FUTURE
PROOFING
SCHOOLS

# Future **Proofing** **Schools**

## The Phase 3 Research Reflections

**This publication**
Produced by Future Proofing Schools | An ARC Linkage Grant Project 2010 - 2012.
Edited by Clare Newton, Sarah Backhouse and Susan Wilks. Twelve named authors have contributed to this publication.
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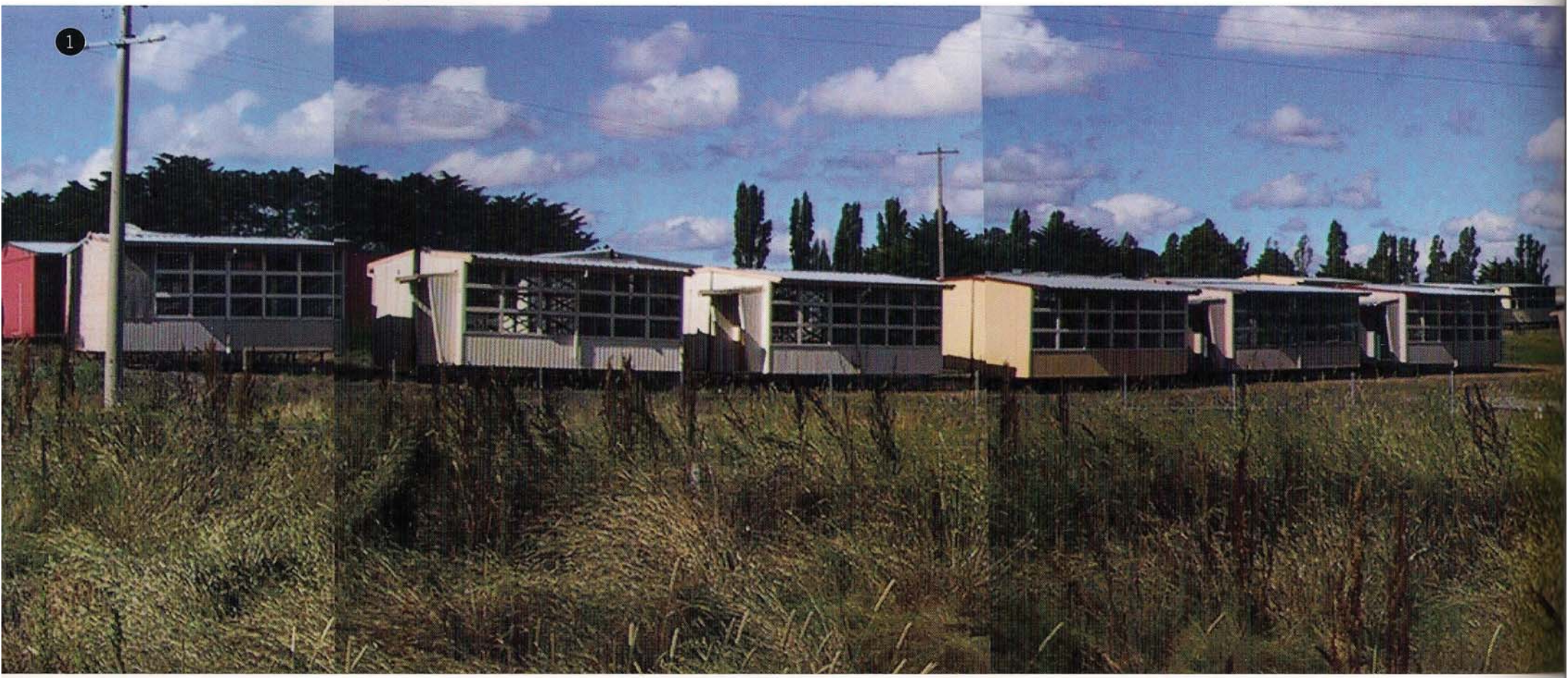
1] Decommissioned relocatable classrooms as seen from the Calder Highway, Victoria



# Contents

## Future Proofing Schools

## The Phase 3 Research Reflections

## The research context

*Future Proofing Schools* is an Australian Research Council Linkage Project (LP0991146, 2010-2012) with Industry Partners including six education departments around Australia; a team of six Investigators, research associates and a PhD student. The research focus has been on the design of relocatable buildings for Australian schools.

Relocatable buildings are widely used by education departments to cater for changing school size as a result of shifting demographics; in emergency situations after devastation such as fire or flood; and to provide facilities in remote locations. These temporary buildings accommodate a quarter to a third of students in some states and are a significant component of school infrastructure within both state and private schools.

Our research suggests that we have an unprecedented opportunity to benefit from a range of 'tipping points' in sustainable school design, 21st century pedagogies and emergent technologies in manufacturing that will allow us to transform the notion of the relocatable classroom.

# Foreword

Now we are in the final year of our three year research project *Future Proofing Schools*, it is timely to reflect on our research journey. An innovation in the design of this research has been the inclusion of an Ideas Competition midway through a three phase research process, a decision that has effectively geared the research and its impact in a range of ways.

*Phase 1* involved eliciting 'the voice' of the diverse stakeholders to develop a series of reference documents which outlined best practice in the four fields of **21C Learning**; **Sustainable Schools**; **Landscape Integrations and Connections**; and **Prefabrication**. It involved visiting schools across Australia to understand educational issues and challenges at both a local and national level. Our research visits engaged with many age groups, contexts and cultures ranging from primary to tertiary education, suburban communities with large representations of new migrants and remote indigenous homeland communities. Understanding emerging techniques in prefabrication and sustainability took us internationally, where conversations with manufacturers, architects and client groups highlighted opportunities, constraints


and inspirational new ideas. An important realisation in doing this research has been the complexity of the design problem.

The *FPS Design Ideas Competition* of *Phase 2* asked design teams from around the world to use the Phase 1 reference documents as their Brief for imagining the relocatable classroom of the future, thereby becoming active participants in the research process. The vast range of design ideas from all entrants were overviewed in the Phase 2 publication, some of which are reviewed in more detail within this document.

Since the Competition we have heard from designers of their struggles to formulate successful solutions which resolved the disparate elements within the brief. As researchers, we experienced a similar difficulty. We are a large team from multiple disciplines each bringing our own methodological research framework and ways of defining problems. We use different terminology and tend to write for different audiences. A benefit in working as a team is that we have each become aware of some of the assumptions we make and shorthand we use when talking within our academic or professional discipline.

It has also been useful to see how decisions regarding one discipline affect other areas. For example, providing for effective ventilation can impact acoustic performance, and providing for relocation can impact the integration of buildings into school grounds.

*Phase 3* has been a period of analysis and reflection on all these issues. This publication is divided into themes that range from competition analyses and reflections on our own brief, through to observations on remote community challenges and the future of Australia's prefabrication industry. Our twelve authors contribute a range of viewpoints from their respective disciplines, and highlight the complexity of the research area we are exploring.

We have overtly attempted to use a language that sits between that used by a journalist and what might be found in a professional journal. By avoiding academic terminology and structures where possible we are hoping to communicate effectively with the broad audience of stakeholders involved in the design, construction and use of relocatable prefabricated learning environments.

*Phase 3 Research Reflections* concludes with our recommendations for relocatables of the future.

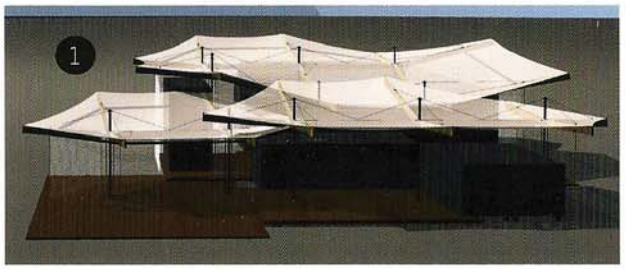
**Clare Newton**

Chief Investigator- *Future Proofing Schools*

All Future Proofing Schools Design Ideas Competition submissions can be viewed at:

www.futureproofingschools.com

# Rejuvenating existing relocatables




Exploiting the parasol roof for both climate control and creation of an outdoor learning environment.
1] Design and image by Lisanne Havinga

Given the large number of relocatable classrooms currently in use, ways in which they can be adapted and improved is of key interest to infrastructure managers.

Although it was not part of the Competition Brief, a small number of entrants chose to explore the re-use and adaptation of this existing stock. The following is a sample of opportunities that have emerged.

## Parasol roofs over existing relocatables

Addition of a secondary 'parasol roof' has a number of key benefits which include:

- decreased energy use as the parasol roof reduces the heat load on the building below;
- decreased maintenance as the buildings are protected from direct sunlight and weathering;
- increased stock longevity, as a direct benefit from this weather protection;
- localised roof angles to harness greatest solar energy.
- increased covered space for learning and play;
- potential of an enhanced aesthetic.

Parasol roofs are well suited to hot, arid, humid climates yet could also have a transformative effect in other contexts. For example, parasol roofs would be an important 'first step' in the following upgrade strategies by providing protection of the existing relocatable during modification works.

## Staged upgrade of existing relocatables

The steel frames of most relocatables allow for a range of 'interventions' without compromising structural integrity, such as the replacement of internal or external wall sections with other components.

**Add-on modular components:** These could 'slot-in' within the frame to modify and extend the finite rectangular forms, or act as connector elements between two relocatable classrooms. They could be generic or purposeful, perhaps containing wet-area zones or technology intensive media labs. Similar strategies could be applied to cladding panels to improve aesthetic appeal and performance of relocatables.

**Indoor outdoor connections:** External wall panels could be replaced with sliding, folding glass or lift-up panels that connect to new external deck areas. This would help alleviate a common problem when the class bell rings and 25-30 students converge on the pinch-points of a ramp then a single leaf door.

## Landscape components

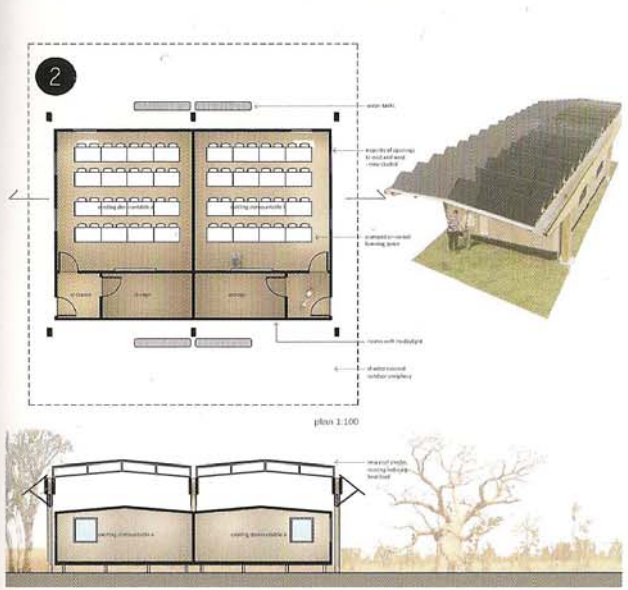
Creating a menu of 'landscape components' should be as important as developing a similar menu for the classroom interior. Landscape components could range from add-on decking elements, water tanks, shelter trees and play elements.

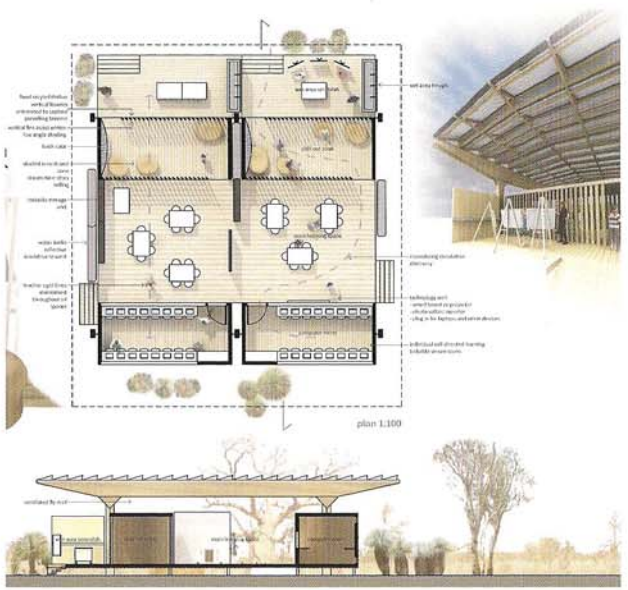
## Water

Relocatable classrooms are generally raised above the ground to allow for connection of services and ventilation. There is an opportunity to use this sub-floor or sub-deck space to integrate either rigid or bladder membranes for water capture.

## Covered Playspace

There is an opportunity to raise relocatables to provide covered play space below. Whilst this creates challenges in terms of accessibility, there will be some school contexts where this can be achieved.




## Examples from Competition Entrants

*The Generative Adaptor* was one of the design ideas that explored 'staged upgrades' to the building fabric. With two simple steps an outdated teaching environment could be transformed, ready for the 21st century:

- step one involves the installation of a parasol roof that creates new external play space and improved environmental performance;
- step two involves the insertion of new modules to extend and redefine the space for 21 century learning.

Such strategies could be appropriate to a wide range of physical contexts.

2] Design and image by Stephen Clement and Michelle Dunas


*Active walls for active kids* proposes to elevate existing relocatables to create a play 'undercroft' below. Although issues around access require further resolution, the core idea has interesting potential.

3] Design and image by David Mitchell

*Chrysalis* explored a secondary roof design that could be used to upgrade existing relocatables, be integral to future approaches, and also act as landscape components.

4] Design and image by Codessi Architects

# 05

## Landscape integrations in space and time

by Jacqui Monie


The Landscape: Integrations & Connections chapter in the FPS Phase 1 Research Compilation provided a brief for entrants on best practice school landscape design and the integration of internal and external space.

As a research team we sought to position the school landscape firmly on the agenda and at the beginning of the process of rethinking relocatable classrooms. We also highlighted the potential for a well-designed relocatable classroom to create, define and transform outside space, and the experience and use of that space.

The competition elicited numerous innovative and delightful design responses that beautifully illustrate the concepts outlined in this landscape 'brief' in ways that have been rarely found in association with relocatable classrooms, in Australia or elsewhere. A large number of these design ideas, whether explicitly or implicitly, embody a real consideration of the value and contribution of landscape integration and outside spaces in formal and informal learning, play, development, comfort, health and reducing stress levels, among other benefits.

This article captures and celebrates these design ideas, and uses the illustrations to revisit and reflect upon the key aims for landscape integrations and connections, in terms of both space and time.

1] Chrysalis: Rana Abboud & Ewen Wright (CODESSI)

### Landscape integrations in space

What is 'landscape'? In simple terms, the school landscape could be considered to be anything beyond the walls of the classroom. However, the relationship between buildings and outside space is more complex: the landscape is experienced from within the classroom, and likewise a classroom (or configuration of multiple classrooms) has a critical influence on the shape, dimensions, quality, use and experience of the spaces that surround and connect to it.

The landscape associated with a relocatable classroom therefore goes well beyond providing a few landscape elements on the outside of the building after it arrives on site, as is generally the case in the

deployment of relocatables in Australia (if at all): adding a garden bed, some mulch, a path or some seating, for example. This does little to soften the visual impact of the building, or to provide the kinds of outside spaces that nurture the development of young minds and bodies.

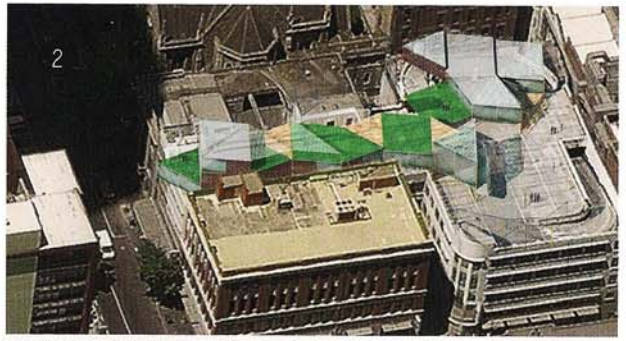
The design ideas featured in this article illustrate these spatial relationships and the possibilities for future relocatables, focussing on their placement within landscapes, the kinds of outdoor spaces they create, and how they provide for physical and visual connections between in and out.

## Landscape integrations in time

If there is to be spatial integration between school landscapes and relocatables, these objectives must also be integrated in terms of time. If landscape is seen to be important and integrated at the beginning of the design process and in planning the siting and arrangement of relocatables at a school, then effective and delightful outside spaces can be created by the building design. They can also be created by the careful arrangement of buildings in relation to each other and the existing infrastructure of the school. Conversely, if landscape is not considered at the beginning, it can be difficult to later adjust a design, retrofit a building, or change the way buildings are arranged on a site, in order to create good outdoor spaces and in-out connections.

Many of the best design ideas emerging from the competition integrated the landscape and site context from the beginning. These ideas 'set up' the outdoor spaces and the spatial relationships so that even upon the arrival of the relocatable at a school, useful and delightful outdoor spaces would be created. These spaces can then be further improved over time, with vegetation that will mature and change, or with other landscape elements (shelter, seating etc.) as budgets permit. Given the temporary nature of relocatables, there is often little or no budget left over for things that are considered 'extra', including landscape improvements. The early consideration of landscape can mitigate this to some degree.

The notion of integrating the landscape into the design and siting of relocatables over time also encompasses thinking about the landscape as dynamic and ever-changing, and something that the students and the broader school community can influence, particularly given the less formal status of relocatables. Over the life of a relocatable, whether left in place or relocated, new needs and pedagogies will also emerge that are currently unforseen, and the outside spaces need to be flexible and diverse enough to provide for these. A number of competition entries addressed these challenges.




2] Machine for Learning: Enza Angèlucci Architects. This design idea challenges us to rethink 'landscape', and shows that even an inner city rooftop can be a landscape.

## The competition: a technical analysis of landscape integrations and connections

In addition to the jury assessment of the competition entries, the research team assessed each entry according to how well it responded to the brief. Seventeen per cent of all entries received a very high score (of 80% or higher) in a technical analysis of how well they had addressed the landscape brief. A smaller number of these entries were quite exceptional in the way the landscape was integrated and central to the design idea.

The most successful of these design ideas embraced the concept of integration, whether intuitively or in response to the brief. The most successful in this respect were those that holistically addressed the design challenge set by the competition. These design ideas integrated their solutions to provide for new ways of teaching and learning, building and landscape sustainability, integration with the existing landscape and newly created outside spaces, while also providing for prefabrication and relocation. When brought together, it becomes clear that each element is critical for providing delightful spaces in which to teach and learn. Landscape plays a key role.

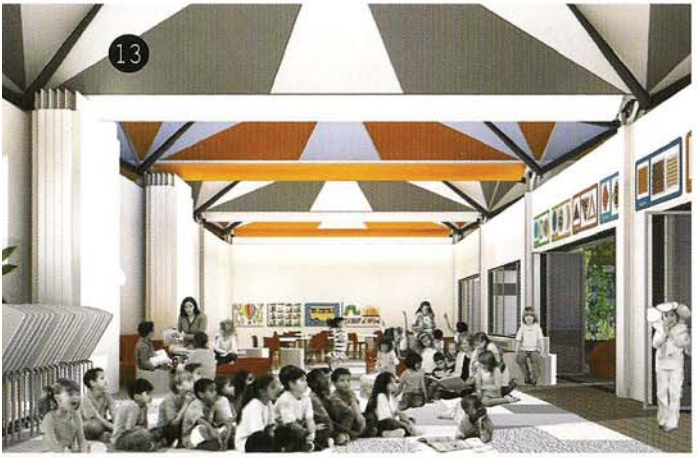
This article captures some of these design ideas, to demonstrate some wonderful possibilities for landscape integrations and connections in future learning environments associated with relocatables.

# Moving and looking in and out

The majority of existing relocatable classrooms in Australia, new and old, have poor connections between in and out, both physically and visually. Narrow entries, ramps, stairs and decks create bottlenecks and prohibit the opening up of the classroom to the outdoors. Windows are often too high for small children or those seated at desks to see out, and buildings are raised above the ground, further disconnecting the inside from the outside space.

Some of the best design ideas addressed these issues by blurring the boundary or providing intermediate spaces between inside and outside, and allowing free movement to the outdoors. These designs acknowledged the importance of the outdoors in learning and play, and supported new ways of teaching and learning which calls for more diverse and flexible internal and external spaces and arrangement of space, including the ability for a class to flow between inside and outside.

## Blurred Boundary between in and out




13] Chrysalis: Rana Abboud & Ewen Wright(CODESSI)


14] PackAdaptable: i2c Design and Management & Aurecon

'Students do not touch, hear or see passively. They feel, look and listen actively. We invite students to interact with the building form and function. Students watch and listen as the translucent bladder fills with water. Dappled light plays on surfaces as the vegetation covers the open frame for shade during the warmer months and let's light through during the cooler seasons.'


## Flows between in and out


15] C3: Classrooms, Connections, Communities: Lauren Wheaton, University of Melbourne

16] GREEN Pack+SMART Pack: dKO Architecture and AECOM

'Based on the individual configuration, the SMART Pack provide many options for spaces to intertwine with each other where there are opportunities to flow out from an enclosed space to a deck or a sandwiched deck between classrooms will be informally converted to gathering and alternative learning space.'

## Intermediate spaces

In some designs, intermediate spaces between inside and outside, or large sheltered spaces outdoors, provide substantial areas for structured outdoor learning, particularly in warmer climates. What if formal classrooms could be reduced in size, with the cost savings put into this less intense infrastructure as a part of the landscape?

17] Click-Learn: Chris Moller Architecture + Urbanism, Studio Engleback,Urban Puzzle Ltd, blue pencil & e cubed building workshop limited

The landscape strategies are based on traditional techniques, natural systems generate airflow, modify temperature and habitat for a rich learning landscape eg edible walls and kitchen gardens integrate internal/external learning from nature.

19] Mode Design. 'Open plan, naturally lit and ventilated teaching environments with direct access to the outdoors'

20] miClass: Ashton Wright

18] Eu Ric Thor & Meng Hng Ho

## Visual connections to the outdoors

The value of providing clear views to the outdoors was recognised in a high proportion of the design ideas – connecting students with the landscape and the world beyond the classroom. This was often achieved in full length glazed doors, which provide for both visual and physical connections.

# Creating outside spaces

The external design of a relocatable makes a significant contribution to the landscape. For example, the form of the facade and the arrangement of relocatables on a site define the shape and size of the adjoining spaces. The visual and physical permeability of the building affects how public or secluded the adjoining space feels. Verandahs or seating nooks affect the level of comfort and the diversity of the outdoor spaces and how they can be used.

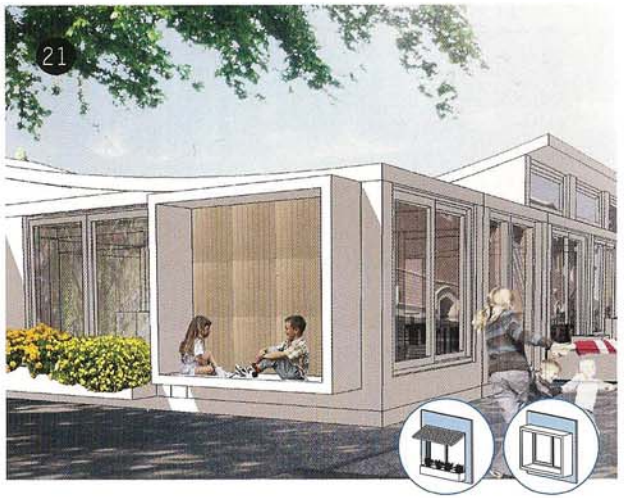
A facade can also contribute to a sense of delight in the adjoining outdoor spaces, a key aim for the design ideas competition.


## Delightful, interactive and playable facades



25] Mount It, STUDIOLS Ruimtepraktijk

21] Nest Architects




Some of the most innovative designs provided delightful facades that introduce colour and interesting building forms into the school ground. Others were interactive, allowing students and teachers to change the facade to open or close it to the outdoors, or to provide different levels of light and shade. Some created building exteriors that were playable, becoming an integrated element in the school play space. Almost 60% of entrants provided for outdoor learning and play, with many also utilising the building as an active participant.

22] Ayrine Kwan, University of Melbourne

23] Click-Learn: Chris Moller Architecture + Urbanism, Studio Engleback,Urban Puzzle Ltd, blue pencil & e cubed building workshop limited

24] GREEN Pack+SMART Pack: dKO Architecture & AECOM




26] Chrysalis: Rana Abboud & Ewen Wright (CODESSI)

'Planters designed into the verandahs of the Chrysalis provide outdoor seating, and climbing plants gradually cover areas of the facade, allowing the relocatables to visually 'grow' into their surrounding environments.'

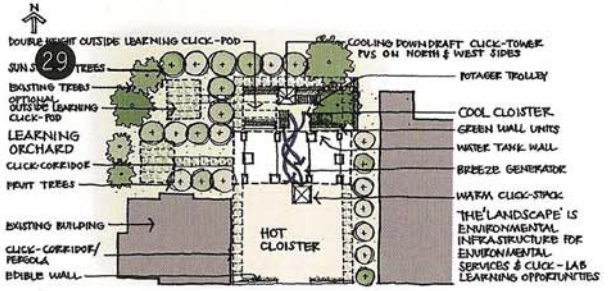
Providing flexible and diverse space in schools, where the functions are not defined, can create the most possibilities for formal and informal learning to take place. Some of the top designs showed configurations of buildings that created diverse outside spaces in terms of shape, size, function, levels of openness/ enclosure, and connectedness to the indoors. Some design ideas effectively brought the landscape indoors, with indoor plantings and internal courtyards. Two thirds of entrants looked at how their design idea would be integrated into specific real or hypothetical school landscapes.



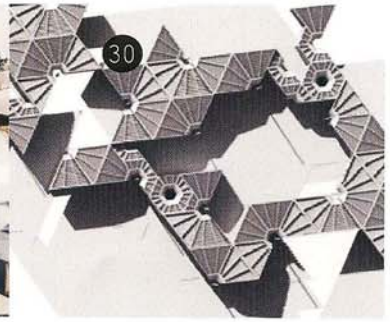
27] Dowling Architects. 'Interior and exterior areas are co-dependent and considered a continuous landscape for kinesthetic learning. Surfaces and niches allow choice for material, texture, colour and planting.'

31] Podulation: Jennifer Yang, Carol Yan & Demetri Demetriou, Univeristy of Melbourne.

32] GREEN Pack+SMART Pack:dKO Architecture & AECOM




## Arranging buildings to create diverse and flexible spaces


28] Machine for Learning: Enza Angelucci Architects

29] Click-Learn: Chris Moller Architecture + Urbanism, Studio Engleback,Urban Puzzle Ltd, blue pencil & e cubed building workshop limited

30] CoolSchool: Anastasia Globa, Victoria University of Wellington


## Enclosing spaces and bringing greenery inside


A key opportunity for creating outside spaces with relocatables may also be in terms of allowing for more free-form, messy spaces, where the students are actively engaged in the physical form and functions of the space, exploiting the temporary status of the building and its relative lack of formality. Designers of relocatables can provide the framework within which this sort of engagement can occur – creating a situation where the learners and teachers are encouraged to participate in their environment, to complete or to continually/incrementally change the space.

# 16

# Eco-badging versus integrated practice

by Philippa Soccio

## "Eco-bling is environmental jewellery for buildings."

On reviewing entries in the *Future Proofing Schools Ideas Competition*, it appeared that designers had attached green features to buildings, rather than taking more integrated and holistic approaches to include sustainability as part of the function of a building. Whether this first observation was true needed further investigation.

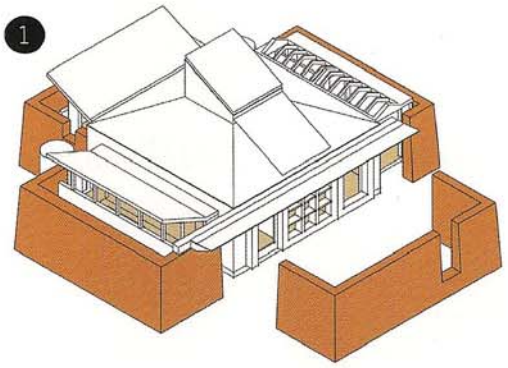
By 'sustainability' this article is referring to the full range of issues outlined in the Sustainable School Environments (SSE) brief, as overviewed in the accompanying article '*Intentions and Bias of the SSE Brief*.

### Eco-bling or Eco-badging?

When I commenced research on this article I decided to focus on 'eco-bling' versus integrated practice. 'Bling' is ostentatious, over-the-top jewellery added to an outer layer of clothing. Eco-bling is environmental jewellery for buildings.

The term 'eco-bling' was first coined by British Architect Howard Liddell in 2008. He used it to describe expensive high-tech sustainable solutions that are fixed to buildings as a display of their environmental credentials[1]. Liddell was largely concerned with the effectiveness of small-scale renewable technologies relative to their cost and long payback periods. He argues that the investment would result in greater savings (financial and environmental) if spent on "non-glaringly obvious solutions" that can be found in good holistic design[2]. Liddell gave an example

1. Liddell, H 2008, *Eco-Minimalism : The Antidote To Eco-Bling*, Riba Publishing, London
2. Liddell, H 2008, page 1




### Example: Energy

90% of entries responded to one or more recommendations on energy. PV arrays featured in around half the entries as the single most popular idea. Passive design principles, such as stack ventilation, building orientation, insulation and thermal mass also featured highly. The integration of passive principles has influenced the building form in many of the entries.

How to use thermal mass in a relocatable classroom presents a real challenge because of the weight in transport. This entry proposed an innovative solution, which was to construct (on site after the delivery of the building) an outer shell that provided thermal mass but was independent of the system.

1] Design and image by Michael Dickson
2] Design and image by Mastura Mokhtar

of how expensive this technology was. In 2008, the cost of installing a 5kW Photovoltaic array in the UK was £25,000[3] which at the time converted to $52,500AUD

In contrast, an indicative cost for installing a 4.7kW Photovoltaic array in Melbourne is now just $12,000AUD. This represents a 75% reduction in costs in 4 years[4]. Combined with an interest in how entries use green features in addition to small scale technology, this made me question whether the conversation is actually about 'eco-bling' or 'eco-badging'.

I have focused on eco-badging which I define as a 'quick-fix' approach to improving a building's 'greenness' by assigning to it green features that aren't holistically integrated into the design. They instead appear to be 'attached' as an afterthought to meet sustainability criteria.

3. Liddell, H 2008, page 17
4. Origin Energy, 2012


Eco-badging has its place, especially in the context of upgrading existing building stock. Eco-badges can be attached to a building, independent of form and prove useful for reducing carbon emissions. However in the context of the *Future Proofing Schools Ideas Competition*, designers who relied on eco-badges missed an opportunity to showcase their best ideas for holistically integrating sustainability into their buildings. Progressive thinking around the concept of sustainability is taking it beyond eco-efficiency and we hoped that competition entrants would embed ideas of this nature.

## Analysis

To more clearly understand the type of information designers were being asked to address, I reviewed the SSE brief. A total of 260 recommendations were made. Of these, 141 related specifically to building design. Through combining recommendations that were similar, for data analysis purposes, the total could be reduced to 65 criteria - still a significant number.

## Example: Materials

Materials choice was either overlooked in the majority of entries analysed or referred to generically. Much of the information about material choice was gathered from the images provided where many of the textures (timber) and the use of colours referenced biophilic design.

This entry used recycled tyres as an innovative infill under the building, to build up an undulating landscape that appeared to effortlessly cross the indoor/outdoor threshold, thus connecting the building to its site.

A random sample containing 60 entries (out of 119) was then assessed against the 65 criteria. The images and text provided as part of each entry were assessed in a 'first pass' analysis to determine if the criteria had been addressed, regardless of whether it was described or demonstrated in the design. This was followed by a more detailed investigation into the quality of the ideas. The analysis was limited by the amount of detail provided in each entry and wherever possible an entry was given credit for addressing the set criteria.

Part of a more detailed analysis of competition entries involved categorising the 65 criteria as either 'eco-badges' or 'holistic'. Some of the green features that could be regarded as eco-badges include: photovoltaics, rain water tanks, attached sun shading devices, green roofs and vertical gardens, wind turbines, LED lights, energy monitors, double and triple glazing and building signage. These are generally building features that can be added to a building independent of its form. By comparison, some of green features that need to be holistically integrated are: clerestory windows for cross ventilation, thermal chimneys, building eaves, thermal mass, acoustic treatments, insulation, windows for views and under floor heating and cooling. These are generally the building features that contribute to shaping the form.

## First Pass

Results from the 'first pass' analysis revealed surprisingly low levels of engagement with issues of sustainability. Half the competition entries either

did not explicitly address sustainability at all or only addressed between 1-5 of the 65 criteria. No single entry addressed more than 30 out of a possible 65 criteria.

### Detailed Results

On average a competition entry addressed 7 out of a possible 65 criteria. We can only speculate that there may have been too much detail in the SSE brief, or designers focused on other aspects of the competition brief as they had just two A1 pages on which to present their design ideas. Overwhelmed, designers may have reverted back to addressing the key areas within their day-to-day practice. Given the top seven responses (see below), this may have been the case, as none of these approaches are surprising. However it should be noted that the actual implementation of a couple of these was unique and worthy of discussion.

- 47% of entries had provision for the installation of a solar photovoltaic array;
- 40% of entries designed the building with catchment areas and plumbing for the integration of rainwater tanks for watering gardens and flushing toilets;
- 38% of entries provided window shading for improved thermal comfort and energy efficiency by eliminating radiant heat load on the glass;
- 38% of entries combine high and low windows to encourage cross ventilation and illuminate the space with daylight;
- 35% of entries ventilated the space naturally using a thermal chimney and the stack effect;
- 33% of entries provided appropriate insulation in the ceiling; and
- 25% of entries provided appropriate insulation in the walls.

The top three represent 'eco-badges'. Across the whole sample, forty percent of responses were 'eco-badges'. Sixty percent of the sustainability solutions were integrated, but representing good practice rather than pushing the boundaries in the way an ideas competition entry could.

This might be because eco-badges are more readily noticed on buildings or that the design teams did not describe or represent (as a graphic) how they addressed the criteria. It should be noted that the SSE brief asked competition entrants to consider a range of ideas that are less visible (such as air quality and acoustics). Whatever the reasons, the high usage of eco-badges calls for further research.

### Conclusion

The competition offered an opportunity to explore the current industry approach to addressing issues of sustainability in the design of relocatable classrooms

Two main points for future research emerged. The first was a surprisingly low level of engagement with issues of sustainability. The second issue relates to eco-badging, which is improving a building's 'greenness' by assigning to it green features that aren't holistically integrated into the design.

*Is this approach unique to the design of relocatable classrooms or is it indicative of the industry approach as a whole?*


### Example: Biophilic Design

One of the big wins was the recurrent references made to Biophilic design through the various entries in response to the SSE brief and we were excited by how the ideas varied.

Solar PVs are so commonly seen as 'eco-bling' however this solution changed our perception by using them to create the roof structure which was modelled on the resting wings of a butterfly.

3] Design and image by Rana Abboud & Ewen Wright CODESSI

# Acknowledgements


## The ARC Linkage Grant

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The views expressed herein are those of the authors and are not necessarily those of the Australian Research Council.

## Thank you

The *Future Proofing Schools* Research Team at The University of Melbourne extends its sincere appreciation to all of those who have contributed to the research process.


## Further Information

To stay updated with the Future Proofing Schools research please refer to:

www.futureproofingschools.com

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The *Future Proofing Schools* ARC Linkage Grant was awarded to:

- Associate Professor Clare Newton (Lead Investigator)
- Professor Tom Kvan [CI]
- Dr Dominique Hes [CI]
- Dr Margaret Grose [CI]
- Dr Sue Wilks [PI]
- Dr Kenn Fisher [PI]

[CI] Chief Investigators

[PI] Partner Investigators

## Research Assistants & APAI

The *Future Proofing Schools* research team has been coordinated by:

- Sarah Backhouse, *prefabrication*

The research team also includes:

- Lena Gan: *pedagogy & ICT*
- Philippa Howard: *PhD student (APAI)*
- David Lister: *parametric design*
- Jacqui Monie: *landscape architecture*
- Alissa Raj: *team support*

## Our Industry Partners

*Future Proofing Schools* acknowledges its Industry Partners:

- Department of Education & Early Childhood Development (VIC)
- Department of Education & Training (WA)
- Department of Education & Training (NSW)
- Department of Employment, Education & Training (NT)
- Department of Education, Training & the Arts (QLD)
- Catholic Education Office Melbourne
- Office of the Victorian Government Architect
- CEFPI (Australasia)
- Hayball Architects
- Mary Featherston Design
- TeeCh Project
- Rubida Research

## The Competition Jury

*Future Proofing Schools* acknowledges the contribution by the Competition jury:

- Jill Garner, The Associate Victorian Government Architect
- James Timberlake, Kieran Timberlake, USA
- Arie van der Neut, HVDN Architecten, The Netherlands
- Gini Lee, Professor of Landscape Architecture, The University of Melbourne, VIC
- Leanne Taylor, Director of Planning and Infrastructure, DET, NT
- Lee Callum, Executive Director, Stratedy, Planning + Performance, DET, QLD
- Tim Fitzgerald, Director of Wannick Unit, DEECD, VIC

## Sponsorship of Competition Prizes

*Future Proofing Schools* acknowledges the Competition prize sponsors:

- Professional prize categories: Melbourne School of Design
- Student prize categories: Civica Education

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