

Critical & Creative Thinking

The Australasian Journal of Philosophy in Education

Vol. 17 No. 2 November 2009

Special Issue Section: Smart Green Schools Project

Clare Newton

Disciplinary Dilemmas: Learning Spaces as a Discussion between Designers and Educators

Susan Wilks

Observing the Transformation of Pedagogies and Spaces

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'Once they have been there and have sat in it, they get it'

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Spaces for Learning: A Teacher's Perspective

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Regular Section

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Marie-France Daniel

Thinking Emotions: A Proposal for Early Childhood Education

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Book Review: *A Life Teaching Thinking* by Matthew Lipman

ISSN 1325-7730

Critical & Creative Thinking:
The Australasian Journal of Philosophy in Education
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With support from the Smart Green Schools Project Team
and the School of Education,
University of South Australia

Printed by Hyde Park Press

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ISSN 1325-7730

Welcome to *Critical & Creative Thinking*

Welcome to Vol. 17 No. 2 of *Critical & Creative Thinking: The Australasian Journal of Philosophy in Education*.

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Carol Collins and Sue Knight, University of South Australia

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About the Journal

Critical & Creative Thinking is an international journal published under the auspices of the Federation of Australasian Philosophy in Schools Associations (FAPSA). The focus of the journal is philosophical inquiry with school-age students. What was once called Philosophy for Children has now grown into a sub-discipline of philosophy with its own history, traditions and pedagogy, and incorporates what could be called philosophical inquiry in the classroom, reflective education and, generally speaking, philosophy in schools, as well as related methodologies such as Socratic Dialogue. The journal performs two roles. The first is to publish scholarly research concerning the theory and practice of philosophical inquiry at school level. These articles will appear in the 'Research Articles' section. The second is to publish reports of practice, comments on resources, suggestions and ideas about philosophising with school students and so forth, with a view to encouraging professional interchange among those interested in philosophical inquiry with school-age students.

Aim and Scope

To provide a vehicle for the communication of ideas and a forum for discussion and debate of issues concerning the practice of philosophical inquiry with school-age students.

To promote better teaching and curricular design for the development of critical and creative thinking amongst school-age students through increased understanding and use of philosophical inquiry in the classroom.

To enrich the understanding of philosophy and philosophical inquiry as well as its role in the development of good thinking and good judgement.

To increase interaction and collaboration between the academic community of scholars in universities and teachers in schools on matters of logic, epistemology, creativity, metaphysics, aesthetics, ethics, inquiry, philosophy of science, mind, personhood, community, understanding, learning, thinking, dialogue, discussion, and related matters concerning philosophy, inquiry and classroom pedagogy.

To promote discussion of the place of philosophy in the nation and school curriculum and its infusion into the present curriculum, as well as the place of philosophy in the intellectual, creative, moral and social development of individuals.

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Editorial

Welcome to the second issue of *Critical & Creative Thinking* for 2009 and, sadly, to the very last issue of the journal. We shall save our reflections and thanks for the moment, however, as there is much to celebrate in the current edition.

The first 'Special Issue' section comprises a collection of papers by a team of researchers working in the 'Smart Green Schools' project, a genuinely interdisciplinary group from the fields of architecture, education, educational planning, urban design and sustainability. Sincere thanks to Susan Wilks (University of Melbourne), a chief investigator on the project and long-time supporter of *Critical & Creative Thinking*, for her initial idea of developing a special issue on the relationships between pedagogy, space and sustainability, and for her help in bringing such an interesting collection of papers together. The first of these, by Clare Newton, sets the context of the Smart Green Schools project and challenges educators to engage more in the planning and design of learning and teaching spaces. Although Newton does not claim to '...present a road map for teachers new to thinking about the impact of space', her paper provides more than enough background information to enable readers to understand at least some of the reasons why educators have thus far been reluctant to engage with the design process. The second author, Sue Wilks, helpfully locates the research project within the current context of billions of federal and state dollars being invested in school infrastructure under the Australian 'Building the Education Revolution' and other stimulus packages. She includes case studies describing teachers preparing to move into new spaces but also cautions that unless they are properly supported to understand and work with innovative school spaces and pedagogies, teachers are highly likely to reorganise such spaces to resemble more traditional classrooms. In the third paper, Ben Cleveland introduces the concept of 'equitable pedagogical spaces' and discusses the potential for school spaces to play a significant role in supporting the personalisation of student learning. His descriptions of learning environments that '...enable

individuals to flow between activity settings' are thought-provoking for those of us who are more used to teaching within a traditional square or rectangular classroom. The next two papers take us squarely into schools and, excitingly, also into already up and running innovative learning spaces. Dominique Hes explores aspects of two such schools that '...wear their green credentials on their sleeves', noting that curiosity, playful exploration, deep thinking, analysis and understanding, characterise these largely sustainable learning environments. Hes also introduces us to the notion of school buildings serving as '3-D textbooks'. Philosophy and English teacher, Emmanuel Skoutas, describes firsthand his experience of moving from a traditional learning environment to a new cultural space created to foster genuine inquiry. The author's examples of students working enthusiastically within these new spaces capture well the real educational and social benefits for both students and teachers. The final paper in this section is not part of the Smart Green Schools project itself, but rather, a response to the inspiring but also unsettling ideas presented by the project's authors from the perspective of a teacher educator and researcher working in the area of philosophy in schools (Carol Collins). Thanks to all involved in this Special Issue section and best wishes for the completion of your worthwhile project.

The 'Regular' section of this edition includes a research report from a colleague working in Singapore, two papers concerned with bringing philosophy to early childhood settings and a review of Matthew Lipman's recent autobiography. Teacher and researcher, Yip Meng Fai, reports on the favourable results of a study conducted with high school students that utilised a newly developed model for identifying student moves in Community of Inquiry discussions. The second paper by Marta Giménez-Dasí and her colleagues in Madrid and Montreal encourages readers to reflect on the need to further develop Philosophy for Children style programmes within early childhood education and provides a detailed outline of how this might be achieved. In her paper highlighting the connections between Montessori and Lipman's work on the development of reasoning in very young children, Virginia Tregenza also calls for more emphasis on fostering philosophical thinking in the early years. Finally, we are grateful to Clinton

Golding for his timely and sincere review of Matthew Lipman's recent autobiography *A Life Teaching Thinking*. This is surely a most fitting way to close the final issue of *Critical & Creative Thinking: The Australasian Journal of Philosophy in Education*.

The decision to stand down as editors was not an easy one, especially in the knowledge that our decision would herald the end of the journal. *Critical & Creative Thinking* was first published in March, 1993, with Clive Lindop and a small editorial team at the helm, helping to put Philosophy for Children – Australian-style – on the world stage. Many of you will recall that Gil Burgh, Stephan Millett and Phil Cam shared the editorial for a short period during the mid-2000s following Clive's retirement and worked to keep the publication alive and to develop a more contemporary, professional format for the journal. Our initial goal in taking on the role as dual-editors from 2006 was to extend the editorial board to include national and international colleagues from the field of cognitive psychology as well as from philosophy and Philosophy for Children. We are pleased to have developed the editorial board in this way and to have worked with such an impressive group of scholars and leaders in their various fields. We are saddened too, of course, by the loss of Ross Phillips and Phil Guin during our time as editors. We also aimed to broaden the scope of the journal to consistently include contributions from researchers reporting on empirical studies in the field, crucial in a time when governments and policy makers are (rightly) becoming increasingly concerned to seek out evidence-based research in education. Here, too, we have been successful and are grateful to the authors and reviewers who made this development possible. Also during this period, Gil Burgh and the Queensland Association of Philosophy in Schools funded and managed the creation of an electronic back catalogue of the journal. Importantly, *Critical & Creative Thinking* has recently been listed in the Australian Education Index and SCOPUS-Elsevier databases and included in the ERA ranked journal list.

As we write, the journal has subscribers based in every state and territory of Australia, as well as in New Zealand, Singapore, Hong Kong, Malaysia, Thailand, South Korea, England, Scotland, Slovenia, Germany, the

Netherlands, Canada and the United States. Similarly, during the last four years, papers have been published from philosophers, psychologists, teachers and teacher educators working across Australia and in Singapore, Scotland, Wales, Spain, Canada, the U.S, Turkey and Iran.

In very many ways, the journal has been a successful venture for some seventeen years, and an important forum for scholarly discussion in the field of education for thinking. It seems it has also been highly regarded by many. We have been moved by messages received from subscribers and contributors since the pending closure of the journal was announced, from colleagues who recognise the gap it will leave for teachers and academics, for early career researchers and student teachers, and for those who follow Australia's contribution to Philosophy for Children through this publication. Still, the running of a scholarly journal, today more than ever, demands at least some level of financial and administrative support. Taking the journal forward would also have required support from colleagues to establish a relationship with an online publisher and to promote the journal more widely. Without such support, regrettably, publication of *Critical & Creative Thinking: The Australasian Journal of Philosophy in Education* will not continue beyond the printing and posting of this issue.

In closing, there are some very important acknowledgements to be made. Firstly, we would like to thank Justine Gallasch, a recent Education Honours student, primary school teacher and friend, whose work as sub-editor during the last four years has ensured that every issue of the journal arriving in your letter box was of the highest editorial quality. We would also like to acknowledge the work of past editors, especially the founding editor, Clive Lindop, along with all who have served on the Editorial Board. Thanks also to colleagues who reviewed papers and provided invaluable feedback to authors, and to the contributors themselves for sharing their ideas, theories and reflections through the journal. And finally, whether you have been a long-term, intermittent or recent subscriber, we extend our sincere thanks for your interest in and support of the journal. We have very much enjoyed being in touch and working with so many colleagues across the globe during the last four years and hope our paths will cross again sometime

in the future. Our very best wishes to you all for the remaining weeks of 2009, and for the years ahead.

Warmest regards,
Carol and Sue

Carol Collins and Sue Knight: Editors 2006-2009

'Once they have been there and have sat in it, they get it'

Dominique Hes (Lecturer in Sustainable Architecture, Melbourne University)

Introduction

Many recent school designs incorporate sustainability features. This paper reflects on several school building projects where the potential was present for these features to be brought into the teaching practice. Using a building as a 3-D textbook means it can be incorporated into the curriculum and aid teaching about heating and cooling, temperature transfer, sun angles, lighting and so forth. A building can embody its philosophy overtly, hanging its green credentials on its sleeve, by providing access to electricity meters, control mechanisms, data and sustainable features.

This research fits within a broader framework of the Smart Green Schools ARC linkage project and sits within its qualitative research methodology centred on case studies.¹ Case studies were chosen as they allowed the investigation of the highly complex influences of built educational environments and their effect on teaching and learning. Observation and 'thick description', which enable judgements about making comparisons with, or the possible transferability of findings to other settings², were used.³

The importance of real world, physical experiential case studies to support learning has been shown by others as crucial for developing tacit understanding (see for example

¹ Yin, R.K. (2003) *Case study research, design and methods*, 3rd edn., Newbury Park: Sage Publications.

² Bryman, A. (2004) *Social research methods*, Oxford: Oxford University Press.

³ Cleveland, B. (2009) 'Engaging spaces: an investigation into middle school educational opportunities provided by innovative built environments. A new approach to understanding the relationship between learning and space', Conference Paper, 16th International Conference on Learning, 1-4 July 2009, University of Barcelona, Spain.

Hes⁴). Our research hopes to illustrate how buildings could be used in learning about environmental sustainability within the middle years of schooling. The ultimate intention is to provide guidance on how schools can integrate buildings as effective 3-D textbooks to support their curricula.

This paper illustrates its arguments through the voices of three of the teachers at the case study schools and their experiences in using these buildings. This has inherent limitations in bias and attachment to their projects that need to be kept in mind when reading their reflections on using buildings as 3-D textbooks to teach environmental sustainability.

Environmental sustainability and schools

Environmental sustainability issues are related to schools in two ways: the impact of the school on the environment and the impact of the environment on schools. Schools can minimise their impact on the environment by incorporating strategies that are applied to green buildings in general; for example, energy, water and waste efficiency, materials selection, design for durability, flexibility and minimisation of ongoing maintenance. Within a green building in a temperate area (e.g. Melbourne and Sydney), it is possible to reduce the amount of energy consumed by 70% or more through good envelope and lighting design (see projects such as Council House 2 and 40 Albert Road in Melbourne's CBD, Australia). Water can be reduced by 80-90%⁵ if efficiency is optimised, rainwater is collected and water reused. Waste in construction and renovation can be virtually eliminated⁶, and waste in operation can be reduced by 60% or more. Materials that are renewable, reusable and recyclable – when combined with design for durability, flexibility and maintenance minimisation – can reduce their embodied environmental impact significantly. Spaces need to be

⁴ Hes, D. (2005) *Facilitating 'green' building: turning observation into practice*, PhD awarded June 2005, RMIT University, Melbourne.

⁵ Chanan, V., White, S., Howe, C. & Jha, M. (2003), 'Sustainable Water Management in Commercial Office Buildings', Innovations in Water: Ozwater Convention and Exhibition, 6-10 April 2003, (Electronic Paper oz264).

⁶ Hes, D. (2007) *ESD design guide for office and public buildings*, 3rd edn., Canberra: Department of the Environment, Water, Heritage and the Arts, <http://www.environment.gov.au/settlements/publications/government/esd-design/index.html> (accessed 1 October 2009).

designed to suit the local climate but can also support the wellbeing of occupants and their ability to teach and learn. Both the way the building has been designed and how it responds to its environment can be used in teaching. Shum Miller⁷ described three schools in the United States where monitoring, technology and design of space were used, not only for educational purposes, but to engender responsibility and understanding for sustainability:

The various elements of a sustainable school can be featured as part of the educational curriculum. For example, statistical data from the on-site photovoltaic system can be used for a mathematics exercise, or data about the sun movement can be incorporated into the science lesson. These bring home the message in a direct and effective manner.⁸

Case studies

Two schools, provided here as case studies, demonstrate that not only is environmentally responsible design important, but that engagement of the teacher and a tailored curriculum are also integral to making the most of the educational opportunity of the buildings. The two schools discussed below are Thornbury Secondary College and Woodleigh School in Victoria, Australia, both designed by Middleton, a Melbourne-based designer.

1. Woodleigh School

Woodleigh commenced operation in 1856 as a coeducational school. It was one of the earliest schools in the state of Victoria and the first on the Mornington Peninsula. Apart from preparing students for tertiary study, it prides itself on equipping students for other less academic aspects of life in the twenty first century. This is done through creating:

...opportunities for self-discovery...providing the challenges that stimulate learning and by striving to be responsive to the needs of each student.

⁷ Shum Miller, K. (2007) 'The A,B,C's of sustainable schools', SB08, International Sustainable Building Conference, 21-25 September, 2007, Convention Centre, Melbourne, pp. 913-920.

⁸ Shum Miller, K. (2007) Op cit., p. 917.

Discipline at Woodleigh is based on three simple rules:

- Respect for self
- Respect for others
- Respect for the environment.⁹

The latter rule is taught through active participation in community events, clean up days, tree planting, active participation in the protection of the school's native vegetation and agricultural activities based on permaculture principles. More recently their buildings have been part of the teaching of Environmental Sustainability.

The building specifically looked at in this research is an agricultural teaching space. The design, led by Middleton, was driven by both the teachers and the students. The students had a significant input into the design, materials and construction of the space, adding their own ideas and even helping to construct the walls (Figure 1).



Figure 1: Woodleigh students constructing the straw bale walls
(Source: Woodleigh School)

⁹ Middleton, L. (2008) 'Project: Woodleigh Ag Hort Building', Building Design Award entry 2008, Building Designers Association of Victoria.

This project, involving the students from Years 8 to 11, showed significant use of scaffolding by the teachers. Teacher 2 gives an example of this process in the students' involvement in materials selection:

...the process of them doing this made them think about how sustainable solutions could be used in a building...but we made sure that we didn't give them the answers...*we gave them the groundwork*...concepts, tools, ideas, but they needed to put these together to *form their own solutions* for the building. So, for example, they helped make the decision about the fly ash content of the concrete [this lowers embodied energy and thus environmental impacts such as Climate Change] and this gave them the practical understanding that you don't just use 'concrete' – there are choices you can make. This carried over to decisions on timber use etc, and this led to the students questioning the materials chosen for the retaining wall and coming up with the used car tyre concept. So doing this with one material gave them the skills of questioning material use in other areas – it modelled a way of thinking about choosing more sustainable materials.¹⁰

In this same space, Teacher 2 suggested the use of a hand pump for the water collected in the rainwater tanks rather than an electric pump to create the tacit understanding of the energy required for pumping water (Figure 2).

¹⁰ Friedlander, M. [teacher Woodleigh School] pers. comm., 6 October 2009.



Figure 2: Rainwater tank, pump and recycled tyre retaining wall¹¹

The building was built out of straw bales and the roof was supported by reclaimed ironbark poles with cypress timber on the northern façade cut in radially to use the timber efficiently. The concept of the roof allowed maximum indirect natural light into the space while facilitating cross and stack ventilation. The use of thick straw bale walls, insulation and concrete floors supported the passive design strategies of controlling infiltration, thermal mass and night purge. Internally, teaching space is light, airy and spacious (Figure 3).

¹¹ Middleton, L. (2008) 'Project: Woodleigh Ag Hort Building', Building Design Award entry 2008, Building Designers Association of Victoria.



Figure 3: Woodleigh internal spaces entry and work area (03 and 04) and main teaching space and teachers' area (01 and 02)
(Photographer: Scott Haskins)

Figure 4 shows a designated space for the teacher for storage and preparation (01), a space for carrying out planting and other practical agricultural activities (03), with generous internal (02) and external (04) teaching areas.

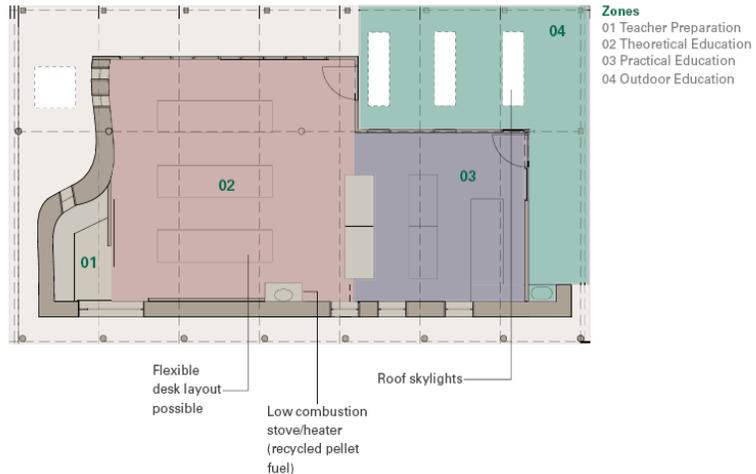


Figure 4: Woodleigh space program¹²

Teacher 1 who uses this building to teach agricultural studies said he feels that:

...it is a really pleasant building to be in, it is comfortable most of the time and has a natural feeling that fits into its setting and it is a working building perfect for teaching agriculture.¹³

¹² Middleton, M. (2008) 'Project: Woodleigh Ag Hort Building', Building Design Award entry 2008, Building Designers Association of Victoria.

¹³ Clarke, C. [teacher Woodleigh School] pers. comm., 6 October 2009.

The policy of the school is very much to teach through experience and application. Teacher 1 reflected:

...the thing about being in the building is that we...can use it as a case study. We are in it! They can look up and see the louvres and understand the cross ventilations strategies. They can see and touch the eco-timer. You can talk all you like about concepts but they remain abstract until you experience them. You can see and experience that these are the features that make a sustainable building.¹⁴

Teacher 2 built on the importance of learning by sitting in and experiencing a sustainable building by showing how the students were then able to apply their learning to a broader context:

At the end of the day we can sit the students down in the building and say:
This building has no lights...is it needed? ...they can answer 'no!'
This building has no heating...is it needed ? ...'no!'
This building has no cooling...is it needed ? ...'no!'
And now they can start questioning why all the other buildings do need these things...¹⁵

An example of using the building as a teaching tool after its construction was given by Teacher 2 where he takes students into the agriculture building to experience it for 10 minutes and then takes them to a fully air-conditioned building and gets them to compare what they 'felt':

...they think it is really comfortable and has a 'good' feel and are surprised that they can affect that... On a good day they can even feel the change from hot and stuffy to cool and fresh when they open the building up to ventilate. As one exercise on a hot day we take them to an air-conditioned building and make them sit there for 10 minutes recording what they feel and then go to the ag building. We then discuss the differences between the two in air quality, comfort etc.¹⁶

¹⁴ Clarke, C. *ibid.*

¹⁵ Friedlander, M. [teacher Woodleigh School] pers. comm., 6 October 2009.

¹⁶ Friedlander, M. *Op cit.*

2. Thornbury High School

The interesting aspect of this case study is that there are two very different buildings. The first is a double general purpose classroom (GPC) which was going to be a standard 'portable'. However, the design team was able to construct the GPC at a similar cost with a significant improvement in amenity, spatiality and performance; achieved with the constraints of the location and footprint of the planned portable. The second building was a purpose-built recording studio where more time and fewer constraints produced a very different outcome.

The major constraints on this design of the GPC were the budget, the timeline and location. From an environmental outcomes perspective, it was the fixed location and footprint that limited what could be achieved. A large building directly to the north meant that the roof needed to be extremely high to allow for the natural light and ventilation strategies (Figure 5). Using what Middleton called the 'Esky building design', the GPC is a lightweight, highly-insulated skin-supported structure using timber studs and trusses. The walls are independent of the roof, allowing future flexibility.



Figure 5: Thornbury High School general purpose classroom
(Photographer: Scott Haskins)

Unfortunately the glass specified to improve thermal performance was not installed. Consequently, the building did not perform thermally as expected. As well, there was a need for the windows to be opened and closed at the correct times of day to help keep conditions comfortable, but this did not occur. The reasons were firstly due to security concerns; low-level windows were closed at night. Secondly, the users lacked a fundamental understanding of passive cooling and the need to open the windows for cross ventilation. Lastly, incorporating an air lock would have helped with the infiltration of unwanted hot or cold air.

The straw bale recording studio was designed from first principles working with the teachers and students. A workshop where the teachers were asked what they needed was conducted. Their first response was 'as big as we can get'. Middleton¹⁷ worked with them to explain the consequences of this request in terms of materials, waste, energy use, cleaning, acoustic control and so forth. Further, by rationalising their needs and not choosing the biggest square box possible but instead going for a design that was a more spatially efficient, acoustically effective fan shape, external spaces for teaching and performance were created. This then led to thinking about using this external space as part of a sustainability pathway which could lead visitors past other sustainability initiatives such as the vegetable gardens, water tanks and potential future projects.

Students helped in the development of the design by making models, thinking about the site and its context, the sun, shade and climate. Students were also involved in some of the construction (Figure 6) and they helped communicate the design intent through multimedia design, website development, writing and making. Thus the project intersected with a variety of subject content in the curriculum domains.

¹⁷ Middleton, L. [designer of case study buildings, Thornbury High School] pers. comm., 2 October 2009.



Figure 6: Students working on the foundations of the recording studio¹⁸

Built out of straw bales, the studio raised more interest and entailed more tacit learning than the GPC. Teacher 3, a teacher and driver of the building projects, reflected:

In contrast to the general classroom where we have had very little interest or questions from the users, the new recording studio, which is more straightforward and outwardly green, has resulted in a lot more questions: 'why straw bale, why the air lock etc'...it is like being involved in the building is part of the learning itself... So even without there being a dedicated curriculum for sustainability linked to this building there is clear learning about sustainability happening by the fact it exists and leads to curiosity.¹⁹

In talking about the GPC, Teacher 3 reflected on those aspects of the space that are not directly attributed to sustainability but are related to good design:

¹⁸ Source Thornbury High School website: <http://www.thornburyhs.vic.edu.au> (accessed 7 October 2009).

¹⁹ Parker, G. [teacher Thornbury High School] pers. comm., 5 October 2009.

The teachers LOVE the space, they think it is fantastic, particularly how the windows work and how the room leads the students to focus on the teacher and within the room even though they have lots of light (Figure 7). It has many good environmental design features, though it would have been nice to have double glazed windows and an air lock so that the conditioned air did not escape every time someone came in the door.²⁰



Figure 7: Thornbury High School general purpose centre
(Photographer: Scott Haskins)

Asked if there was any specific sustainability teaching that the GPC supported, Teacher 3 spoke of the challenges of secondary teaching where spaces are not owned by the users:

The Thornbury general classrooms are used by a number of teachers, the space isn't owned and even though the opportunity is there to write aspects of the building into the curriculum, no one does it. For example, there are vegie patches outside the classroom and the idea was that each Year 7 group would own one and it would be part

²⁰ Parker, G. *ibid.*

of their learning to grow food there, and this would lead to other aspects of sustainability and the classroom being considered, but the curriculum isn't there, so it isn't being done... It isn't like a primary classroom where a teacher can integrate various aspects because it is their space and they teach a variety of material, here it is fragmented and so there is not ownership of the concept and people just work in their own silos and bits of the curriculum without talking to each other.²¹

Environmental sustainability, pedagogy, curriculum and teaching

The concept of using a building as a teaching aid fits well with the new directions in teaching and learning that emphasise the connectedness of knowledge and interdisciplinarity of concepts. Based on ideas of constructing knowledge and real-world experiences, these buildings provide the perfect test bed for collaborative group work and the exploration of the interconnected aspects and the effect on themselves. There is the opportunity to embed their learning into real-life experience.

At Woodleigh, the building is designed to cool at night using the low and high level windows. Experimenting with the impact of not opening these windows, students could directly experience the next day how much warmer and less comfortable the space was than when it was used correctly. Further, with 20 temperature sensors around the room, they could actually quantify this experience. Intertwined with this could be concepts of thermal mass, the physical properties of air, cross ventilation and stack ventilation.

Teacher 2 highlighted the connectivity of learning, experiencing and creating understanding through his reflection on the students' conversion of concepts on sustainability into practice:

What was most interesting to see...was the playful exploration that students did. They applied the ideas we covered with them and provided a solution that would never have been reached by the adults involved. When the

²¹ Parker, G. [teacher Thornbury High School] pers. comm., 5 October 2009.

students took the straw bales and made their own solutions to what a 'sustainable building' should be, they demonstrated a playfulness and conceptual understanding beyond what had been covered in class. In many respects this understanding seemed more inherent and tacit than they could articulate in word. When asked why they had built the cubby that way their answers were 'it felt right' and 'it seemed to work' rather than 'because hot air rises, this keeps the sun out, lets light in' etc. Their building was very intimate, cave-like and inaccessible to adults. It worked really well thermally and had a small stack to ventilate it. This was all done through planning and negotiation across the four year levels, changing and evolving their 'design' together as they went along. The funny thing about this cubby was that it addressed all the aspects of the school policy which is about giving students citizenship and engagement in their environment – they had ownership of the program, how the building met their needs, their learning, the concepts covered and *how it all worked together became more than an idea...it invited individual meaning creation...it became part of them.*²²

Conclusion

Schools are best understood as complex systems in which the physical environment interacts with pedagogical, curricular, social, cultural, management and economic factors. Rather than thinking of environmental initiatives only in terms of energy benefits, it is useful to also consider how simple green palettes can transform school environments into 3-D textbooks enhancing the school curriculum. The case studies demonstrate that students can interact with buildings and develop better appreciation of issues such as seasonal changes, comfort levels, passive design, material selection and efficiency. Being involved in the design, development and construction of the buildings provided a valuable learning experience. Most importantly, Woodleigh demonstrates that students can take these lessons and apply them within other contexts.

²² Friedlander, M. [teacher Woodleigh School] pers. comm., 6 October 2009.

Interestingly the two case studies have shown that there are important teaching opportunities for buildings that are overtly sustainable. This attribute seems to raise curiosity and interest. Those buildings that are not carrying their 'greenness' on their sleeves are used without reflection on its performance. Teaching/learning opportunities are lost. These three buildings and the reflections of the teachers demonstrate that using buildings as 3-D textbooks to support the teaching for environmental sustainability is an effective tool: *'once they have been there and have sat in it, they get it'*.²³

Acknowledgements

Sincere thanks for the support and information provided by Luke Middleton from eme design, Thornbury High School and Woodleigh School, and the teachers interviewed: Charlie Clarke, Mark Friedlander and Greg Parker.

This Smart Green Schools research project has been funded by the Australian Government through the Australian Research Council Linkage Grant Scheme. The Chief Investigators of the grant are Clare Newton, Dr Dominique Hes, Dr Sue Wilks, Dr Kenn Fisher and Professor Kim Dovey. The Industry Partners are the Victorian Department of Education and Early Childhood Development, the Victorian Government Architect's Office, Rubida Design, Mary Featherston Design, Hayball Leonard Stent, H2o Architects, McGauran Giannini Soon Architects, McBride Charles Ryan Architects and SBE Melbourne.

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Spaces for Learning: A Teacher's Perspective

Emmanuel Skoutas (Dandenong High School, Victoria)

Introduction

'Is all this for us?' an incredulous student asked on the orientation tour of our new learning spaces earlier this year. I asked what he meant and he answered, along with a sweeping gesture of his arm, 'These buildings are "modern" and "professional" and we don't usually see places like these'. His comment and tone revealed an assumption that his class could not impossibly deserve such a building, so I retorted with something like, 'Of course it is for you, both the teachers and our community want to provide the best opportunities for your learning'. I also made reference to our school motto *Faber Quisque Fortunae* – We are the Architects of Our Destiny – and how we are aiming to create the foundations for successful futures for all of our students. 'But sir,' came the dry response, 'We are from Dandenong and don't have a future'.

There are many reasons why the expectations of this young person are low, but don't we as a society think that children like Liam deserve our best efforts so that they too can begin their life's journey with the skills and dispositions that can lead to a good life?

Dandenong High School has been operating since 1919. It is located in one of the most socio-economically disadvantaged urban centres in the country. Over the last two years the school has amalgamated with two neighbouring secondary schools – Cleeland Secondary College and Doveton Secondary College. Each has brought its own cultural identity and distinctive challenges and strengths.

Approximately 66 languages are spoken by the students. Almost 90% of the student population has a non-English speaking background. At present, Dandenong High School is in a transitional stage in its development of a