

What do we know about the relationship between the learning process and the design and form of the physical environment in which it typically takes place? Not enough, says **Andrew Tidswell**. An Adelaide conference will attempt to expand a skimpy body of knowledge

# knowledge gap in school building design

**WE MAKE CONSCIOUS CHOICES** about some of the physical environments we inhabit, particularly our homes, but most other places are imposed on us. In places where we spend considerable amounts of time such as work places, (especially office environments), usually we make some attempt to personalise them either by the arrangement of furniture and more particularly by the introduction of items such as potted plants, photos and memorabilia, depending on the rules that apply.

In schools the opportunity for the occupants to have personal input into their physical environment varies. In early years from pre-school through to the middle primary years, where students stay in the one room for most activities, the environment is usually full of their own handiwork, plastered on walls and windows and hanging from the ceiling. Teachers of these year levels are able to create the most amazing environments; not only are they personalised to the students but they include a wide variety of types of space from a library and reading corner to a 'Wendy house' and computer annexe. This isn't too difficult to create given that 24 small children only take up a few square metres when huddled together on a mat for a story.

In later years as students become more mobile, spending each lesson in a different room, it becomes impossible to apply the same level of personalisation to the learning environments, although some examples have been tried where the student retains a 'home base' workstation for a number of years. Usually the only concessions available to high school students are to personalise their diaries, sometimes school bags (at least in government schools) and locker doors. The current design of desks doesn't even allow the carving of one's name into the top anymore, though some still try. Classrooms, laboratories and workshops are generally bland, generic environments decorated by notices and posters provided by the teachers. Art rooms may be the exception, with displays of student work common.

What is the relationship of people with their physical environment, and how much does it matter? And how much does it matter in a learning environment?

Some people believe it matters a lot, such as those who promote Montessori, Steiner and Reggio Emilia education. Almost from the beginning of universal education, educationists promoted the view that learning was somehow influenced by the school buildings. In Australia, it was a significant influence on the design of schools as far back as the late 1800s, as researched by Mike Dillon from SA School Inspectors' reports published in the SA Education Gazette.

"Inspectors considered two broad themes. The first related to hygiene conditions ... and the second to the 'aesthetic' conditions of the classroom and the school grounds. The need to improve lighting and the importance of ventilation in schools were frequently reported by Inspectors as significant in improving acquisition of knowledge. There are frequent assertions throughout the Education Gazettes of 1900 to 1920 that the educative part of the aesthetic environment plays a significant role in child development," Dillon says.

In 1906, Inspector Whillas noted 'pot plants in the windows and flowers on the mantel make the school beautiful.' It was also mentioned that by 1900 there were distinctive styles of architecture for public buildings such as prisons and schools. (Some have observed that these two building types appear to have changed little in the more than 100 years since).

There seems to have been limited research done on the relationship between school buildings and the learning that happens in them. What has been researched, especially in the United States, is the impact of particular aspects of school building design on student achievement as measured

by test scores, much of it many years ago. Significant relationships are difficult to demonstrate statistically as there are so many variables in schools, not least being the quality of the individual teacher. Glen Earthman and Linda Lemaster in a 1997 'PEB Exchange' publication (of the OECD Program on Education Buildings) reviewed research studies done in the 1970s and 1980s in the US on the impact of school buildings on student achievement and behaviour. Of the several hundred studies reviewed, the only general conclusions were:

- Good lighting quality was found to be positively related to student achievement and performance
- There is a correlation between colour in the environment and achievement
- High noise levels have an adverse effect on learning
- Students in schools which were well maintained had better attitudes and fewer behaviours requiring disciplinary action

The most important factors that influence learning seemed to be those that relate to control of the thermal environment, proper illumination, adequate space, quality of furnishings and maintenance.

Other recent studies in the US still seem to focus on how small improvements in test scores can be achieved by small improvements in, for instance the physical condition of the buildings or the lighting levels. Some people, myself included, find this a far too restrictive consideration of physical environments. Winston Churchill has often been quoted as saying "we shape our buildings and afterwards they shape us".

Schools are more than mere containers for learning to occur in. Montessori, Waldorf and Reggio Emilia schools are examples of where an education that has a very strong pedagogical focus also recognises the relationship between learning and the physical environments in which the process takes place as particularly important.

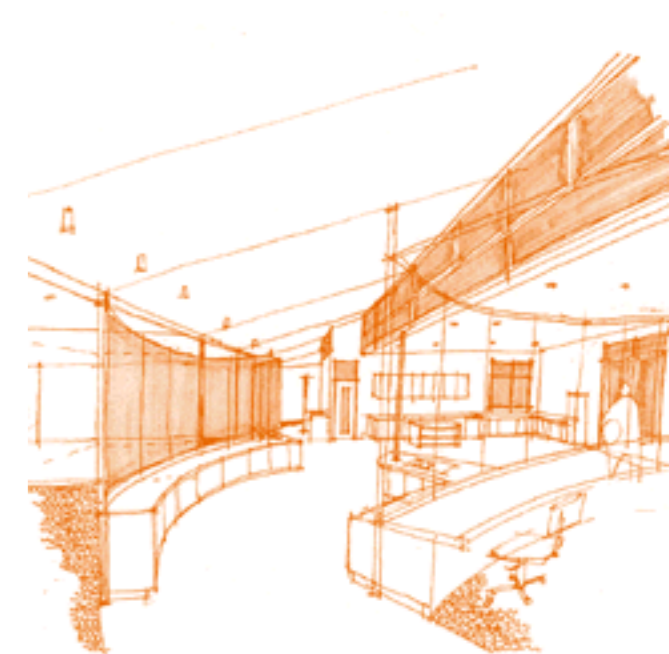
Space sizes and shapes, colour, lighting, materials, acoustics, smell, views, the micro-climate, relationship to the natural environment and furniture all have their own language and send obvious and subtle messages to occupants about what is important and what behaviours are expected by those who have paid for, designed and are in charge of the spaces.

Unfortunately, in many contemporary buildings there is little connection between form and function. Is it any wonder we have a sense of 'placelessness'. Prakash Nair (international school planning consultant and frequent visitor to Adelaide) has said "school buildings have been and continue to be places to warehouse children. New schools just do it in more comfortable surroundings".

Those responsible for the briefing, planning and design of schools should be held accountable for not only whether they meet the budget, that the air-conditioning works properly and that the areas meet the standard requirements, but also for the quality of student learning, social skills and emotional well-being that result from their decisions.

Where is the research into such qualitative relationships? Thin on the ground. Is this because the quantitative things (adequate lighting levels, good acoustics and test scores) are easier to measure and compare or is it that the qualitative things are not seen as all that important?

Past facilities reflected past social structures where formality, regimentation and a linear path of transmitting knowledge from teacher to student was the accepted norm. Education



Braeview Primary School which adopts the Reggio Emilia principles for the learning environment

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is no longer about filling children's heads with stuff; it is about motivating them to learn and providing opportunities and environments in which this can best occur. An effective school environment has to be a different sort of place now for it to nurture the spirit, curiosity and motivation of the learner.

The Australian Science and Mathematics School (on the Flinders University campus) was designed to create spaces for senior secondary student learning that were more like office environments to match a pedagogy that gave the students more autonomy and flexibility over their time and study. Results so far indicate that students generally are thriving in this environment.

Braeview Primary School had an old open-space building retrofitted (after it was gutted by fire) following Reggio Emilia principles and early indications are that this has seen excellent results. Similarly with the new Early Learning Centre at St Andrews at Walkerville which was designed to allow Reggio Emilia learning. The Willunga and Mt Barker Waldorf schools have developed their unique facilities and grounds over a long period of time and provide the most delightful and interactive environments for engaging

students in the learning process. The design of school buildings may very well be more important than we have really appreciated. The SA School inspectors of more than 100 years ago had some understanding of the importance of the physical environment on the learning outcomes. Montessori, Steiner and Reggio Emilia education put great store in appropriate physical environments for their special forms of learning.

Where is the research into the relationships between the physical learning environments and the breadth of intellectual, social and emotional learning that they can have an influence in developing?

Where is the teacher education which provides an understanding of how the physical environment can be a help or a hindrance in delivering the learning programs?

Where is the architectural education which provides an understanding of the complexity of our relationships with the physical environment?

Prakash Nair challenged educators to challenge architects: "Give architects a meaningful framework to play with and not let them just be playful with shapes".

Such issues will be explored at the forthcoming Australasia Region CEPFI Conference to be held in Adelaide from May

7 to 9. CEPFI (The Council of Educational Facilities Planners International) is an international organization that brings together architects and educators to explore appropriate learning environments and facilities. The Regional Conference is in Adelaide for the first time and provides an opportunity for architects and educators to meet, listen to provocative keynote speakers like Greg Mackie, Dr Barry McGaw, Dr Julia Atkin and Adrian Welke, participate in discussion and workshop sessions, and visit a range of innovative government and independent school sites.

The discussion topics include:

- Early learning centres
- Renewing existing buildings
- New models for science and ICT
- Developing education communities
- Steiner and Reggio Emilia models
- Ecologically sustainable development
- Public Private Partnerships

Further information and registration is available from the conference website [www.apapdc.edu.au](http://www.apapdc.edu.au)

**Andrew Tidswell** is an architect and Manager Strategic Asset Policy and Projects in the Department of Education and Children's Services (DECS)



The Australian Science and Mathematics School on the Flinders University campus (above) and the Braeview Primary School

## Learning philosophies that make the environmental connection

**SCHOOLS WHERE EDUCATION** has a very strong pedagogical focus and which believe the relationship between learning and the physical environments in which the process takes place is crucial include:

### Montessori

The Montessori philosophy sees the teacher as putting children in touch with the environment, and helping them make intelligent choices and carry out exploration of the world in which they live, as distinct from the traditional model of information passing from teacher to student. It is seen that the role of the adult is to link the child with the environment so that they can find answers for themselves. This is intended to foster a love of lifetime learning.

In Montessori education it is important that the facilities reflect the activity that takes place – a place for quiet reading should have a different character (perhaps cave-like) than that for art or physical activity. Also as children grow and develop so they require different environments to meet their needs.

### Waldorf

Waldorf education was developed by Rudolf Steiner some 100 years ago to nurture and develop the physical, emotional, intellectual, aesthetic, moral and spiritual capabilities of children, rather than just to fill their heads with information. Entering a Waldorf school is like passing through Alice's

looking glass into an educational wonderland. In the Steiner approach to education the school is not merely a place where children go to class, but a holistic institution where teacher and student interact as part of a process in which the child learns about the world. Steiner envisaged the education process as a journey which children take with their teachers. The school provides an environment in which the journey is marked by spaces and places that parallel the spiritual, mental, social and physical growth of the child.

In a Steiner school the kindergarten is a soft shelter, and round in form. Progressing through the years the classroom

Waldorf School, Port Willunga



shape becomes more angular and elongated, to symbolise the increasing individualisation of the students and with it the changing relationship of the teacher to (from) the group.

### Reggio Emilia

This is a philosophy and practice of care and education for children developed in the city of Reggio Emilia in Italy after World War II as a cooperative exercise to educate children in a democratic environment. Central to the philosophy is the belief that all children are rich, powerful and strong, capable of acquiring knowledge and skills from a very early age. The aim of Reggio Emilia teaching is to provide conditions which facilitate learning.

It is important for spaces to be designed with infinite care to stimulate, to teach and reflect the activity being undertaken. Spaces need to provide support for children's social, emotional and intellectual development and to entice their imagination. Reggio Emilia education refers to the physical environment as the third teacher. As such, spaces should be designed and equipped to encourage exploration, to surprise and to support collaboration amongst and between adults and children.

Loris Malaguzzi, regarded as the founder of Reggio Emilia said "children have a hundred languages, but ninety-nine of them are taken from them" – and much of that happens in traditional schools.

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