

Chapter 3: Transforming spaces for learning

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In the context of educational spaces, the word “transforming” implies that these can have a transforming effect on learning, but it can also mean making a thorough or dramatic change in the form, appearance, or character of something. Given that form follows function, intent “to make a thorough or dramatic change in form” suggests that there is a need for a radical change in the function of learning spaces.

Educational rationale for transforming spaces for learning

The clarity of the educational rationale for the function of learning environments and spaces is paramount if one is to both navigate through the complexity of transformation as well as make considered judgments on the merit of the emerging designs in terms of their potential to have a transforming effect on learning.

The design of education and the environments to support 21st century learning must be driven by a response to the 21st century context, clarity of educative purpose and contemporary pedagogy (the art and science of helping young people to learn).

The nature of the 21st century world, characterised by globalisation, post-industrialisation and unpredictable economic and social events, determines that a key aspect of our educative purpose must be to prepare young people for uncertainty and changes that are yet to come, and to prepare young people for a society that is in a state of rapid transformation. 21st century education is thus increasingly driven by a desire to develop young people’s ability to be more adaptable, creative, collaborative, responsive, self directed and capable of being self managing in networks and less hierarchical settings and communities than their parents or teachers were at the same age.

These attributes and competencies are not developed by transmission of information. We do not learn to be collaborative or self-directed and self-managing by learning about being collaborative, by learning about being self-directed. We learn these skills rather through participatory, experiential learning: learning as an “apprentice”

collaborator and self-manager, guided by a “master learner”, the teacher, in settings that inspire creativity, active investigation and self expression, *i.e.* settings that are the antithesis of the standard industrial era classroom.

In parallel to the societal changes that have accompanied globalisation and the transition to the knowledge era, the last 20 to 30 years have seen an explosion in our understanding of learning and the development of refined pedagogical practices due to several factors. These range from a maturing of learning theory and educational psychology (Skunk, 2011), insights derived from neuroscience (OECD, 2007) and a societal drive not simply to give access to education for all but a drive to educate all members of society effectively. These developments, simply stated, have led us back to timeless principles of effective learning (Atkin, 1994; 1996). At its most powerful, learning is:

- **intrinsically motivated and lifelong:** learner driven learning is transformative and generative;
- **personal:** making personal meaning and building personal capacity in a safe, supportive but challenging environment;
- **relational:** gaining support and inspiration from learning in relation to others, deriving a sense of challenge and expectation from significant others;
- **holistic and experiential:** the whole person learns through participating in authentic, purposeful, experiential activities;
- **complex and non-linear:** holistic growth through active engagement and integration rather than simply accretion or accumulation of layers.

The clarity and simplicity of these five fundamental principles of effective learning, combined with 21st century needs, have significant ramifications for educational design and learning space design. Before looking at these ramifications in detail, it is helpful to envision the possibilities for 21st century education by comparing pre-industrial, industrial and post-industrial eras and to note the

Table 1. Changing contexts for education and learning

| LEARNING | Pre-industrial | Industrial | Post-industrial knowledge era |
|----------------------|--|---|--|
| Style | Informal, personal | Formal, impersonal | Informal, formal AND personal |
| Place in community | Family, local community | School separate from community | Re-integration with community, integral part of community. |
| Location | Around the village pump | Confined, separate | Local- beyond local- global- virtual |
| Time | Anytime | Set times, set ages | Anytime throughout life |
| Form | Nature, environment, "apprenticeship", with people cross section of ages, in community | Mass production, uniform experience based on age bands, detached from community | Personalised in nature, learning in "apprenticeship", in community, single age and cross age |
| Source and resources | Experience, elders, life, people, family, community | Books, experts, teacher "who knows", 1:many | Anytime, anywhere, anyhow with anyone – both experts and fellow travellers |
| Context | Learning <i>through</i> life | Learning <i>about</i> life | Learning through AND about life through real life and virtual life |

different forms education and learning have taken across these eras (Table 1).

Traditional industrial era education focused on ensuring that all young people develop fundamental competencies and knowledge that enabled them to take their place as adults who could participate and contribute to society as it was then. Given the requirements of work in the industrial era and the nature of society, education at that time emphasised uniformity and conformity. The teacher was considered to be the "knower" and the teacher's role was to transmit information to students. Thus, education in the industrial era emphasised the same experience for all in a given age group, at the same time, in the same place. The result was that there was a time and a place for learning and this was at school; school was detached from the community and the classroom was detached both visually and physically from its external environment; hence the standard industrial era classroom design and the transmission model of teaching.

A skim down the third column of Table 1 indicates that the post-industrial era presents the possibility of enhancing learning through information and communication technologies that give instant access to an extraordinary wealth of information while also transcending boundaries of time, geography and culture. However, even more striking is the fact that the post-industrial era both demands and makes it possible to emphasise the personalisation of learning and to nurture the capabilities of the individual within the community. There is a confluence between the principles of effective learning and the nature of learning required to survive and thrive in the complexity of the 21st century world. This shift in emphasis for learning in the 21st century involves more than building "a faster caterpillar". It requires a transformation that demands careful and thoughtful re-design of all aspects of a school: leadership, pedagogy, learning spaces, organisational structures and the place of a school in communities.

Responding to the challenge of transformation

Integrating the five fundamental principles of effective learning with the emerging form of education for the 21st century leads to a set of guiding criteria for design:

Communities within community

Self-sameness at every scale. Develop groupings of learners and teachers in which each person is known, feels safe, has a sense of belonging and is prepared to help others learn. This means learning communities of students and learners within a house or sub-school, nested within a school community that in turn is nested within the wider community. It means ensuring that the school has a strong presence in the wider community both in terms of physical placement and structure as well as connections with the community.

Cross-sector collaboration, co-ordination and integration

Maximise integration and shared use of educational, wider community and recreational services and facilities through co-location and collaborative approaches to management and shared use agreements.

Innovative learning environments

Embrace pedagogical approaches and create innovative, contemporary learning environments that:

- i Promote learning for students, professionals and the wider community through active investigation, social interaction and collaboration.
- ii Support a full range of learning and teaching strategies from direct explicit instruction to facilitation of inquiry to virtual connection and communication.
- iii Support disciplinary and interdisciplinary learning.
- iv Move beyond the simplicity of flexible open spaces to integrate resource rich, special purpose spaces with flexible, adaptable multipurpose spaces to provide a dynamic workshop environment for learning.
- v Support individual, 1 to 1, small group and larger group learning.
- vi Are age-stage appropriate.
- vii Facilitate learning anywhere, anytime, by any means, through seamless access to ICT, distribution of learning resources for ease of access in learning spaces and accessibility beyond the traditionally defined school day.
- viii Activate and invigorate learning spaces – indoor and outdoor.
- ix Inspire participation in, and responsibility for the learner's community.
- x Enable all aspects of the buildings, building design and outdoor spaces to be learning tools in themselves.

Holistic

Ensure that education experiences contribute to a holistic lifestyle: learning, living, working, re-creating. Emphasise personalisation over institutionalisation; integration over segregation.

Integration with the environment

Integrate educational facilities into, and maximise their use of the natural, built, social, civic and cultural environments.

Ecological sustainability

Model ecological sustainability principles in all facets of the indoor and outdoor environments, buildings and landscape design.

Economic sustainability

Model commercial sustainability principles by embedding the potential for re-configurability, both in the present for multi-purpose use, and for changing needs over time.

Case studies of transformation

In this section some of the criteria for 21st century schools listed above, particularly those pertaining to the learning space design are illustrated in relation to two innovative Australian schools within the state education department of Victoria: Epping Views Primary School and Dandenong High School. In both of these cases an inclusive, collaborative, iterative design and development process was employed.

Epping Views Primary School

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| ARCHITECT: Gray Pucksand |
| CLIENT: Department of Education and Early Childhood Development, Victoria |
| TYPE OF SCHOOL: Primary school |
| NUMBER OF STUDENTS: 199 |
| TYPE OF PROJECT: New school |
| GROSS SURFACE AREA: 3500m² |
| YEAR OF COMPLETION: 2007 |
| CONTEXT: New community |



Figure 1. A key driver of the design was integrating the school into its environment giving access to the nature reserve with significant native species such as red gum trees.



Figure 2. Each learning neighbourhood incorporates external spaces including courtyards and covered walkways.

The site for Epping Views Primary School was disused farmland north of Melbourne. Unique to this project was the lack of a pre-existing residential community.

In the absence of an established user group, the development team adopted a surrogate user/stakeholder group to ensure that an iterative, collaborative process guided the design. This team included local council officers, parents of students at nearby schools, principals and leading teachers from adjacent primary and secondary schools, regional education leaders, sustainability coordinators and the estate developer.

Originally, the client provided a traditional education facilities schedule based on long-term student enrolment numbers and standard area entitlements for the different spaces. During the early stages of briefing, it became evident to the team that the modes of learning represented by these more traditional spaces were becoming increasingly irrelevant.

This led to a re-evaluation of the brief so that the new school could accommodate the emerging modes of learning, and achieve enhanced student learning outcomes and staff engagement. Workshops were used to test and explore the opportunities for creating a rich variety of learning settings whilst keeping within the area entitlement.

Integration with the environment and community

A driving force in the design was the integration of the school into its environment. The adjacent nature reserve represented an opportunity to anchor the built form into the site and establish a sense of place and environmental connectedness for the school community.

The site is laid out so that there are two learning neighbourhoods (Figure 3), and separate multi-purpose and administration buildings. The materials used in the composition of the buildings drew inspiration from the surrounding landscapes. Each learning neighbourhood wraps around an external courtyard, protecting it from the prevailing winds. These courtyards were located to take advantage of the views over the nature reserve, visually absorbing it into the school site. Glazing is strategically

placed to ensure a strong sense of connection between each building, the spaces between them and views beyond. As a result, the inside and outside spaces merge with the natural environment to form external spaces to internal neighbourhoods and provides a sense of transparency and accessibility to activities both inside and out.

Opportunities for shared community use were also essential and the school's facilities are sufficiently flexible to be used for out-of-school activities such as meetings and performances.

Creating innovative learning environments

Internally, each building has a unique colour and palette of finishes to help personalise and establish a specific identity within the broader school community. What would



Figure 3. Site plan. The school is structured in two main complexes or learning neighbourhoods linked by all-weather walkways.



Figure 4. Plan of learning neighbourhood.

have been standard sized classrooms of 63m² along travel corridors have instead become a set of varied, integrated learning spaces using the same area. The studios provide home base areas within each of the learning neighbourhoods and create small learning communities. Small group presentation spaces, quiet spaces, project spaces and seamless access to ICT all support a variety of learning activities and student-led inquiry (Figures 5 and 6). By redistributing the area entitlement for art space each neighbourhood has two separate, creative investigative



Figure 5. Creative investigative space.

spaces that interface with external learning spaces, as well as a clear-floor, multi-use space. All studio and project spaces are connected to larger internal activity spaces as well as sheltered external breakout areas resulting in spaces with high levels of permeability.

A shared central agora, located north of the multipurpose building, provides a focus for whole school community building and allows for more formal gatherings, performances and recreational activities.



Figure 6. Large multipurpose space.

Dandenong High School

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| ARCHITECT: Hayball |
| INTERIOR DESIGN: Mary Featherston |
| EDUCATION CONSULTANT: Dr Julia Atkin |
| CLIENT: Department of Education and Early Childhood Development, Victoria |
| TYPE OF SCHOOL: Lower and upper secondary |
| NUMBER OF STUDENTS: 2 100 |
| TYPE OF PROJECT: New school |
| GROSS SURFACE AREA: 21 226m² |
| YEAR OF COMPLETION: 2010 |
| CONTEXT: Town |



Figure 7. Entry to one of the seven houses.

Three high schools were amalgamated to create the current Dandenong High School. A large proportion of the students are from non-English speaking backgrounds and many are new immigrants. Merging three schools provided considerable challenges to an inclusive, collaborative process, not only in terms of honouring the traditions and cultures of each of the schools whilst creating a new school and new culture, but in dealing with the sense of loss experienced by each of the school communities. Absolutely crucial to the Dandenong High School success is the synergy achieved through collaboration between effective school leaders, responsive architects, imaginative designers, flexible DEECD facilities planners, teachers who were willing to learn, enthusiastic and appreciative students and a committed wider community. The driving force throughout has been a focus on ensuring that the vision and values established by the whole school community is realised. Every aspect of the educational design has been redeveloped including leadership (staff and student), organisational structure, curriculum, pedagogy and facilities.

Currently, the school is focusing on embedding its approaches and refining them through processes of ongoing critical reflection and provision of support for professional learning.

Communities within communities

It was vital to establish a sense of belonging and community. It is easy for individuals to be overlooked in a large school so, given the size of the student population, it was key that both the physical and organisational design be based on a smaller learning community size. As a result, the school was designed around the concept of schools within schools (SWIS). Each of these SWIS, or houses as they are known at Dandenong, are home to 300 students from Year 7 (age 12–13 years) to Year 12 (age 17–19 years).

A House Leadership Team leads each house. In addition, a student leadership team composed of senior students acts as mentors for groups of 12 students in Years 7–12. The student house leaders also work as a whole school team. The staff house leaders are responsible for the internal leadership of the house, and for ensuring that their house pedagogy and culture are congruent with the school's values and vision while being free to support the house in developing its own unique character. This creates a strong whole-school approach and a robust house spirit.

Innovative learning environments

Each house has a staff team of 25 teaching and support staff. Teachers work in collaborative teams of 3:50 across many of the curriculum learning areas. Most of the learning time for Years 7–10 students is house-based with learning in some areas occurring in specialist facilities. Years 11–12 students mix more across houses in learning groups to access the courses that suit the pathway they have chosen. Along with the school vision and educational rationale, Dandenong has developed four principles of effective learning: community of learners; transformative learning; enlarging experience and enriching futures; and the spirit of learning. Teachers have a strong commitment to collaborative learning and teaching as a means to achieve their vision.

The clarity the school now has about its leadership and organisational structures, its way of being and working and the learning that it values has emerged in a dynamic way throughout the process of development and is continually being refined and elaborated. Herein lay the challenge for the design of the learning spaces and facilities. At the stage when the school vision was still being translated into practice there was a need to finalise the internal design of the seven houses. The danger was that an old model, or an old model slightly adapted would be adopted for expediency's sake. This was avoided due to the courage of the leader and the responsiveness of the architect. Thus, the structure and form of the "shell" of the houses was agreed upon early on: the development team explored and generated ideas, after which the design of the internal learning spaces emerged and a prototype was tested.

A key process, in which the interior designer facilitated the emergence of the learning space design, involved the team imagining all the different types of learning activities



Figure 8. Dandenong High School is divided into seven houses.

they would want to engage the students in, the types of learning settings that would support those activities, the number of students involved, and the number and type of spaces that needed to be available simultaneously. This process generated many ideas for the designer to work with and served to transform the teachers' vision of what learning spaces could be. The school's principles of learning rather than the designs of the past had become their reference points.

It was not until the teachers began to work in collaborative teams and in the new spaces that the real transformation began. It remains an ongoing journey, but there is no doubt that the learning spaces are contributing to transform the way that both teachers and students learn.

Conclusion: transforming spaces for learning

The biggest challenge in transforming spaces for learning lies in transforming the industrial era concept of schools, and this represented a paradigm shift. These shifts are notoriously difficult. However, developing clarity about the purpose behind transforming spaces and the commensurate guiding criteria for design is only the first step. The plethora of current attempts to transform spaces for learning do not signify the beginning of attempts to redesign schools, rather they represent another cycle in the process – a cycle, nonetheless, that shows signs of

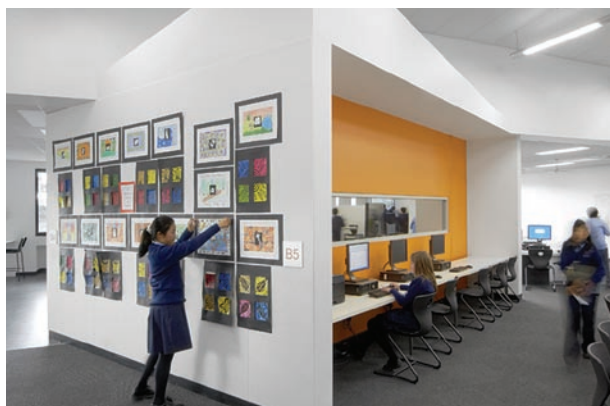


Figure 9. Learning spaces have been designed to enable a variety of individual and group learning settings.

a critical mass of the educational community worldwide developing shared understandings and aspirations.

There are several differences between this current cycle and the open classroom attempts of the 70s. There is a more sophisticated understanding of learning, information and communication technologies that lend themselves to enhancing and enriching learning and supporting personalised learning. Also, there are signs of increased collaboration between the various professional groups that together are the agents for educational facilities design and implementation, for example, the educators, architects, interior designers, landscape designers, urban designers, facilities managers and government agencies. It takes genuine collaboration to achieve a common purpose for learning and an inter-disciplinary and inter-agency approach that leads to an architecture that supports the needs of learners and has an impact on learning.

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Figure 10. External spaces can become an extension of internal spaces.

Notes

1. See, for example, the Melbourne Declaration on Educational Goals for Young Australians, www.mceecdya.edu.au/mceecdya/melbourne_declaration,25979.html, accessed 10 June 2011; the vision of the New Zealand Curriculum <http://nzcurriculum.tki.org.nz/Curriculum-documents/The-New-Zealand-Curriculum/Vision>, accessed 10 June 2011.

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Figure 11. Different learning zones are created with minimal physical intervention.



Figure 12. Ground floor plan.

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The corporation is supervised by the Greek Ministry of infrastructure, transport and networks as well as by the Ministry of education, life-long learning and cults.

SBO shares responsibility with local administration for the planning and construction of school buildings in Greece while it is solely competent to supply schools' equipment (desks, boards etc.) all over the country.

Core values and vision of **SBO** is to provide the Greek students and teachers with contemporary ecological learning environments that help enhance national education.



Primary school in Athens

Situated in a challenged area of the city of Athens, the land intended for the 150th Primary School had in place a deserted listed house of the 19th century.

The listed building had to undergo a series of transformations in order to suit the needs of a modern school infrastructure for pupils coming from a widely multi-cultural environment.

The architects refurbished the old residence and added a new modern one adjacent to it. The complex is an excellent example of harmony between traditional and modern architecture.

At the same time, the school complex provides energy-efficient solutions, access for pupils with disabilities and security for those youngsters going to school in a difficult Athens' neighbourhood.



18,01

Bioclimatic kindergarten in Peristeri (wider Athens region)

A model of an energy-saving building, the 26th kindergarten in Peristeri was a great dare for architects and engineers who conceived and materialised a modern bioclimatic school on a multiple-angle bizarre shaped land.

Despite the constraints, the final design exploits the Athens' climatic advantages at the utmost. It features elements such as a green roof-top, natural lighting and ventilation systems from skylights and natural shading and cooling systems from southern oriented blinds.

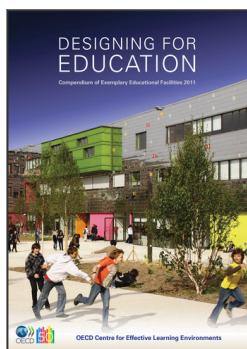
The school was constructed in 2007; testimonials from teachers and children show that it is a very satisfactory learning environment.

Administration also shows proof of reduced operational costs.



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