and apply architectural knowledge in Australia, a review of the Australian Institute of Architects Sisalation Prize in 2001 resulted in its restructure into a journal format to attract the best applicants and result in more accessible outcomes for members of the profession. The editor, as prize winner, draws together a team of associate contributors to produce a journal volume featuring an edited collection of papers. The theme of each issue bridges academic and practice issues in architecture. The Australian Institute of Architects Sisalation Prize is awarded annually and seeks to further the development of architecture through both the annual publication of the guest edited journal, TAKE, and an annual symposium event addressing key issues of the journal publication.

The Australian Institute of Architects Sisalation Prize is guided by a Steering Committee including practitioners, academics and a representative of the sponsor, Fletcher Insulation. The Steering Committee is responsible for the overall management of the prize including selection of the major prize winner, selection of the journal theme, guidance to the editor and copy editing. The Australian Institute of Architects National Prizes & Awards Unit provides management support for the prize, including the journal publication, and the Australian Institute of Architects Chapter Manager in the state/territory in which the event is held manages the annual symposium. The symposium launching this eighth issue was held in Melbourne, Australia in October 2009.

STEERING COMMITTEE MEMBERS
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All enquiries about the Australian Institute of Architects Sisalation Prize should be directed to:

NATIONAL PRIZES & AWARDS MANAGER
Australian Institute of Architects
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Telephone: 02 6121 2000
Facsimile: 02 6121 2001
Email: prizes@raia.com.au
Previous Publications Available from The Australian Institute of Architects

Women Architects in Australia 1900 – 1950
by Dr Julie Willis & Dr Bronwyn Hanna; $49.50 (GST inc), Postage/Handling $9.50.

Acclimatisation (Architecture at the Top End of Australia)
by David Bridgman; $38.50 (GST inc), Postage/Handling $5.50.

TAKE 1 – Urban Solutions: Propositions for the future Australian city
Editor: Robert McGauran; Contributors: Nigel Bertram, Peter Bowtell, Peter Corrigan, Keith Cottier, Giles de Mont-Marin, Eli Giannini, Helen Gibson, Graham Jahn, Chris Johnson, Michael Keniger, Geoffrey London; $36.30 (GST inc), Postage/Handling $9.90.

TAKE 2 – Housing Design in Indigenous Australia
Editor: Associate Professor Paul Memmott; Contributors: Geoff Barker, Jane Dillon & Mark Savage, Shaneen Fantin, Carroll Go-Sam, Su Groom, Paul Haar, Colin James, Catherine Keys, Phillip Kirke, Paul Pholeros, Simon Scally, Julian & Barbara Wigley; $36.30 (GST inc), Postage/Handling $9.90.

TAKE 3 – The Double Dimension: Heritage and Innovation
Editor: Jennifer Hill; Contributors: Susan Macdonald, Wessel de Jonge, Jennifer Hill, Phillip Goad, Neville Quarry, Alec Tzannes, Howard Tanner, Lindsay Clare, Andrew Andersons, Mariolina Toiniolo, Elizabeth Farrelly, Graham Jahn; $39.60 (GST inc), Postage/Handling $11.00.

TAKE 4 – Collaboration & Coalition: Creating Architectural Knowledge in Contemporary Practice
Editors: Louise Wallis, Paula Whitman & Susan Savage, Contributors: Paula Whitman, Louise Wallis, Philip Crowther, Susan Savage, Catriona McLeod; $33.00 (GST inc), Postage/Handling $11.00.

TAKE 5 – Looking Ahead: Defining the terms of a sustainable architectural profession
Editors: Paolo Tombesi, Blair Gardiner & Tony Mussem; Contributors: Arthur Apter, Michael Benedikt, Nick Blishan, Brian Boyd, Margaret Bozik, Mark Bumy, Fred Chaney, Murray Coleman, Tim Cilvahouse, John Denton, Timothy Derham, Marcus Fakhry, John Frazer, Kristian Fok, Jonathan Gardiner, Will Hughes, Michael Jansen, Rachel Kelloway, Helen Lingard, Geoffrey London, Peter McDonald, Peter Mould, Patrick Ness, Shelley Penn, Wayne Petrie, Fiona Poon, Peter Poulet, Grant Rowlands, Paul Steinfort, John Sutton, Jeromy Temple, Joe Woolf, Paolo Tombesi, Blair Gardiner, Tony Mussem; $44.00 (GST inc), Postage/Handling $11.00.

TAKE 6 – Beyond Beige: Improving architecture for older people and people with disabilities
Editors: Beverley Garlick, Diane Jones & Guy Luscombe, Contributors: Catherine Bridge, Linda Corkery, Leo Campbell, Debra Dean, Flower and Samios Architects, Beverley Garlick, Mark Hanson, Alison Hill, Colin James, Diane Jones, Desley Luscombe, Guy Luscombe, Robert Morris-Nunn, Shane Murray, Jan Pascal, Personeni Rafeale Schärer Architects, Ann Quinlan, Ben Roche, Samantha Ross, Harry Sprinz, Barbara Squires, Toyo Itò & Associates, Architects, wardcarter art + architecture. $44.00 (GST inc), Postage/Handling $11.00.

TAKE 7 – Housing Australia: How Architects can make a difference


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Potts Point NSW 2011
Ph: 02 9356 2022
Fax: 02 9368 1570
sydney@architext.com.au
<table>
<thead>
<tr>
<th>Year</th>
<th>Winner</th>
<th>Topics of Research</th>
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<tr>
<td>1956</td>
<td>Roderick Macdonald</td>
<td>Architectural Office Practice in the USA</td>
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<tr>
<td>1957</td>
<td>Leslie Perrott Jnr</td>
<td>The Changing Status of the Role of the Architect</td>
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<td>1958</td>
<td>Sidney Smith</td>
<td>The Preplanning of Building Contracts</td>
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<td>1959</td>
<td>John Davidson</td>
<td>The Awarding and Administration of Building Contracts</td>
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<tr>
<td>1960</td>
<td>Barry Patten</td>
<td>Scope and Methods of City Planning in the USA</td>
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<td>1961</td>
<td>James Birrell</td>
<td>The Co-ordination of Designers – an Aspect of Master Planning and the Architect</td>
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<td>1962</td>
<td>Phillip Jackson</td>
<td>A report on Industrialised or “System” Building</td>
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<td>1963</td>
<td>Stephen Trotter</td>
<td>Cities in the Sun</td>
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<td>1964</td>
<td>Neil Everist</td>
<td>Management in the Building Industry</td>
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<td>1965</td>
<td>Ross Chisholm</td>
<td>A report on Contractual procedure</td>
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<td>1966</td>
<td>Kevin Rice</td>
<td>Communication – The Architect/Client Situation</td>
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<td>1967</td>
<td>Kenneth Woolley</td>
<td>Provision of Buildings by Arrangements other than the Traditional One</td>
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<td>1968</td>
<td>Geoffrey Butterworth</td>
<td>Architect Manufacturer Communication</td>
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<td>1969</td>
<td>James Learmonth</td>
<td>The Use of the Computer in Planning for Tertiary Education Institutions</td>
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<td>1970</td>
<td>Donald Wyllie</td>
<td>Surveys of the Ways in which Architectural Practice is organised in Different National and Economic Contexts</td>
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<td>1971</td>
<td>Phillip Cox</td>
<td>Management Processes of Small to Medium Size Architectural practices</td>
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<td>1972</td>
<td>Keith Cottier</td>
<td>Documentation Methods in Australia, Europe and USA</td>
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<td>1973</td>
<td>Colin Still</td>
<td>Prefabrication Related to Industrial Constructions</td>
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<td>1974</td>
<td>John Cooke</td>
<td>Integrated Contracts</td>
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<td>1975</td>
<td>John Moran</td>
<td>The Approach and Development relating to the Use of the “Fast Track” process in the Construction Industry Overseas</td>
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<td>1976</td>
<td>Robert Cowdroy</td>
<td>Project Management as an Extension of the Architects Roles</td>
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<td>1977</td>
<td>Graeme Law</td>
<td>Natural Energy in Building</td>
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<td>1978</td>
<td>Gareth Cole</td>
<td>Film on Solar Energy</td>
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<td>1979</td>
<td>Noel Robinson</td>
<td>Marketing Architectural Services</td>
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<td>1980</td>
<td>Constandine Pikoulas</td>
<td>The Architect’s Changing Role/Developing New Skills</td>
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<td>1982</td>
<td>Bryan Miller</td>
<td>Building Disputers</td>
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<td>1983</td>
<td>Richard Allom</td>
<td>Conservation of the Historic Built Environment with particular emphasis on the relationships between community expectations, Government Legislation and professional Responses</td>
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<td>YEAR</td>
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<td>1984</td>
<td>Graham Whitely</td>
<td>An insight into Overseas Commissions</td>
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<td>1985</td>
<td>Howard Tanner</td>
<td>Appropriate new Architecture for Established Cities – Guidelines for urban surgery – North America and Europe</td>
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<td>1986</td>
<td>Robert Caulfield</td>
<td>The Pathology of Buildings</td>
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<td>1987</td>
<td>David Oppenheimer</td>
<td>Small Solar Buildings in Cold Northern Climates</td>
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<td>1989</td>
<td>David Brown</td>
<td>Medium Density Housing</td>
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<td>1990</td>
<td>Charles Nelson</td>
<td>Risk Management</td>
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<td>1991</td>
<td>Gregory Burgess</td>
<td>Community Architecture</td>
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<td>Andrew Metcalf</td>
<td>Thinking Architecture</td>
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<td>1993</td>
<td>David Week</td>
<td>Better Office Design</td>
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<td>1994</td>
<td>Deo Prasad</td>
<td>Energy Efficiency in Commercial Buildings</td>
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<td>1995</td>
<td>Julie Willis</td>
<td>Women Architects in Australia 1900-1950</td>
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<td>1997</td>
<td>Philip Goad</td>
<td>Australia – Asia: A 20th Century Architectural Liaison</td>
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<td>1998</td>
<td>Michael Rayner</td>
<td>Integrating Art and Architecture</td>
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<td>1999</td>
<td>David Bridgman</td>
<td>A Critical Investigation into Regional Architecture in the Northern Territory Tropics</td>
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<td>2002</td>
<td>Paul Memmott</td>
<td>Housing Design in Indigenous Australia</td>
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<td>2003</td>
<td>Jennifer Hill</td>
<td>Development of a sustainable philosophy for heritage conservation</td>
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<td>2004</td>
<td>Susan Savage</td>
<td>Coalitions and collaborations: creating architectural knowledge in contemporary practice</td>
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<td>2005</td>
<td>Blair Gardiner</td>
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<td>Anthony Mussen</td>
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<td>Diane Jones</td>
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<td>2007</td>
<td>Geoffrey London</td>
<td>Housing Australia: How architects can make a difference</td>
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<td></td>
<td>Simon Anderson</td>
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<td>2008</td>
<td>Clare Newton</td>
<td>The transformation of educational spaces for the 21st century.</td>
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<td>Kenn Fisher</td>
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This volume of TAKE has been written and published with the support of the Australian Institute of Architects Sisalation® Prize, sponsored by Sisalation® and coordinated through Australian Institute of Architects.

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The prestigious Australian Institute of Architects Sisalation® Prize, with its outstanding list of past winners, shares many of these same values and attributes. Offered annually since 1956, the Prize has actively promoted the development and application of architectural knowledge in Australia and has provided opportunities for practitioners and academics to reflect and write on the practice of architecture and the building industry and advance the boundaries of knowledge for the profession.

Sisalation® is proud to continue its association with the Australian Institute of Architects through this the eighth TAKE publication—TAKE 8.
Author/s:
Atkin, J; Chester, M; Cleveland, B; Culkin, M; Calzini, J; Davies, M; Featherston, M; Goddard, T; Hes, D; Jamieson, P; Leonard, R; London, G; Salagaras, S; Stewart, P; Sutton, L; Wilks, S; Woodman, K

Title:
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