Competing in Architecture: The Complexity Dilemma

Abstract
Architectural competitions are accepted internationally as a way to choose an architect or an architectural design or develop ideas for challenging issues. This paper explores untapped potential for competitions to be part of a research process in the same way that crowdsourcing can help escalate knowledge. Over the last three years, a multidisciplinary team has explored a research methodology that included an Ideas Competition at its heart. 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. We argue that competitions can be strategically conceived to leverage knowledge between academia and industry in both directions but there is an intrinsic difficulty to do with complexity.

In this paper we explore some of the strategies for the research, asking what the ingredients are for a successful competition. We explore how the complexity of the design question can be at odds with entries presenting easily digestible messages for time-poor juries. Are some questions just too complex to be tackled successfully in a one-stage ideas competition? Bringing expertise as a competition advisor, the first author positioned the competition format into the research process. The second author brought applied expertise in brief development and working with complex teams. Both see competitions embedded within research as a way of encouraging cultural step change when faced by wicked problems.

Keywords: Competition briefs, complex designs, multidisciplinary designs, school design, competitions as research.
1. INTRODUCTION

This paper centres on one particular competition run in 2011, the Future Proofing Schools Design Ideas Competition, which was embedded within a three year research project (http://futureproofingschools.com/). To our knowledge, this 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. As we approach the conclusion of the research project, it is timely to reflect on the effectiveness of the Competition in a research context.

As academic researchers we were using the Competition as a strategy to encourage and inspire change. Our research focus was to explore the potential for design-led transformation of the utilitarian, temporary classrooms which house up to 30% of Australian school students in some states. 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.

Our key question during the three year research process was to ask how the education sectors within Australia can be encouraged and supported to take advantage of tipping points within the design, construction and education sectors to improve the quality of temporary learning environments.

Our research methodology, supported by our six education department research partners from across Australia, was developed as a three-phase process (Figure 1) with the Competition 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)](image)

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 apparently simple temporary classroom is in fact a complex, wicked problem. In his paper entitled “Wicked Problems”, Churchman (1967) summarised Rittel and Weber’s concept of wicked problems as a "class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing." Design as a way to conceive and plan is useful in the context of the indeterminacy of wicked problems, before the final result is known (Buchanan, 1992).

2. THE TEMPORARY CLASSROOM IN AUSTRALIA

2.1 The benefits of temporary classrooms in Australia
Temporary 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.

Figure 2: Examples of temporary classrooms across Australia (Source - FPS Research Team)
As 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 provided in permanent buildings, and accommodation needs above that ‘core’ capacity are provided in temporary, relocatable classrooms. These provide a rapid response in the aftermath of events such as fires, floods and cyclones; they are used in remote communities where construction labour and materials are scarce; and are used to accommodate changing school populations due to shifting demographics.

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.

2.2 The problem of temporary classrooms in Australia

A significant moment occurred while visiting one of Australia’s recently constructed schools. As the school needed to follow the ‘Core Plus’ model of permanent and temporary facilities, the architect described being particularly pleased to have planned the school so that all the temporary classrooms were hidden at the rear of the school (Figure 3).

Figure 3: The temporary, relocatable building hidden at the back of the school (Source - author)
By contrast, the *permanent buildings* had been designed to make the most of the seaside location and provide delightful spaces in which to teach and learn (Figure 4). Architects do not normally design these temporary classrooms they simply position them. Even within an architect-designed school, the temporary classrooms were the same generic classroom products that appear across Australia, classrooms that are designed by prefabricated building manufacturers to meet standard government specifications.

![Figure 4: An Australian environmentally designed school (Source - author)](image)

This seemed to us to be a missed opportunity. We considered why temporary buildings are not given the same architectural attention as the rest of the school.

### 2.3 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 temporary 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 (Figure 5). If the buildings are moved, they still have a 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 temporary classrooms should be designed as *permanent quality yet moveable buildings*.

![Figure 5: Number of relocatables in Australian states versus annual moves (Source FPS Research Team)](image)

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.

3. **THEORETICAL FRAMEWORKS FOR THE RESEARCH**

   3.1 **The benefits and limitations of design competitions**

Architectural competitions are expensive for the architectural profession and tend to remove opportunities for the client to collaborate with designers but even with these difficulties they are useful in some circumstances. 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 by a public” (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 (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 and speculative competitions play an important role.

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 a 2006 Wired.com article when he discussed the increasing role of the internet in tapping the talent of the crowd. He described it 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.

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).

3.2 A multidisciplinary approach
Multidisciplinary research is particularly relevant when dealing with complex, ‘wicked problems’.

When faced with complex problems which lie across knowledge boundaries, multidisciplinary research is often required. However working across and between disciplines brings particular difficulties particularly as each bring distinct research methodologies which do not always link effectively. Our multidisciplinary team brought a mix of strategies. Data measurements of indoor environmental quality, energy use and user satisfaction surveys along with focus group interviews (Bordass & Leaman, 2007) were used to measure existing temporary spaces. Although somewhat limited in time, we attempted to bring critical ethnographic outlooks to understand behaviours within learning spaces particular as we shift towards student-centred pedagogies where students are choosing how, when and where to learn (Denzin & Lincoln, 2000). Broader survey techniques were not used in this case as subtleties in user experiences were less likely to be measured. We did however include a form of expert elicitation to capture current themes through our partners representing education departments across nearly all of our mainland states.

Our ambitious aims for the research were to (a) capture, into a competition brief, the manifold viewpoints and contexts influencing the design and procurement of the temporary classroom. (b) invite response to that brief via an open competition, (c) analyse the entries, synthesise key themes and opportunities, (d) disseminate responses and observations to inform and inspire change.

4. APPLIED CONTEXTS OF THE RESEARCH
The apparently simple temporary classroom was in fact a complex conundrum and required a multi-faceted effort. The multidisciplinary research team’s expertise spanned architecture, interior architecture, pedagogy, environmental science, sustainability, landscape design, ecology, information technology, parametric design, project management and facilities management. This breadth and depth of expertise was located within four research strands
exploring pedagogy, sustainability, landscape and prefabrication (Figure 6), important tipping points that would inform the ideas for design of future temporary classrooms.

![Figure 6: The Research Strands (Source - FPS Research Team)](image)

### 4.1 The spatial implications of changing pedagogies

Student-centred constructivist approaches to schooling have roots in 20th century educational theorists such as Dewey (1966), Freire (1970), Vygotsky (1986) and Gardner (1993). These shifts in approaches to education have spatial implications. For example, if student collaboration and independent research are increasingly expected then the traditional classroom environment needs to change.

The links between pedagogy and space have been under-researched until recently perhaps because of the ubiquitous nature of classroom environments. Fisher (2002) suggested that teachers were not sufficiently aware that space could support or restrict learning. He argued that because the classroom had been the predominant learning environment for so long, it was somewhat invisible. In the past decade, research in the field had escalated as education moved beyond a ‘cells and bells’ approach to engage with 21st century information technology and as governments and communities required more sustainable design solutions. With easy access to information through the world-wide-web, education has been gradually changing from teacher-led learning in discrete classrooms to student-centred learning and team teaching within more open plan environments.

### 4.2 Sustainability – integrated approaches

Another tipping point that has resulted in a rethinking of school design has been government and community drivers towards sustainable design. Literature reviews on the benefits of environmentally responsible school designs indicate few well-designed, evidence-based studies concerning the overall effects of green schools on the health or educational development of students and teachers (National Research Council, 2006) and a lack of robust research on integrated learning environments (Higgins et al 2005). There are, however, many
dissertations that correlate specific factors such as moisture problems with respiratory problems; air quality and lighting with learning and productivity; and reduced noise levels with student achievement (Schneider, 2002). Other researchers linking indoor environment with effective learning include Cox-Ganswer et al (2005), Heschong Mahone Group (1999), and Wakefield (2002).

New classroom buildings have the potential to be 3D texts helping students understand issues around sustainability and the built built environment.

4.3 Landscape integrations and connections
A focus on off-site mass production rather than one-off design risks disconnecting the design from both the site and the client. To ensure competition entrants considered new strategies available to provide a mass customised design rather than a ‘one size fits all’ approach, the brief emphasised the need to integrate into a range of school landscapes and built environments as well of connecting and extending the indoor learning environment with the outdoors.

The placement of buildings to define outdoor spaces and create a diversity of options for outdoor experiences was a component which many entrants considered. The potential of landscapes to provide students with a sense of security and stability (Herrington 1997) needed to be balanced with teachers’ responsibility to oversee the safety of indoor and outdoor spaces.

The way a temporary classroom meets the ground is critical to ensure the building integrates with the school context. Buildings lifted on stumps above the ground can reduce opportunities for interiors to flow to the exterior as well as emphasizing the temporary connection between the building and its site.

4.4 Tipping points in prefabrication
Prefabrication is described as architecture’s oldest new idea (Harker 2007) but there are new technologies available which will enable prefabricated buildings to compete with one-off design and in situ construction. In particular there is a shift from mass-production to mass-customisation and new possibilities with parametric modelling for site-specific responses.
Concurrently Australia is experiencing a shortage of skilled trade labour in many communities and an increased demand for housing which is increasing construction prices.

One of the obstacles to be overcome in Australia is that clients generally perceive prefabricated buildings as utilitarian and low cost rather than high design and high performing. With prefabrication providers entering the market, this perception is gradually changing. Another obstacle is that architects are not normally well trained in product-design strategies so one of the ambitions of the brief was to introduce the design community to the parameters to be considered when designing for mass-customisation and transport to site.

5. THE FUTURE PROOFING SCHOOLS’ COMPETITION

The three-phase research process (Figure 7) placed the Future Proofing Schools Design Ideas Competition at the heart of the action research methodology.

Figure 7: The three research process (Source - FPS Research Team)
The 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. We were aware of the complexity of the design issues and yet we were also aware this was simply an ideas competition and it would be unreasonable to expect completely resolved solutions. On the one hand we wanted to encourage architects to develop big ideas for the future rather than fine-grained resolutions ready for building tomorrow. But we were also worried that the difficult and complex activity of design thinking would be easily forgotten or reduced in the resulting product (Buchanan, 1992).

5.1 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, 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 six education departments from around Australia made the research and its possible outcomes real and tangible.

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

5.2 The Competition Brief

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

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 a wide range of teaching and learning styles.

Figure 8: A three step challenge (Source - FPS Research Team)

The three-step challenge (Figure 8) 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 9)

Figure 9: The Hierarchy of Competition Documents (Source - FPS Research Team)
5.3 The Competition Launch
The competition period was kept short, just four months, in keeping with expectations for an Ideas competition. The launch and publicity were crucial to entice the maximum number of entries. In addition to the on-line announcement and launch of the Competition Brief, a Symposium on the theme of temporary classrooms increased interest in the topic and disseminated information. Although hosted in Melbourne, the Symposium was fully recorded and posted on the Competition web-site.

The Symposium was also the 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.

5.4 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 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.

5.5 The Jury Process
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. During international teleconferences, jurors were then able to discuss at length their tentative 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.

5.6 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.

![Figure 10: Professional Competition - First Prize Winner](Source: Design and Images by Architectus Melbourne Pty Ltd)

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. User group participation in the design process would be facilitated by a
‘computer app’. The visual strength and the potential of the idea captured the imagination of the multidisciplinary jury (Figure 10). Similarly, the Tertiary Student Competition (Figure 11) and University of Melbourne Competition (Figure 12) Prize Winners demonstrated a visual clarity that was eloquent in convincing the jury.

Figure 11: Tertiary Student Competition - First Prize Winner
Source: Design and Images by Anastasia Globa

Figure 12: The University of Melbourne Competition - First Prize Winner
Source: Design and Images by Ayrine Kwan
### 5.7 Competition Analysis

The 119 competition submissions proposed a wide range of approaches, and a number of these offer surprising and delightful solutions which resolve the complex brief at a range of levels. A quantitative interrogation of each entry examined if they had explicitly responded to the strands of the brief or not (Figure 13).

As researchers it was important to analyse the themes, the areas of innovation, the ideas for ‘quick wins’, and the ‘gaps’ within the competition entries. Given the complexity of the brief, gaps were expected. Yet some gaps were unexpected, the most notable of these being in the areas of sustainability, new learning modes, and the impact of new technologies in the classroom. A number of entries favoured an in-depth exploration of a prefabrication approach, yet appeared to overlook the critical issues of relocation and transferability. Some

**Figure 13: Overview of Competition Analysis (Source - FPS Research Team)**

| Prefabrication | 2D kit of parts | 3D | Parametric design | 2D | 3D hybrid | Reuse existing portables | Indoor | Existing context | Outdoor learning | Play | Landscape elements | Two storeys+ | Slopes | Levels | Site legacy | Climate adaptable | Energy + water use | Innovative materials | IEQ | Green curriculum | Scalability | Multi unit hubs | Contiguous space | New learning modes | Furniture ideas | Technology |
|----------------|----------------|-----|-------------------|-----|-----------|--------------------------|-------|----------------|-----------------|------|-------------------|-------------|--------|--------|------------|----------------|----------------|------------------|-----|----------------|----------|----------------|-------------|--------------|-------------|------------|-------------|------------|
|                | 65%            | 47% | 27%               | 20% | 19%       | 3%                       | 73%  | 66%           | 68%            | 68% | 57%               | 46%         | 27%    | 8%     | 6%         | 56%           | 61%            | 27%             | 32%| 15%           | 86%       | 86%          | 79%         | 38%         | 37%         | 24%        |
aspects of learning environments were largely absent from entries because they did not translate into visual design. Presumably entrants assumed factors such as sustainability, acoustics and good indoor environmental quality would be included in any design development. What was more surprising was the absence from many schemes of furniture and clear modes of occupation even for particularly unusually shaped spaces.

The nature of an ideas competition is to explore and inspire without needing to resolve or address specific details. Our brief was seen as an educative document and included more detail than entrants seemed to be able to integrate into designs. Perhaps entrants may not have explicitly addressed certain themes even though they may have been considered or may be easily incorporated into design development. A more worrying possibility is that entrants, faced with a complex brief, reverted to past knowledge. This is our dilemma regarding complexity within an Ideas Competition.

6. **LESSONS FROM THE COMPETITION**

Within this mixed method research context, it is useful to consider the benefits and shortcomings of the Competition.

6.1 **The complexity dilemma**

The reality of a competition, particularly an Ideas Competition, is that juries can overlook subtle design resolution of a complex brief in favour of bolder, 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 our Competition 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, six education departments
across Australia 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 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.

6.2 Ingredients of a successful Competition

Our reflections in 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.

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 who 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.

7. **DISCUSSION**

The *Future Proofing Schools Design Ideas Competition* was effectively a process of crowdsourcing 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 and yet for designs to be improved, designers need to be included in discussions.

As we reflect on the legacy of the Competition, its greatest success has been to initiate new conversations. Competition entrants are now talking with manufacturers and education departments about developing new, design-led products for the future. This is a step-change for the ubiquitous and much maligned relocatable, temporary classroom.

8. 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.
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