

Newsletter #03, October 2011

July and August were busy months in this pivotal year for our Future Proofing Schools ARC Linkage Grant. We launched the Future Proofing Schools Competition and hosted the Talking Spaces 3 Symposium, and were well occupied by all that is involved 'behind the scenes' in organising two such high profile events.

The Future Proofing Schools Design Ideas Competition went live in 4 July and registrations closed on September 19. During that time, more than 450 entrants registered and we are hoping that will translate to over 100 submissions when the Competition closes on October 31.

We have also been delighted by the overwhelmingly positive response to our Talking Spaces 3 symposium that was held in August. On Day 1, speakers shared a rich variety of perspectives with many senior people from interested organisations were able to make time in their busy diaries to attend. RM Education, who have sponsored the tertiary student competition prizes, set up an immersive learning environment and facilitated a hands-on workshop for attendees.

On Day 2, delegates had the chance to visit some of the most innovative new learning spaces at the University of Melbourne, followed by a prefabrication factory visit hosted by our hosts at Modscape.

The Symposium also provided an important moment for our Competition Jurors to meet face to face, as due to their interstate and international provenances the judging process will take place on line. We share more on the Symposium with you in this Newsletter.

In addition, our research related activities continue. PhD student Pippa Howard is planning her next round of visits to check on the environmental monitoring equipment that is installed in 8 relocatable classrooms around Australia. Dominique Hes is currently in Europe, first attending a conference on sustainability at the University of Leeds, then travelling to meet and collaborate with academic and professional colleagues such as architect [and FPS Competition Juror] Arie van der Neut. The entire team is also in a writing phase for future publications, so we'll keep you up to date on these activities.

Additionally, Sarah Backhouse has been running a Design Studio with final year Masters of Architecture of students who are following the Competition brief for their thesis. Mary Featherston and Richard Leonard were able to join the group of 17 students for the mid-semester review and see the wide range of ideas that students have been exploring for relocatables of the future. We look forward to sharing all the design ideas with you once the on-line gallery goes live in early December.

And me? I'm currently in Japan with Tom Kvan to see first hand the automated technologies of some of the country's leading housing manufacturers.

Clare Newton

Coming soon...

FPS Design Ideas Competition

Submission close 5pm on 31st October, winners announced end of November and on-line gallery opens early December.

We will keep you updated.

<http://www.msducubator.com/fps/competition/>

Below: From left Mal Parr, Leanne Taylor, Kerry Kasmira and Richard Leonard. *Photo: D. Hes*



Above: Talking Spaces 3, Day 2 tours.

Photo: J. Monie

Below: James Timberlake and Arie van der Neut, Talking Spaces 3. *Photo: D. Hes*





Japan prefabrication visit

by Clare Newton

The research into prefabrication has taken team members of Future Proofing Schools into Germany, the Netherlands, Britain and the USA. The research trip to Japan, postponed after the horrific tsunami in March, has now taken place. Tom Kvan and Clare Newton were able to meet with Professor Shuichi Matsumura at the University of Tokyo on Tuesday October 11 to discuss prefabrication technology in Japan. Professor Matsumura's frank evaluation of industrialised housing production in Japan gave an invaluable context for factory visits the following day.

Professor Matsumura's context overview

In the 1950s, Japan was leading the world in industrialisation. The single housing market became strong in the 1960s as income levels rose with most using lightweight steel and panelised construction. Unlike the United States and Australia, the market is based primarily on individual orders rather than speculative development. In Japan, the market tends to perceive prefabricated housing quality as higher than in situ construction. Indeed prefabrication manufacturers have had to follow special government requirements as an industrialised process. The experience of mass customisation in the car industry of the 1980s did filter into factories. In the latter half of the 1980s, information technology was introduced to control production lines. Production varies from company to company with a mix of robotics and hand construction. At Sekisui Heim the welding of the moment frame is by robotics. Energy consumption meters are increasingly used in houses with subsidies from government but other smart systems are not yet in demand by customers.

Professor Matsumura explained that the domestic market in Japan will dramatically change from now on with a reducing population and extended housing life as quality has improved. In the last twenty years the 80 trillion Yen investment in construction has halved. The number of housing units in Japan has also halved in that time.

The prefabricators in Japan are typically large providers who currently offer complete design and construction services for customers rather than involve architects and designers outside the company.

The factory visits

Three distinct prefabrication production methods were viewed on October 12, 2011 beginning with a visit to the world's largest factory producing unit housing (rather than a kit of parts or flat pack approach).



Above: Sekisui House - display of construction systems. *Photo: C. Newton*

Below: Sekisui Heim - display house. *Photo: C. Newton*





Japan prefabrication visit *(continued from page 2)*

Sekisui Heim uses a mix of robotic and hand construction with 80% of each house completed in the factory. Houses tend to be small with an average house using 13 modules or units. Each unit takes approximately five hours to complete in the factory and 130 units (or ten houses) are completed daily. Units are 2.5 or 1.3 metres wide and range from 1.8 to 5.4 metres in length. Ceilings and floor linings are placed with automatic feeding machines and screwed with robotics. Packs of colour-coded wiring are laid into a reversed ceiling at waist height which is then inverted for final fixing. A large unit assembling machine puts together the floor, ceiling and walls with robotic welding of all eight corner joints at once. Accuracy is checked by another robot making 9,000 checks in two minutes. After assembly of the frame, external wall linings are placed and fixed with concealed daisy rivets. Units are finished in two factory lines with a fast track line for the more straightforward units and a slower track for units with stairs and bathroom or kitchen fittings. A customer's order can take just one month in the factory, a day to be assembled on-site and a further month to finish.

At Sekisui House, the prefabrication approaches are distinctly different. As well as the steel factory, timber factory and recycling factory, there is a House Museum and display village on-site. The steel construction factory includes highly automated processes for cutting, drilling, welding, assembling, coating and baking. The second factory for post and beam timber construction systems uses concealed steel brackets ready for on-site joining. In the timber factory, 3D computer models track each component being manufactured. Each year, 30,000 people visit the house museum and display village. As well as viewing completed houses, visitors see construction techniques and how joints can survive vibrations of 50mm. The third factory visited at Sekisui House is entirely for recycling waste products and development of waste into new products such as recycled plastic roofing battens. Virtually all waste is recycled with figures for September showing 0.02% discarded. The recycling factory is located adjacent to a 'Zero Emission display house' which includes an experimental moss covered roof, photovoltaic cells in glass, recycled glass floor tiles, photo catalyst wall coatings and smart systems for energy monitoring.

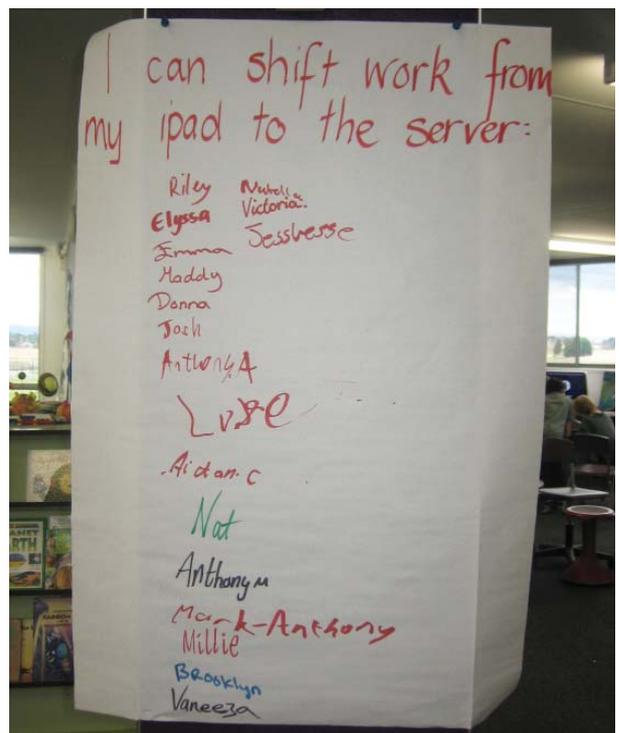
Sekisui House is one of the world's largest housing manufacturers having built 2 million houses since the 1960s. About 30-40% are still standing. With 57 million housing units across Japan currently, Sekisui House has built around 1% of current housing stock.

<http://www.sekisuihouse.com/zeh/eng/>

Visual Snapshot: St Joseph's School, Mernda, Victoria



Above: One of a number of 'village hubs' in the school which are adaptable to a variety of activities such as student performances, prayer time and home group meetings. The prefabricated building modules are by KL Modular, Kinglake, Victoria. Photo: S. Backhouse
Below: This photo reminds us how digitally native today's primary students are... Photo: S. Backhouse



Talking Spaces 3

by Sarah Backhouse

There is no escaping the fact that the topic of relocatable classrooms is a contentious one, and this is especially so when the topic is debated within a mixed audience. At this year's Talking Spaces 3 Symposium, there were certainly a good number of delegates who started the day by questioning the very existence of relocatables, an opinion that is frequently mirrored by the media.

Yet the framework of the day managed to challenge a great number of such preconceptions, and we have received subsequent feedback that suggests attendees now more fully understand and appreciate the need for relocatable infrastructure. Negative preconceptions related to prefabrication also started to shift over the 2 days which was reinforced by the quality buildings that delegates saw during the Modscape factory visit.

The Symposium attracted a host of new faces and a high number of senior attendees from State Education departments, architecture and design practices, and the Directors of Grove Group and KL Modular.

Below : Session 2 Panel of Mark Burry, Tom Kvan and Wayne Craig
Photo: D.Hes



Our Jury from left : Leanne Taylor, Arie van der Neut, Tim Fitzgerald, Lee Callumm, James Timberlake, and Jill Garner. Juror Gini Lee was unable to attend. Photo: D. Hes

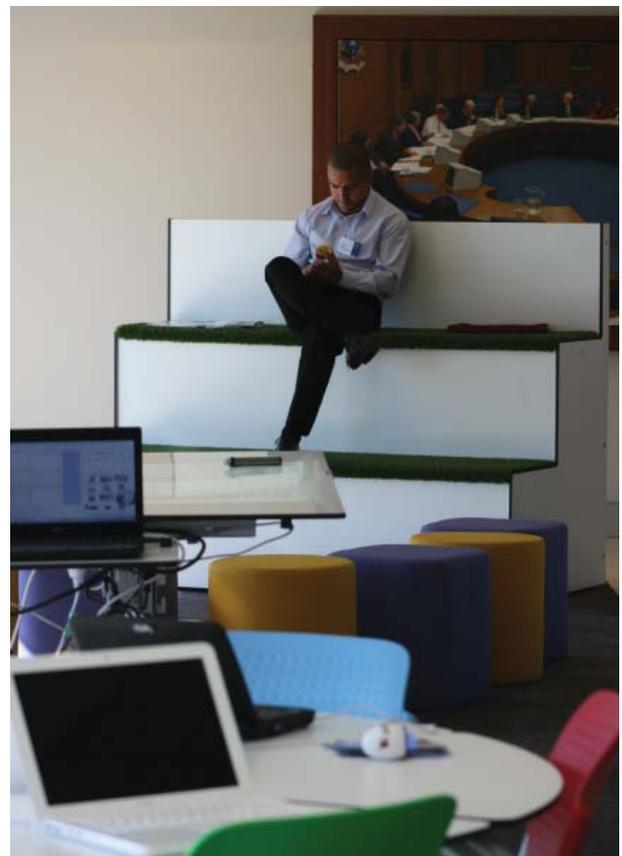


Our very special thanks go to our all speakers, facilitators, tour guides, Modscape, Caroline Handreck at the Woodward Centre and Mary + Steve caterers who made such an information filled event possible.

You are able to review the Symposium's agenda and listen to the audio recordings of the main sessions of Day 1 at the following link :

<http://www.msd.unimelb.edu.au/events/conferences/talkingspaces3/index.html>

Below : RM Education's hands-on immersive learning environment.
Photo: D. Hes





Relocatables and priorities

by Lena Gan

One interesting research exercise we have conducted this year is asking educators and infrastructure department representatives to outline their priorities in response to a number of criteria such as cost, environmental comfort, internal layout and appearance. Survey participants were asked to indicate their rating for each variable:

High priority **H** | Medium priority **M** | Low priority **L**

Although the survey only represents the priorities of a small sample group of respondents, we see the educators tend to prioritise indoor environment quality and the need for internal adaptability, and the infrastructure representatives tend to prioritise cost and speed of installation.

Educators Priorities:

1] Acoustics 2] Thermal Comfort | Storage | Glare | Air quality | Daylight

Facilities/infrastructure:

1] Costs 2] Acoustics | speed of manufacture & install. 3] Standard module size

We are keen to build up a more complete set of views, so if you haven't yet had the chance to complete the survey and would like to do so, please contact Lena Gan at lgan@unimelb.edu.au.

The adjacent table indicates a summary of feedback to date.

		Educators Priorities:											Infrastructure Priorities:							
		Remote: Prin	Regional	Regional	Regional	Regional	Regional	Outer Metro	Outer Metro	Reg: Prin	Regional	Metro: Prin	Reg: Prin	Metro: Prin	QLD	QLD	NT	NT	WA	VIC
Design	Choice of layout configuration	H	H	H	M	H	H	H	H	M	H	H	H	H	H	H	M	L	L	M
	Ability to respond to varied site conditions (slopes)	H	L	H	H	L	M	M	H	L	M	H	L	H	H	H	H	M	M	M
	Ability to respond to varied climate conditions	H	M	H	H	H	M	H	H	H	H	H	H	H	L	M	H	L	H	H
	Ability to fit in with local/school look	H	L	M	M	H	L	M	H	L	H	M	M	L	L	M	L	L	M	M
	Visual integration into landscape	H	L	M	L	L	L	M	H	L	M	H	M	L	M	M	M	L	H	H
	Environmentally sustainable design (ESD)	H	H	M	M	H	M	H	M	M	M	H	H	H	M	H	M	M	M	H
	Add-on options (deck, pergola, furniture, etc)	H	H	M	H	H	M	M	H	H	H	H	M	H	H	H	M	L	M	H
	Orientation on site – facing north for example	H	H	H	H	H	L	M	H	H	H	H	M	H	H	H	H	H	H	M
	ICT – integrated, fit for purpose	H	H	H	H	H	H	M	H	H	H	H	H	H	H	H	H	M	H	M
Two-storey option (footprint/m2)	L	-	-	-	-	L	L	L	L	L	L	L	L	L	L	L	L	L	L	
Adaptability	Ability for staff to reconfigure internal layouts	H	H	M	H	M	H	H	H	M	M	M	M	M	M	L	H	M	L	L
	Internal storage spaces – cupboards	H	H	H	H	H	H	H	H	M	H	H	M	H	H	M	L	M	L	M
	Internal wall space for display	H	H	H	H	H	H	H	H	M	H	H	M	H	H	H	M	H	M	M
	Add-on options (wet areas, floor finish, etc)	H	H	H	H	H	M	M	H	H	H	H	H	H	H	H	M	M	M	M
	Indoor – outdoor connections	H	M	M	M	M	M	M	H	H	H	H	H	H	H	H	M	L	H	H
	Linkage of additional modules	H	M	H	M	H	L	M	H	M	H	M	L	H	H	M	L	M	L	M
Internal	Day-lighting, glare – blinds, blackout option	H	H	H	H	H	M	M	H	M	H	H	H	H	M	H	M	L	M	
	Temperature, humidity, air quality	H	H	H	H	M	H	H	H	H	H	H	H	H	H	H	M	H	H	
	Acoustics – relatively soundproof	H	M	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	M	M
	Openable windows for fresh air & breezes	H	H	H	H	H	L	H	H	H	H	M								
	Air conditioning & heating	H	L	H	H	H	H	H	H	H	H	H								
	Able to open up to a double classroom	H	M	H	M	M	M	H	M	H	H	M								
	Floor does not vibrate when people move about	H	M	H	H	H	H	H	H	H	H	H								
External	Floor finishes – carpet & lino	H	M	H	H	H	M	H	H	H	M									
	Proximity to main school buildings	H	L	H	H	H	M	M	M	M	H	H	H	L	L	H	M	H	L	L
	Proximity to toilets	H	L	H	H	H	M	H	H	H	H	H	H	L	L	M	M	H	L	L
	Footprint options (dense urban solutions)	-	L	-	M	-	L	M	M	M	H	H	M	-	L	H	M	H	M	M
	Add-ons - awnings for sun protection, deck etc	H	H	H	H	L	L	H	H	H	M	H	M	H	M	H	M	H	L	M
Characteristics	Robustness: can cope with multiple moves	-	L	M	M	L	M	M	L	L	H	H	M	H	M	H	H	H	L	L
	Transportability: modular, flat pack...	-	L	M	M	L	L	M	L	L	M	H	L	H	L	H	M	H	M	M
	Standard module size	-	L	H	M	L	L	M	L	L	H	H	H	H	H	H	H	H	H	L
	Speed of manufacture + installation on site	H	L	M	H	L	M	M	L	H	H	M	H	H	M	H	H	H	H	H
	Ease of installation: work on-site is minimal	-	L	M	H	L	M	M	M	L	M	M	M	M	H	M	H	M	H	H
Value for \$	Cost of manufacture	H	L	M	H	L	H	M	-	L	H	L	-	H	H	H	M	H	H	H
	Cost of installation/relocation	M	L	M	H	L	M	M	-	L	H	L	-	H	H	H	M	H	H	H
	Cost of refurbishment	M	L	M	H	L	M	M	-	L	H	L	-	L	M	M	L	M	L	M
	Cost of internal reconfiguration	M	L	M	M	L	H	M	-	L	M	L	-	L	L	M	L	L	L	L
	Life cycle costs	M	L	M	M	L	M	M	-	L	H	M	-	H	H	H	M	L	L	H
Operating costs / energy consumption	H	L	M	H	H	H	M	H	M	H	H	H	H	M	H	M	L	L	H	

A lunch with Kent Larson

by Sarah Backhouse

Kent Larson directs the Changing Places research group at the MIT Media Lab in Boston. He is also director of the MIT House_n Research Consortium and the MIT Living Labs initiative in the School of Architecture and Planning. His varied interests include the future of scalable, mass-customisable, prefabricated architecture.

During his recent visit to Melbourne, members of our research team (architect Sarah Backhouse and graduate architect David Lister) were lucky enough to interview with Kent over lunch for the Future Proofing Schools research project.

We share with you 4 big questions that were put to him:

FPS team Q1: *One of the big challenges we are finding in Australia is how to bridge the current knowledge gap that exists between architects and manufacturers, and this could be holding back new ideas that could help us address some of the big social challenges we currently face such as high volume, good quality and affordable housing, or creating sustainable and relocatable infrastructure to support rapidly changing demographics. Is this the same in the USA?*

KL: That's a difficult one. There are lots of really good design ideas out there for lots of things, but there's a lack of *scalability* and *inter-changeability*. These ideas need to be transformed into *product families* that can work together. Unless architects actively engage with the manufacturing industry to imagine, develop and create scalable components, products and systems, then the great ideas out there – no matter how good they are – remain just that, ideas.

There need to be incentives to generate new conversations and start new relationships. Then we could start a new era in construction that avoids common stories today such as manufacturers saying "we can't do this as we would never meet the budget" and "it's non-standard so we'll have to add a premium to that" or architects saying "we can't work with this, it's just too limited!"

FPS team Q2: *Do you think that the idea of designing a house needs to change to be a more marketable and competitively priced commodity? It's certainly happening in clothing and product design. What potential is there for architects to develop affordable, mid-range, prefab housing solutions in the same way?*

KL: With housing there is a fantastic opportunity to take that approach. Just imagine if one of the well

known multi-nationals such as Virgin worked with architects to develop their own brand houses? Virgin are already proposing to take us to outer-space! IKEA has already had great success in the European market place with their BoKlok houses. *Volume is the key*; have one big client group who have quality architects associated with their brand and can keep prices down.

For more on BoKlok: <http://www.boklok.com/theconcept/>

FPS team Q3: *How important do you think digital technologies are for the future of architecture?*

KL: Technology – especially today's digital technology – is the key for future design tools and for manufacturing tools, and the interface between these two will be critical. Technology will be a vital platform for integrating the ideas of architects and manufacturers.

FPS team Q4: *And what about the future for prefabrication?*

KL: We've recently worked on some ideas projects with some of our research partners*. They are developing some great technologies that could have architectural applications, and we're working together to imagine what these could be. Electronics and technology companies are so dynamic, with new ideas emerging daily, so they're great research partners. I'm always amazed at how forward thinking the technology companies are.

We've already talked about the need for *product families* and inter-changeability. Just imagine if architects and manufacturers had the possibility of inserting a compatibly sized wall panel from a technology company into their buildings, a panel that came with fully integrated technology. Wow, what a potential goldmine! We could have high tech, highly customisable prefab housing... but a fundamental mind-shift is required by all parties in order to achieve this. We need more systems thinking and similar sizing strategies across different sectors of the supply chain...

For more on Kent's research: <http://web.media.mit.edu/~kll/>

** For list of MIT Media lab's research partners:* <http://www.media.mit.edu/sponsorship/sponsor-list>

Want to know more?

You can listen to Kent Larson's University of Melbourne lecture at:

<http://www.msd.unimelb.edu.au/events/special-lectures/kent-larson.html>