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Competing in Architecture
Crowdsourcing as a Research Tool

Abstract
Architectural competitions are powerful strategies for generating visual ideas for new futures. Academic research generates new knowledge based on rigorous investigations of informed propositions. This paper describes an unusual merging of a research process with a competition process using crowdsourcing to leverage knowledge. The Australian Research Council (ARC) is the pre-eminent funding body of academic research for universities across Australia. In 2010 a multidisciplinary academic team, with twelve industry partners including six education departments, successfully sought ARC research funding. The application proposed an unprecedented strategy to include an open Ideas Competition in the middle year of a three-year research program as a form of crowdsourcing to leverage knowledge between academia and industry. The research project, entitled Future Proofing Schools, was focused on Australia's relocatable school buildings.

Keywords: Crowdsourcing, architectural competitions, multidisciplinary designs, prefabrication for schools, competitions as research.

Introduction
The research project at the centre of this paper is a three-year Australian Research Council Linkage Project which has sought to *redefine the relocatable classroom* within Australian schools. Relocatable classrooms within Australia accommodate up to thirty percent of government school students in some states and yet they are not given the same design attention as the permanent buildings. The multiple contexts influencing the design and procurement of the relocatable classroom had led to them being viewed as *temporary.* At a time when the quality of permanent school buildings in Australia was being recognised internationally, the large contingent of relocatable classrooms continued to be designed as prosaic and functional rather than delightful.

As academic researchers, we were aware of tipping points occurring across a range of disciplines and were interested to develop confluent solutions that could encourage and inspire *change*. Our research focus was to explore the potential for design-led transformation of these utilitarian relocatable classrooms. Such a cross-sectoral challenge required manufacturers, architects and client groups to work together and imagine what these learning spaces might look like in the future. With a background as a Competition Advisor for the Australian Institute of Architects, the first-named author saw untapped potential for competitions to be a two-way process of engagement between academia and industry.

Choosing a competition as an academic research strategy
This project is the first time that Australia's pre-eminent research funding body for academic research, the Australian Research Council, has funded a project that includes a design competition as a pivotal element of the research methodology.

In Australia, competition processes are largely based on those from the RIBA (Royal Institute of British Architects) and the UNESCO- UIA (International Union of Architects). While competitions in Australia are not as common as they are in Europe, they still form an important role for significant buildings and/or sites. The Australian Opera House is Australia's most significant competition outcome.

Competitions are typically conceived as a one-way knowledge transfer process with competitors addressing the needs of a client. In contrast, a key aspect of our strategy was to use the competition brief as an educative tool aimed at shifting knowledge within our design community on tipping points within education, design and construction environments.

Choosing a competition as a crowd-sourcing strategy

Ideas Competitions present opportunities to explore complex issues through many lenses, although their potential as a means of crowd-sourcing in architecture is not yet highly developed. Jeff Howe first introduced the concept of *crowd-sourcing* in 2006 as "the act of taking a job traditionally performed by a designated agent and outsourcing it to an undefined, generally large group of people in the form of an open call" (Howe, 2006). These *open calls* detail specific tasks or problems, and individuals and groups are invited to submit creative proposals in response (Biggar, 2010). This was the approach of the *Future Proofing Schools Design Ideas Competition*, where we made an open call to the design community.

Using competitions within a research methodology

Our research methodology, supported by our six education department research partners from across Australia, was developed as a three-phase process. The Competition was seen as a form of "open call" for the design community's assistance in tackling this particular design problem. Phase 1 involved research to inform development of the Competition Brief; Phase 2 included the Competition Period and adjunct dissemination activities; and Phase 3 analysed the Competition entries and how their ideas could be applied in a real world context.

Figure 1: A three phase research process (Source - FPS Research Team)

The Competition demanded a lot from its entrants. It expected exploration of sustainable design, 21st century pedagogies, future prefabrication possibilities for parametric design and mass customisation as well as effective landscape integrations across various Australian locales. The open and public characteristic of competition processes reminds us that they "should be seen as a democratic opportunity through the infusion of a rich set of alternatives to a given problem" (Chupin, 2011).

Australia does not have a strong history of using competitions to invite new architectural ideas compared with Europe but there are still significant buildings resulting from competitions including: Walter Burley Griffin and Marion Mahony Griffin's winning entry in the Federal Capital Design Competition of 1911 which informed the design of Canberra, our capital city (Johnson, 1977); Mitchell Giurgola and Thorpe's winning entry of 1979 to design Australia's Parliament House (Beck, 2000); and, of course, the well known Sydney Opera House competition of 1973 by Danish architect, Jørn Utzon. Competitions bring value for projects which are highly contentious, on significant sites, or for complex problems where a range of alternatives help us visualise new futures. Competitions may be

one-stage or two-stage, open registration or invited and may be with or without anonymity. They may be run to select a winning building, winning ideas or a winning design team to work further with a client to develop a built outcome. Not all architectural competitions are about immediate built outcomes and project commissions. Speculative or ideas competitions play an important role.

What we saw as an interesting concurrent strategy was the concept of 'crowd education' in that we sent out to the design industry a detailed and educative brief on current issues in pedagogy and space, sustainability and prefabrication strategies.

> Research efforts examining the ways in which crowd-sourcing can be conceptualised as not just an online business model, but rather a problem solving model aimed at dealing with social and environmental problems, are nascent and require new research frameworks (Brabham, 2008).

Our ambitious aims for the research were to:

- capture, into an online competition brief, the manifold viewpoints and contexts influencing the design and procurement of the temporary classroom;
- launch an educative and two-way conversation both online and via a symposium called 'Talking Spaces' with presentations by the members of the international jury;
- invite responses to the brief via an open competition;
- support an online jury process with anonymous entries;
- analyse the entries, synthesise key themes and opportunities;
- and disseminate responses and observations to inform and inspire change.

The online format captured an international audience. From the anonymous entries, we were interested to see winners from four countries. That people were willing to participate in an ideas competition with a complex brief demonstrates the interest people have in being part of design and problem solving conversations. Howe (2009 p14) suggests

> Crowdsourcing capitalises on the deeply social nature of the human species. Contrary to the foreboding, dystopian view that the Internet serves primarily to isolate people from each other, crowdsourcing uses technology to foster unprecedented levels of collaboration and meaningful exchanges between people from every imaginable background from every geographical location.

The relocatable classroom in Australia

The benefits of relocatable classrooms in Australia

Relocatable classrooms are an important planned response to the provision of Australian education infrastructure for both government and privately funded schools. These prefabricated buildings (Figure 2) vary somewhat across Australia but tend to be prosaic rather than delightful in their design.

As a young country with a growing population, our education departments follow a '*Core Plus*' model of school facility provision in which a '*core*' of teaching and support facilities is located in *permanent buildings*, and accommodation needs above that 'core' capacity are located in *temporary, relocatable classrooms*. As well as coping with shifting demographics, they also provide a rapid response in the aftermath of events such as fires, floods and cyclones, and are used in remote communities where construction labour and materials are scarce.

These utilitarian classroom buildings have been part of Australia's educational scenery

for decades but continue to look like makeshift rather than planned solutions. Many Australian students will have spent part, if not all, of their schooling in these buildings.

Figure 2: Examples of relocatable classrooms across Australia (Source - FPS Research Team)

Should 'temporary' equal lesser quality?

Is 'temporary' a justification for lesser quality? Society tends to consider temporary as a reasonable justification for lesser quality. When we go camping, we willingly adjust to lightweight tents. When we picnic, we're happy with simple paper or plastic plates. If the relocatable classrooms are only in place for a few years to accommodate a peak in student numbers or to provide temporary schoolrooms after a disaster, do they need to more than reasonably comfortable and functional?

Firstly, there is an important issue of perception. For the infrastructure manager in an education department, they will view these classrooms as *temporary* if they are in place for a five of six-year period. For many students, five or six years will coincide with the entire time at a school, so in their experience of the school, these classrooms are *permanent*. Secondly, these temporary spaces are not moved very often and even if they are moved, they still have an overall life of fifty or so years. Ultimately, all students deserve access to learning spaces of quality. We believe these spaces are as important as the permanent school spaces and argue that relocatable classrooms should be designed as *permanent quality yet moveable buildings.*

Given these temporary buildings are an important part of Australia's education infrastructure, how might they be designed so they might be proudly positioned at the front of

a school rather than hidden away at the rear? It was around this question that the *Future Proofing Schools Design Ideas Competition* became a central part of our research methodology.

The Future Proofing Schools' Competition

The *Future Proofing Schools Ideas Competition* featured both professional and student categories. We opened up registration to all and required anonymity to give confidence to entrants that all designs would be considered on an equal footing.

The three-phase research process (Figure 3) placed the Design Ideas Competition at the heart of the action research methodology.

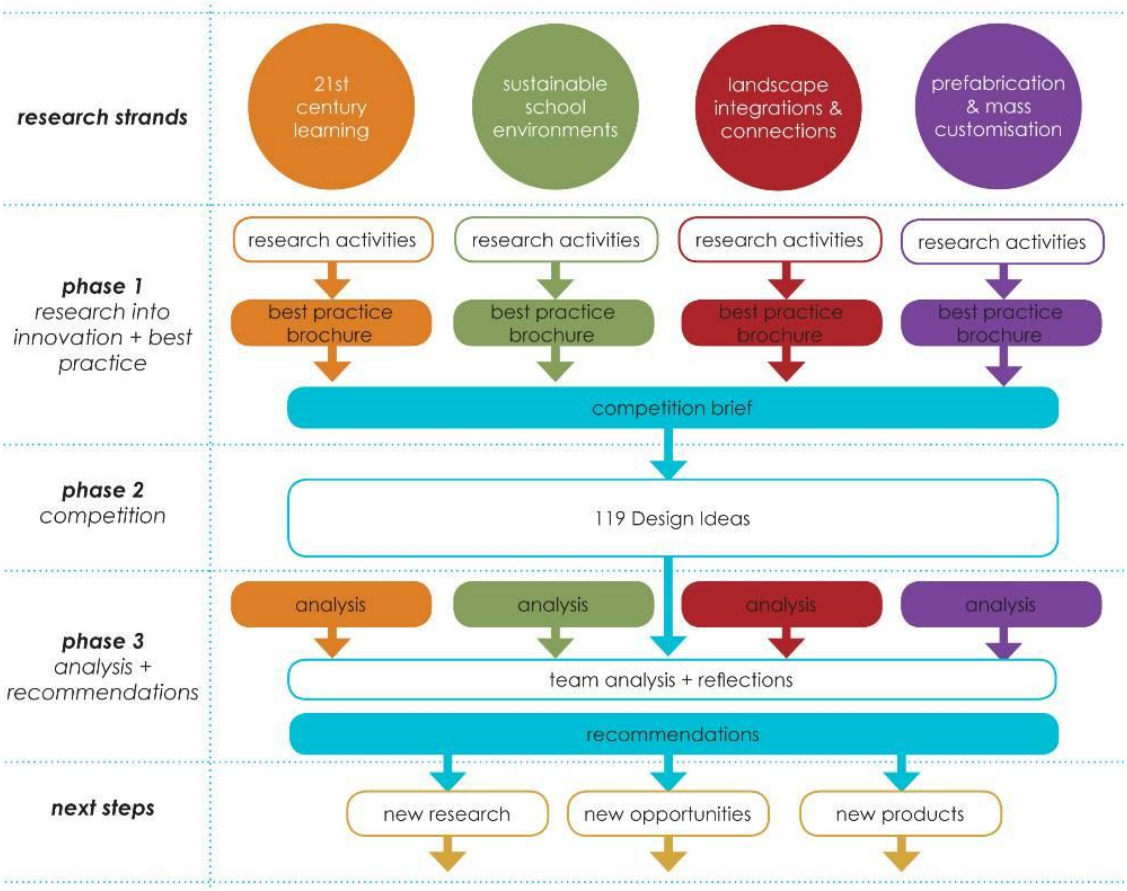

Figure 3: The three research process (Source - FPS Research Team)

Preparing for the Competition

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 School Environments*; *Landscape Integrations and Connections*; and *Prefabrication*. Members of the research team visited 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 to Europe, the USA and Japan, where conversations with manufacturers, architects and client groups highlighted opportunities, constraints and

inspirational new ideas. Research partners brought vital industry knowledge, and the collaboration with education departments from all corners of Australia's mainland made the research and its possible outcomes real and tangible.

Although this research phase focused on investigating and distilling key research findings and issues, it was essential that the four reference documents had a life and relevance outside and beyond this single event.

The Competition Brief

The Competition Brief was complex, but so too was the design challenge.

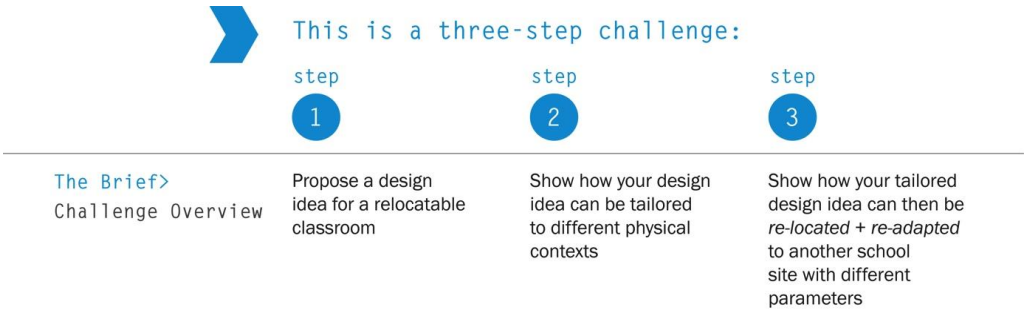

Figure 4: A three step challenge (Source - FPS Research Team)

Our brief sought Competition responses that explored not only the *physical* but also the *temporal* and the *cultural*. We invited entrants to propose a generic design idea, *adapt it* to a particular location, and then *re-adapt it* to another context. *Transferability* was required from one climate zone to another, from one physical and cultural context to another, and from one pedagogical style to another. The building solution needed to support and enhance a wide range of pedagogies. For the relocatable classroom to be future proofed we invited design ideas that explored how it can adapt from one climate zone to another; to a wide variety of physical and cultural contexts; and to support changing teaching and learning styles.

Figure 5: The Hierarchy of Competition Documents (Source - FPS Research Team)

The three-step challenge (Figure 4) invited designers to develop a design idea that: responded to a range of parameters and contexts; was both customisable and economical; and supported both relocation and adaptation of buildings to new contexts at some point in the future. The wording of the brief was developed, reviewed, questioned and refined in collaboration with the multi-disciplinary team and industry partners. The Competition Brief was also supported by our four 'best practice' research brochures (Figure 5).

The Competition Launch

The competition period was kept short, just four months, in keeping with expectations for an Ideas competition. The launch and its publicity were crucial to entice the maximum number of entries. In additional to the on-line announcement and launch of the Competition Brief, a Symposium on the theme of relocatable classrooms increased interest in the topic. Authenticity was crucial to this event, and discussions spanned education and infrastructure to architecture and manufacturing. One speaker was the principal from a remote community school in Australia's outback who shared stories of her day to day challenges in creating a nurturing learning community in a context where distance and culture could be divisive. Another speaker, an architect from the Netherlands, discussed approaches for creating high quality yet relocatable architecture. Although hosted in Melbourne, the Symposium was fully recorded and posted on the Competition web-site.

The Symposium was also a unique moment when all the Jurors were able to meet in person to exchange ideas and establish relationships as the international judging process later took place on-line.

A Web Based Competition

The utilitarian temporary classroom is not unique to Australia. They are also important components of education infrastructure in the UK, the USA, and New Zealand. As such, we aspired for the Competition to gain international interest and entrants. A web-based format was developed to allow for the greatest local and international reach.

The website was developed in order to communicate with various audiences throughout the life of the Competition and beyond. It disseminated the competition brief and the four research brochures. It was the submission portal and it was the secure judging gallery during the jury deliberations. After announcement of the winners it became the submission gallery that celebrates the work of the 119 entrants, and today it acts as an educative resource and reference point for the wider community (University of Melbourne, 2013).

The Jury Process

The multidisciplinary nature of the Competition topic required a jury that represented expertise in architecture, prefabrication, education, infrastructure, landscape, designing for indigenous communities, and government policy. It also required national and international representation. It was important to consider the practicalities of the jury process with jurors located in The Netherlands, The USA, and distributed across 3 time zones of Australia.

Whilst it is common for competition submissions to be made via a web-based portal, we were unable to find examples of competitions that were judged solely on-line. Working alongside two web designers, an on-line, secure judging gallery was created. A three-stage review and voting process firstly allowed jurors to review all submissions in advance and cast tentative votes as *yes*, *no* or *maybe*. During international teleconferences, jurors were then able to discuss at length these votes and create a shortlist. The web-based system allowed the Jury Chair to control the display, so that all jurors saw the same material simultaneously.

For such a process, it was also essential to place boundaries around the competition submission. We limited the size of entries to two A1 size sheets which would allow for exhibition printing. We also required entrants to submit A3 size reductions for the purposes of the online gallery.

The jury met twice by teleconference, and also spent many additional hours becoming familiar with the schemes. In between teleconferences, jurors shared views via email. With

over one hundred high quality entries to review, the international jury found the decision process arduous and their hard work was highly valued.

Introducing the Winners

Ultimately there were clear winners. The Competition was anonymous and so it was interesting that the jury selected winning entries from 4 countries.

The first prize winner in the Professional Category had developed a deceptively simple and clever idea. With a core proposition of two base modules, a vast number of configurations were possible. The entry proposed a computer 'app' for future clients to configure their own design, and their primary presentation sheet was limited to an image of a hand held technology device (Figure 6) within the centre of a white page. Whilst this was a bold move for an architectural ideas competition submission, the strong potential was evident as the jury imagined a future in which client and user groups are able to use an 'app' to actively participate in the design of their built environment, within a clear framework established by an architectural design team. Follow up interviews with the winning team highlighted that a student with computer game design experience had been working in the architecture office at the time of developing the competition submission, and the potency of interactive technologies had become a centre-piece of their design thinking. Since making their submission, this 'app' has been further explored (http://www.edu-mod.com/). It is interesting that their ambition for this strategy to be an open engagement with a client group imitated the crowdsourcing strategy of the competition itself.

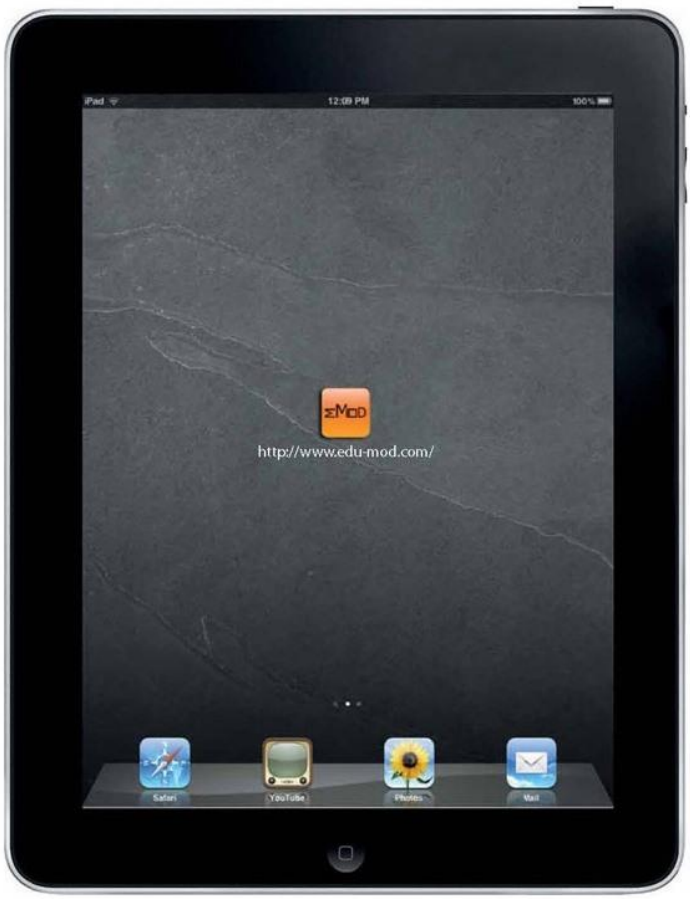

Figure 6: Professional Competition - First Prize Winner (Source: Design and Images by Architectus Melbourne Pty Ltd)

The winner of the Tertiary Student Category (Figure 7) developed a strategy using mass customisation and computer-aided manufacture. The Cool School design successfully addressed the complex competition brief, exploring pedagogy, manufacture, and transport to create a practical and effective, yet poetic and delightful approach to the relocatable classroom of the future.

Lessons from the competition

After the competition winners were announced, a detailed analysis was completed to capture the key themes, gaps and any 'quick wins' which might be usefully adopted immediately by education authorities. While this paper does not include that analysis it is useful to consider the benefits and shortcomings of the Competition.

Figure 7: Tertiary Student Competition - First Prize Winner (Source: Design and Images by Anastasia Globa)

The complexity dilemma

The reality of a competition, particularly an Ideas Competition, is that juries can overlook a subtle design resolution of a complex brief in favour of simpler, clearly communicated ideas. Competition entrants know they need to work strategically if they are to convince a jury. Entrants can deal with complex briefs in a range of ways: aspects can be emphasised or hidden in anticipation that the well-resolved components will outweigh the missed considerations; solutions can be provided that, while apparently simple, concurrently resolve many elements of the brief; a clear strategy can be provided that does not resolve in detail but has the agility to accommodate complexity with further development; or entrants work with complexity but without reaching final resolution.

We were aware that the brief would normally be considered too complicated for an Ideas Competition. Detailed briefs are used in two-stage negotiated competitions to enable a partial design development of ideas. In contrast, our client group wanted entrants to reconceptualise what relocatable learning spaces might look like in a decade rather than focus on designs ready for manufacture tomorrow.

While no individual submission would be able to respond to all components of the brief, the submissions as a whole provided a rich range of approaches. We interrogated the entries in terms of innovation, the gaps and the ideas for 'quick 'wins'. In particular, the gaps

have been unexpected. We have found a tendency for entrants to inventively explore the prefabrication components while paying token attention only to innovative design for sustainability. We found some entrants reverting to schoolroom layouts which assumed teacher-centred models even though the brief described recent developments in pedagogy towards student-centred learning. But we also found surprising and delightful solutions in which compromise solutions were avoided in favour of ideas which resolved the complex brief at a range of levels.

Ingredients of a successful Competition

Our reflections on the entire process suggest a number of key ingredients for a successful *Design Ideas Competition*. A strong, clear competition brief is essential. It sets the task and acts as a form of contract between entrant and competition organisers. The brief normally has a short-lived role and is obsolete once the Competition process has concluded. By contrast, we collated the best-practice components of our brief into a bound publication entitled *The Phase 1 Research Compilation* to extend the dissemination of our research.

Anonymity during the judging process assures entrants that their submissions are being judged on merit rather than reputation. In the context of an Ideas Competition, it is important to encourage new, emerging talent. Endorsement by professional organisations such as national or international institutes of architecture reassures entrants that best practice guidelines are being followed. Our competition was endorsed by the Australian Institute of Architects.

In an Ideas Competition where there is no direct outcome of an architectural commission, prize money is an important incentive to attract a breadth and depth of talent. Identifying and securing sponsors of prize money is a significant task, and requires an investment of time to consider appropriate alignments of interests.

A quality jury with experience in the topic area is critical. Involving them early in the process allows them to elaborate on the judging criteria, and in turn this supports the development of the brief. A competition with international reach requires an international jury, and a multifaceted competition task requires a multidisciplinary jury.

A competition will have clear prize winners, yet the totality of entries should be considered an important resource. Exploring and celebrating of the diversity of ideas in competition entries supports both the research and dissemination process. Websites, on-line galleries, exhibitions and publications allow the both the professional and broader communities to learn from, and be inspired by, new ideas. This is invaluable in the context of inspiring change. This also creates an educational feedback loop for entrants who will be able to improve their future competition strategies. Two publications were produced after the Future Proofing Schools Competition: *The Phase 2 Research Competition* and *The Phase 3 Research Reflections*. Upon receipt of these publications, a Competition entrant wrote to us, reinforcing feedback we had received verbally

> It's a very rare ideas competition that goes beyond the competition to consolidate and reflect on the results. We truly value this initiative which is something we can all learn from.

Finally, it is important to consider the ownership of the ideas and drawings produced by an entrant for a Competition. Despite the Competition being embedded within a university research project, our Competition Rules were clear that the ownership of ideas and drawings remained with the entrants. In entering the Competition, they merely granted the Research Team a license to use their drawings in research related publications and the on-line gallery,

will full attribution at all times. This has meant that entrants have received publicity for their submissions through a variety of media and are able to develop their ideas into the future.

Discussion

Crowd-sourcing and leveraging research into industry

The *Future Proofing Schools Design Ideas Competition* was effectively a process of crowd-sourcing with a benefit which is not yet commonly associated with the concept. Our open call was positioned within the context of research that our team had conducted during the previous year. This research formed an educative brief which we hoped would leverage knowledge in a two-way process rather than a one-way call for creative propositions.

There are obstacles to be overcome if cultures of utilitarian design for prefabrication are to be challenged. Education departments, like universities tend to be siloed structures in which decisions are made primarily by discipline specialists rather than multidisciplinary teams. Under pressure to provide timely and affordable space, the quantity of space is likely to take precedence over the quality of space. Temporary classroom products are currently viewed as 'off-the-shelf' items which do not warrant a design fee. Yet for designs to be improved, designers need to be included in discussions.

New conversations and built outcomes

As we reflect on the legacy of the Competition, its greatest success has been to initiate new conversations. In June 2012, we invited education partners, competition winners and pre-fabrication manufacturers to a workshop to discuss the outcomes. A commitment was made at that workshop to begin discussions for a peak body to be set up in Australia for prefabrication. That body was incorporated in March 2013 and is committed to a design-led prefabrication industry in Australia.

In addition, new conversations are occurring between manufacturers, designers and education departments about developing new, design-led products for the future. Recent news is that an Australian winning design and a New Zealand winning design are to be constructed later this year. Winner of the Sustainability Category of the competition, New Zealand architect, Chris Moller said

> This competition has been a defining moment for architectural competitions as it has successfully synthesised dissemination of research with a design and crowdsourcing tool. The potential of this approach, as it generates new multi-disciplinary, cross-industry and global conversations and ideas, is limitless.

Conclusion

To our knowledge, this is the first time that a design competition has been incorporated into a government-funded academic research project. This move was aimed at both harnessing and encouraging best practice across several disciplines to move beyond current practices into tipping point possibilities. The competition facilitated a situation where knowledge and influence could flow back and forth between the complex range of stakeholders including designers, prefabrication manufacturers, education departments and educators.

We conceived of the brief as an educative document on pedagogy, school design, prefabrication and landscape integration. The complexity of the competition brief resulted in designers making strategic decisions to focus on particular aspects. In our analysis we were interested in understanding which aspects were considered within the entries and which were overlooked. These areas of focus and gaps provide useful lessons about current design

practices beyond what would have been achievable if a competition was not used to leverage both research and community knowledge through a process of crowdsourcing.

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