# Developing 'Design Minds' for the 21st Century Through a Public Sector Initiated Online Design Education Platform

Christian Duell, State Library of Queensland, Australia
Natalie Wright, Queensland University of Technology, Australia
Joanna Roxburgh, Queensland Government Arts Queensland, Australia

## Abstract

Education in the 21st century demands a model for understanding a new culture of learning in the face of rapid change, open access data and geographical diversity. Teachers no longer need to provide the latest information because students themselves are taking an active role in peer collectives to help create it. This paper examines, through an Australian case study entitled 'Design Minds', the development of an online design education platform as a key initiative to enact a government priority for state-wide cultural change through design-based curriculum. Utilising digital technology to create a supportive community, 'Design Minds' recognises that interdisciplinary learning fostered through engagement will empower future citizens to think, innovate, and discover. This paper details the participatory design process undertaken with multiple stakeholders to create the platform. It also outlines a proposed research agenda for future measurement of its value in creating a new learning culture, supporting regional and remote communities, and revitalising frontline services. It is anticipated this research will inform ongoing development of the online platform, and future design education and research programs in K-12 schools in Australia.

## Key words

design thinking, digital technology, K-12 schools, distance education

## Introduction

With an understanding of design as the link between creativity and innovation (Cox 2005, 2), more recently, the incorporation of design and design thinking across all levels of education has been acknowledged as a method of fostering the agency and capacities needed to support the transition away from the postindustrial economy, towards an emergent knowledge-based creative economy (Design Commission 2011). An international analysis of design education policy highlights Finland's Design 2005! program as a dynamic example of utilising design for national innovation and cultural change (Design Commission 2011, 39). This program was underpinned by a conceptual structure in which design process skills connect cultural and social factors to business, around a central core of technology (Figure 1).
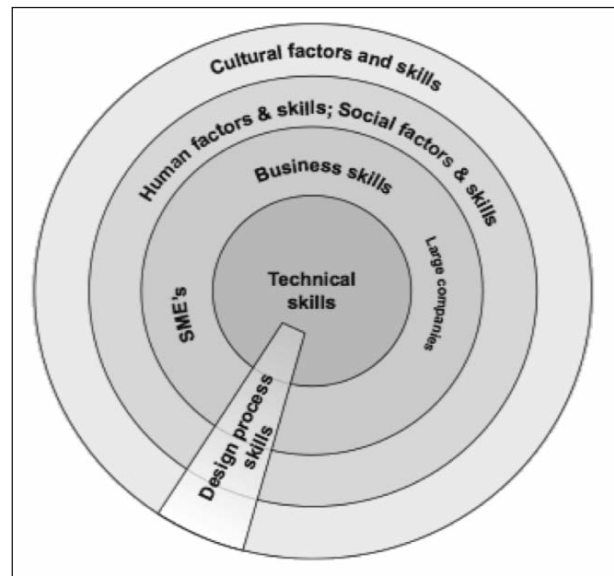


Figure 1: Conceptual Diagram – Finland's Muoto 2005! Source: Drawn by Juha Jarvinen, original design by Juhani Salovaara and Ilpo Koskinen (Koskinen et al 2011, 157)

Significant investment (Macleod et al 2007) in design research, education and promotion, had a dramatic positive impact on the country's global competitiveness and its rating as the top performing education system in 2006 (Ministry of Education and Culture of Finland 2007), and later its ranking in the top three for mathematics, reading and science in the OECD 2009 Programme for International Student Assessment (PISA) tests (OECD 2010).

The National Cultural Policy "Creative Australia" recognises design thinking as a "ubiquitous capability for innovation" (Commonwealth of Australia 2013, 90) and commits to "ensuring the talent and entrepreneurial drive can be translated into further sustainable business and high skilled jobs" in the Asian century (Commonwealth of Australia 2013, 92). However, currently no policy document addresses how this strength will be cultivated. While Australia also statistically rated significantly above the OECD average in the 2009 PISA assessments, if indeed "using creativity and design-based thinking to solve complex problems is a distinctive Australian strength that

# Developing 'Design Minds' for the 21st Century Through a Public Sector Initiated Online Design Education Platform

can help meet the emerging challenges of this century"(Australian Government 2012, 8), a similar design-led culture in Australia must be established, with the introduction of design awareness at a school level, and provision of incentives for students and teachers to build innovative pedagogical frameworks and open, cross disciplinary, collaborative learning networks servicing Australia's vast geography. This will ensure future generations are empowered with the skills, mindsets and behaviours for business innovation and active citizenship.

This paper highlights the challenges and current deficiencies surrounding design education in Australia in a new culture of learning, in particular the ability of online design education platforms to build community and enact cultural change. It details the development of a framework for incorporating design thinking (as a generic capability) in K-12 education in regional areas of Australia, through the collaboration of representatives from government, industry and all levels of the education sector. A future research agenda pursued through the *Design Minds* online platform (State of Queensland State Library of Queensland 2012a) case study is outlined. It is anticipated that the findings of this research will encourage policy makers to see the value of design-led innovation and online design education platforms in strengthening community resilience in regional areas, and developing strong economic and social ties with the Asia Pacific during the "Asian Century"(Australian Government 2012).

## Australia's shifting economy and learning culture
### From a commodity economy to a creative economy
In coming decades Australia faces a significant challenge to adapt to a shifting global economy, lead by an emerging Asian middle class (Hajkowicz et al 2012, 11). As identified in the "Australia in the Asian Century White Paper" (Australian Government 2012), this challenge represents an opportunity to shift from a commodity economy to a creative economy. Asia Pacific countries such as Singapore, Korea, Hong Kong and China are actively realigning design education to ensure effective delivery of a workforce positioned to support future industry innovation (Design Commission 2011). These countries also rated amongst the top-performing school systems in the 2009 PISA tests (OECD 2010).

If education is seen as the key foundation for seizing the opportunities of this new global era, perhaps the greatest challenge facing Australia is the geographic isolation of its

regions. This is most evident in the state of Queensland. Collectively, there are 1,239 state schools in Queensland, incorporating pre-schooling, primary, secondary and special schools. Approximately half of these schools cater for almost a quarter of the state school students in rural and remote areas, equating to approximately 616 rural and remote schools in Queensland (The State of Queensland Department of Education, Training and Employment 2010). In 2011, 18% of Australian primary schools were in Queensland, including 72% government and 28% non-government schools (Australian Bureau of Statistics 2011). It is notable that Queensland has a higher proportion of small regional primary schools than other states in Australia (McCollow 2012, 5). While Queensland's geographic isolation is not a new challenge, new technology is more recently providing greater opportunities to connect, while also destabilising traditional models of knowledge exchange.

## Design and the new culture of learning
The 'information age' has seen the emergence of a number of related knowledge movements including 'open data', 'open source', DIY (do-it-yourself) / DIWO (do-it-with-others) and hacker/activist cultures. Each of these movements thrives on constant change and the collective exchange of continually up-to-date information. This represents a shift toward what has been termed "a new culture of learning" (Thomas and Brown 2011, 17). Education in this new culture of learning therefore requires a new environment for appropriating information in the face of rapid change, "moving from learning through *instruction* to learning through *doing*", particularly in areas of social information. "This environment is called a collective; a collection of people, skills and talent that produces a result greater than the sum of its parts" (2011, 52).

While limitless access to information and collectives is exciting, it is important that this new culture of learning is established through a curatorial approach. Design in an educational sense, becomes a structured framework for these new forms of learning to take place. The term "design" (also referred to in this paper as "design thinking") in this context is interpreted as a verb and defined as a process:

> …of imagining something that does not yet exist. And then arranging all the elements required to make it a reality. Design is equal parts embracing constraints, challenging the status quo, and summoning courage. (Yamashita 2012, 1)

# Developing 'Design Minds' for the 21st Century Through a Public Sector Initiated Online Design Education Platform

With a focus on fostering curiosity and developing inquiry-based thinking, the design process provides a useful model for exploring "a new culture of learning", by focusing on the identification and creative exploration of complex problems.

## Government Investment in Design Education for Cultural Change

In an Australian context, the role of design in education has attracted various forms of Government attention.

### Federal Government

The Australian Government seeks to improve the education system so that it ranks as one of the top five performing OECD countries in the world (for education) by 2025 (Hattie 2012). Australia's history of progressive education positions it well to compete with its Asian neighbours in all education spheres, however this is dependent on emphasis being placed on a creative and democratic production of knowledge, focusing on inquiry and critique, rather than a narrow, linear reproduction (Hooley 2012). This paper argues that design as a process is not an isolated area of study limited to the creative industries, but is rather a necessary and ideal framework for establishing "a new culture of learning" and capitalising on Australia's emerging creative economy opportunities. As Bentley suggests:

> This vision involves shifting the way we see education from a separate sector of society to a culture which infuses every sector, linking together individuals, communities and institutions through diverse, overlapping networks of learning relationships. (Bentley 1998, 187)

Four significant national initiatives present implications in terms of responding to the challenges posed by cultural change in education, geographic isolation and the "Asian Century":

• The National Broadband Network (NBN); a federally-funded ten year program that seeks to overcome geographic boundaries by connecting 93 per cent of Australian homes, schools and businesses through fibre optic networks, capable of providing broadband speeds of up to one gigabit per second
• The Australian National Curriculum; a nation-wide reconfiguration of learning to create efficiencies across states and recognising 'higher order-thinking' and

complex problem-solving abilities. Currently design is not delivered as an overall Performance (OP) Ranking school subject for immediate university entrance, and the new Australian Curriculum: The Arts does not recognise design as a foundation discipline for creative capacity building.
• Council of Australian Governments National Education Agreement; "recognises that high-quality schooling supported by strong community engagement is central to Australia's future prosperity and social cohesion". (Commonwealth of Australia 2013, 77)
• National Design Policy (proposed) (Australian Design Alliance 2012); currently under development (including a key recommendation for Design Education) in pursuit of legislation.

These initiatives sit within the context of a range of state led initiatives to support cultural change through design.

### State Government

The Queensland Government has a very successful, internationally recognised "Queensland Design Strategy 2020" (Arts Queensland 2009) dedicated to positioning design at the heart of Queensland life, while making Queensland a leading centre for design excellence and innovation in Australia and the wider Asia-Pacific region by 2020. The "Queensland Design Strategy 2020" has four key objectives: (a) Strengthen the Queensland economy; (b) Foster a design culture; (c) Build design knowledge and learning; and (d) Support public sector innovation. Alongside Queensland Government investment, design momentum is also supported through the Visual Arts and Craft Strategy – a bilateral funding agreement of the Australian, State and Territory governments - with an allocation of $0.6M over 4 years (2011–12 to 2014–15).

Established in 2011 to support the strategy, The Queensland Design Council (The State of Queensland Arts Queensland 2011), which has also established design endorsement initiative and website QUEENSLANDERSIGN™ (The State of Queensland Arts Queensland 2013), is a multidisciplinary strategic advisory group comprised of high-profile leaders from the design industry, commercial enterprise and academia who believe:

> The role of design thinking and practice in education is critical. The National Education Policy should dovetail with the National Cultural Policy and National Design

# Developing 'Design Minds' for the 21st Century Through a Public Sector Initiated Online Design Education Platform

Policy to legitimise design, culture and creativity. To acknowledge design thinking as part of our learning approach, no matter what level, can foster productivity while simultaneously serving as an access bridge to the core arts. (Queensland Design Council 2011, 19)

A report commissioned on design education in Queensland, entitled "Knowledge Economy Market Development Mapping Study" (Wright, Davis and Bucolo 2013, 31-33) identifies 54 curriculum independent (tertiary and National curriculum) design education/research programs (14 at a regional location) delivered since the inception of the "Queensland Design Strategy 2020". Of these programs, State Government driven education initiatives include The Edge (The State of Queensland State Library of Queensland 2013); Asia Pacific Design Library (APDL) (The State of Queensland State Library of Queensland 2012b); Unlimited: Designing for the Asia Pacific (The State of Queensland Arts Queensland 2010), Queensland-Smithsonian Cooper Hewitt Design Museum Fellowship (The State of Queensland 2012).

"Design Minds" (The State of Queensland 2012a) is believed to be Australia's first online platform for design and creative led learning and skill development resources, endorsed by QUEENSLANDERSIGN™, and promoted through "The Learning Place" (Education Queensland's online channel) (The State of Queensland Department of Education, Training and Employment 2012). A key delivery initiative of the strategy's "Build design knowledge and learning" objective, Arts Queensland partnered with the Cooper-Hewitt and the State Library of Queensland APDL to develop online design education resources with the aim to "encourage knowledge and skills exchange in design education and to increase the capacity of Queensland teachers to teach creativity and design"(Arts Queensland 2009, 38).

### Design Minds in the Context of Global Online Design Education Models

### Establishing Design Minds
With the commencement of the Queensland-Smithsonian Cooper Hewitt Design Museum Fellowship in 2008 and the establishment of the APDL in 2010, the delivery model for *Design Minds* was formalised in November 2011 and an investment agreement established for the delivery of Stage One by 30 June 2012. A project delivery

team, including Smithsonian Cooper-Hewitt Design Museum Fellows representing primary, middle school and secondary school sectors, and selected representatives from academia, relevant government departments, The State Library of Queensland, The Learning Place and Josephmark (Website Design), was assembled to plan the methodology model for the online education platform and the construction of the *Design Minds* website with basic functionality.

A key component of the planning stage was the evaluation of various existing online design education models, as well as design methodologies employed by leading businesses, universities and educators. It was determined from an early stage that rather than adopting and replicating an existing model verbatim, it was necessary to develop a model that synthesised global best-practice in terms of design thinking, and responded to the geographic and cultural qualities unique to Queensland.
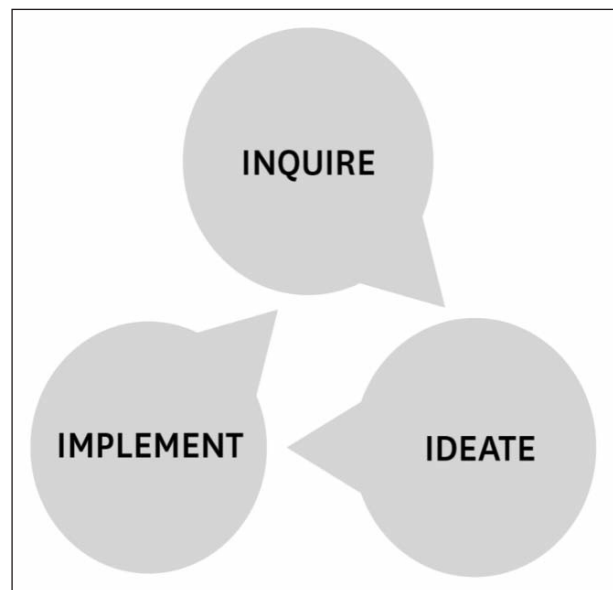


*Figure 2: Design phases as part of the Design Minds methodology. Source: (The State of Queensland State Library of Queensland. 2012a)*

In April 2012, the *Design Minds* project delivery team held a 'Content Methodology Workshop' to explore and evaluate various methodology models (Table 1) including the Cooper Hewitt's "Ready, Set, Design!" (Smithsonian, Cooper Hewitt Design Museum 2011), d.school's "Stanford Design Program" (Hasso Plattner Institute of

# Developing 'Design Minds' for the 21st Century Through a Public Sector Initiated Online Design Education Platform

Design 2010) and IDEO's "Design Thinking for Educators"(IDEO 2012).

It was observed, that while each of these processes allow opportunities for flexibility and fluidity in exploring a problem, they tend to operate linearly, and focus on practical outcomes, rather than emphasising educational theory. It was argued that a 'design-for-education' approach that advocates designing as way of empowering 'non-designers' in resolving and reframing complex open-ended problems (Ambrose and Harris 2009) should be favoured over a 'design-for-business' approach that concentrates on adding value (Brown 2008, 2009; Lockwood 2009; Martin 2009). The former recogises that:

> central to studio based learning is the positioning of work in a critique space that renders the work never complete, always on a pathway toward better iterations (Brocato 2009, 142)

It also acknowledges Thomas and Brown's observation that:

> Only when we care about experimentation, play and questions more than efficiency, outcomes and answers do we have a space that is truly open to the imagination. And where imaginations play, learning happens. (Thomas and Brown 2011, 118)

A simple, fluid, non-linear process was devised, focused on developing higher order thinking skills, and creating an environment to facilitate experimentation and innovation for non-designers across non-design subject areas. It was based on the model of 'Inquire, Ideate & Implement', supported at each stage with structured 'Reflection'. (Table 1 and Figure 2)

This three-phase approach flexibly encompasses the various activities and modes of thinking inherent in other design methodologies, and communicates them in a simple and accessible way to non-designers.

### The Design Minds model

*Design Minds* aims to create a neutral space for "a new culture of learning" to take place in Queensland, within an Asia Pacific context. It utilises design thinking to develop 21st century capabilities, within existing Queensland and Australian education frameworks and benchmarks. It achieves this by presenting information on three levels by 'explaining' design, 'inspiring' through resources and 'empowering' through design thinking toolkits. These three levels of information are intended to gradually introduce non-design educators and students to the concepts of design thinking, and encourage deeper curiosity-lead investigation.

| Methodology | Design Stages | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cooper Hewitt | Identify | Investigate | | Frame/ Reframe | Generate | | Develop | | Evaluate | Re-evaluate |
| iDesign Thinking | Intending | Defining | | Exploring | Suggesting | | Innovating | Goal-getting | Knowing | |
| D School | Empathize | Define | | Ideate | | | Prototype | Test | | |
| IDEO | Discovery | Interpretation | | Ideation | Experimentation | | Evolution | | | |
| Design Minds | ←  Inquire  → | | Reflect | ←  Ideate  → | | Reflect | ←  Implement  → | | ←  Reflect  → | |

*Table 1: Comparative evaluation of design thinking methodologies. Source: State Library of Queensland, Asia Pacific Design Library*

# Developing 'Design Minds' for the 21st Century Through a Public Sector Initiated Online Design Education Platform

## Design Phases

In evaluating the various precedent methodologies (Table 1), and seeking to simplify and synthesise the overlap in the various identified design process phases of 'inquire', 'ideate' and 'implement', it was proposed that each phase could cultivate different behaviours and utilise different modes of thinking, both creative and rational:

• Inquire: exercises related to research, identifying/defining a problem, developing background understanding, and setting objectives
• Ideate: exercises related to brainstorming, generating ideas and solutions to a problem, experimentation, risk-taking and play
• Implement: exercises related to testing developed ideas, prototyping and communicating an end result

Considering the overall process as fluid and non-linear, it is possible for a problem to be explored by shifting back and forth between phases (see Figure 2). This can be transformative if the behaviours and modes of thinking unique to each phase are adopted. It is evident from this approach that a large percentage of the Design Minds methodology is not purely creative, but involves modes of thinking utilised in both the Sciences and Humanities (Table 2).

| Sciences | Design | Humanities |
|---|---|---|
| What is | What Ought to Be | Human Experience |
| Classification | Pattern-Formation | Metaphor |
| Analysis | Composition | Criticism |
| Rationality | Creativity<br><br>Innovation<br><br>Imagination<br><br>Ingenuity | Intuition |
| Objectivity | Purposefulness<br><br>Practicality | Subjectivity |
| Expression of Facts | Expression on Behalf of the Other | Self-Expression |
| Truth | Reality | Justice |

*Table 2: Comparative modes of thinking in education. Source: (Seif 1998)*

While the popular use of the term 'design' and its association with creativity is evidently misleading, the apparent opportunity in this observation is the potential value of the design thinking process to inform and extend subject areas outside design, allowing opportunities for design-led creativity and innovation in areas which have traditionally not been perceived as creative, such as literacy and numeracy. As described by Lloyd (2012), students learning design at a distance, have the opportunity to acquire knowledge through a process of induction, "iterating through structures that slowly become intuitive".

## Existing learning benchmarks

*Design Minds* therefore seeks to promote to non-designers, the value of the design process in developing a broad range of creative and rational thinking skills. A key theme that emerged during the planning process, consistently reinforced by teachers, was the importance of closely integrating *Design Minds* content within the context of existing learning benchmarks in order for it to gain traction in school classrooms.

This feedback lead to the incorporation of existing learning benchmarks including Naplan (National Assessment Program for Literacy and Numeracy), Australian Curriculum (a standardised national approach to school curriculum), C2C (resources assisting teachers in implementing the Australian Curriculum in the classroom), and Professional Standards for Teachers (Queensland-based professional development standards for teachers) within *Design Minds* toolkit content. It was perceived that this would further enable the enthusiastic adoption of resources by teachers in K-12 classrooms throughout Queensland, particularly for those unfamiliar with the design process.

## Preliminary Evaluation, Knowledge Gaps and Opportunities

Preliminary evaluation of knowledge gaps and opportunities was undertaken during the Stage One planning process via discussion with members of the *Design Minds* Project Delivery Team and consultation with an 'Early Adopter' Network. After the successful launch of *Design Minds* on the 28 June 2012, a Stage One Evaluation Report complying with the investment agreement, included data compiled from website views, visitations and total toolkit downloads. Key outcomes are summarized in Table 4.

# Developing 'Design Minds' for the 21st Century Through a Public Sector Initiated Online Design Education Platform

| 2012-13 | Site visits | Target | Page views | Target | Non metro (views) % | Total toolkit downloads | Target |
|---|---|---|---|---|---|---|---|
| July | 920 | 750 | 2443 | 2050 | 34% | 17 | 17 |
| August | 506 | 750 | 1289 | 2050 | 35% | 34 | 34 |
| September | 354 | 750 | 924 | 2050 | 50% | 47 | 51 |
| October | 302 | 750 | 735 | 2050 | 34% | 57 | 68 |
| November | 256 | 750 | 768 | 2050 | 30% | 67 | 85 |
| December | 249 | 750 | 544 | 2050 | 64% | 76 | 102 |
| January | 560 | 750 | 1506 | 2050 | 69% | 109 | 119 |
| February | 451 | 750 | 1004 | 2050 | 32% | 132 | 136 |
| March | 391 | 750 | 1118 | 2050 | 38% | 144 | 153 |
| April | 762 | 750 | 1943 | 2050 | 47% | 166 | 170 |
| May | 647 | 750 | 1440 | 2050 | 46% | 208 | 187 |
| June | 836 | 750 | 1960 | 2050 | 45% | 305 | 204 |
| July | 811 | 750 | 2180 | 2050 | 47% | 323 | 221 |
| August | 674 | 750 | 1579 | 2050 | 52% | 341 | 238 |
| September | 515 | 750 | 1408 | 2050 | 54% | 359 | 255 |
| October | 612 | 750 | 1514 | 2050 | 58% | 372 | 272 |

*Table 4: Performance measures established during Stage One evaluation. Source: State Library of Queensland 2012-13*

## Community partnerships and engagement model

Beyond the investment agreement's initial success requirements of basic functionality and resources, many additional outcomes were achieved, including a successful pilot community partnership project, the "Sit-Art 60 Chair Challenge" (The State of Queensland State Library of Queensland 2012c). "Sit-Art" invited senior design students from Kelvin Grove State College to create customised seating designs for 'The Myer Centre', a commercial inner city shopping precinct in Brisbane, Queensland, and compete for a 'People's Choice Award'. The completed designs now feature on 60 chairs installed in the refurbished central atrium of 'The Myer Centre' food court. 'The Myer Centre' has since received a Queensland
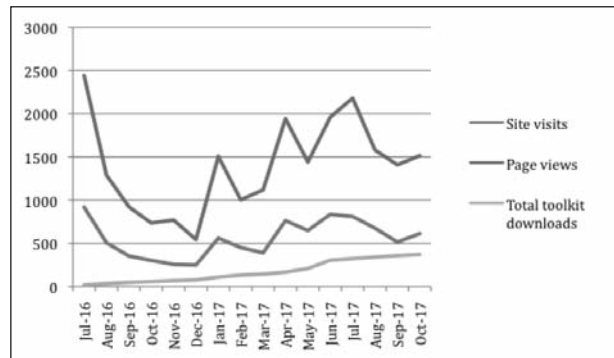


*Figure 3. Three key insights and subsequent opportunities have been identified from the preliminary evaluation. These form the basis for a future research agenda.*

Property Council Excellence in Marketing Award for a super/Major Regional Shopping Centre, and the project has also been announced as a finalist in the Australia and New Zealand Shopping Centre Marketing Awards and the prestigious ICSC Asia Pacific Shopping Centre Awards. While "Sit-Art" was initially conceived as an isolated project for the purpose of generating initial content for Design Minds, the success of the project has lead the project delivery team to further investigate the value of this real-world challenge model for "a new culture of learning" in which the school transforms as the hub of learning networks, "brokering learning opportunities with people and organisations in the communities around them. (Bentley 1998, 183)

Beyond successful community engagement that comprised a network of over seventy individuals – stakeholder representatives from retail business, design/architecture practice, a university School of Design (tertiary design student mentors and lecturers), a state secondary school (school students and teachers), and The State Library of Queensland – anecdotally, students, teachers and facilitators celebrated the benefits of learning through this community network via video recordings and a survey completed at the end of the project.

An opportunity now exists to develop a *Design Minds* model for challenge focused, community learning projects, which can assist in generating community partnerships in schools across Queensland and may incorporate the following components:

# Developing 'Design Minds' for the 21st Century Through a Public Sector Initiated Online Design Education Platform

• a local problem, challenge or competition involving a community group or business (framed as a "How might we..?" question);
• project facilitator/s, e.g. classroom teacher;
• a professional design consultant and a group of design mentors to support the learning/problem solving exercises; and
• resource and facilitation support from the *Design Minds* team.

### Early adopter network

Kvan (2011), when considering the pedagogical aspects of virtual design studios, notes that there are additional obligations for the 'tutor' in facilitating and managing discussion online, and building trust between remote peers in a group-based learning setting. In an effort to recruit 'tutors' in the lead up to the Stage One launch of *Design Minds,* approximately sixty educators from across Queensland were engaged to provide feedback on content, participate in professional development workshops, and access and promote the pilot content. This group was identified as the 'Early Adopter' network. Early website statistics suggested that this network was responsible for driving the majority of traffic to the site in the months following the website launch. 51% of toolkit downloads have been accessed by users in non-metropolitan locations across Queensland, demonstrating broad geographic reach.

An opportunity exists for the APDL to continue to measure, geographically track and develop the 'Early Adopter' network across Queensland. Federal government investment in the National Broadband Network in the coming decades will ensure that regional communities will not only have the opportunity to digitally connect to each other but also to other global communities. It is therefore a priority for *Design Minds* to expand and connect these networks with learning communities across the Asia Pacific. To this end, the APDL has commenced correspondence with a global network of likeminded organisations in Finland, the United Kingdom and Singapore. These global relationships will be developed in the future to continue the exchange of knowledge and international best practice in design education.

### Impact evidence and feedback loop

Having met the initial success measures of the investment agreement, subsequent targets for *Design Minds* have been established to monitor future engagement and growth (Table 4). While this data is useful in measuring the reach and growth of the platform, it does not meaningfully evaluate the extent to which *Design Minds* is developing desirable behaviours and capabilities, having cross-curriculum impact and integrating within existing learning benchmarks. There is an opportunity for *Design Minds* to create an ongoing communication feedback loop that informs content development to meet the design education aims of the platform and the broader "Queensland Design Strategy 2020".

### Future Research Agenda

The opportunities identified in the preliminary evaluation have informed the development of a proposed future research agenda, which will significantly underpin the procurement of ongoing public and private sector support for the platform, and more broadly contribute to the extension of current theory on online design education. This will involve qualitative and quantitative research facilitated as an integral component of the online platform, and also conducted as part of community partnership project case studies, employing action research.

### Community partnerships and engagement model

Building on the success of "Sit-Art", *Design Minds* will continue to promote a community partnerships/ engagement model through facilitated projects and in-direct support. In 2013, Design Minds has supported a range of metropolitan-based community challenge case studies including:

• 'Adspace' (an advertising challenge in partnership with Queensland University of Technology, Smith Family Partnership Brokers, the Queensland Communications Council and 12 south-east Queensland high schools)
• 'How Might We Create Community?' (in partnership with Pimpama Secondary State College, Griffith University and Mirvac developers)

There is an intention to identify partners within this framework to directly facilitate a minimum of five metropolitan community challenges in future years, commencing in 2014.

Indirectly, commencing in 2014 *Design Minds* will also aim to support a minimum of five self-managed regional community projects per year. While it is unlikely that on-the-ground support can be offered for these projects, the Design Minds team will provide online professional

# Developing 'Design Minds' for the 21st Century Through a Public Sector Initiated Online Design Education Platform

development, support in documenting the project, and mentoring to assist in the execution of the project. This model presents a valuable opportunity to activate regional communities, as former Queensland-Smithsonian Cooper Hewitt Fellow and regional Queensland teacher Kevin Collins explains:

> If you can find something that your town or your community thrives on, you get people involved in your school, the kids get excited, the community get excited and things start happening and people love it! (The State of Queensland, State Library of Queensland 2012d)

One key method for supporting these regionally focused projects will be the creation of a *Design Minds* toolkit in 2014 that provides a guide for teachers on how to facilitate community partnerships and how to record the success of the program for principals, teachers and community partners, through an action research methodology. Further, the execution and documentation of these projects will be incentivised by providing up to five 'micro-grants' to assist in video documentation of the projects and data collection via surveys. The videos and relevant research outcomes will be showcased on the *Design Minds* website to inspire other regional schools to pursue community partnership projects and ongoing action research data collection.

## Impact evidence and feedback loop

A central tool in demonstrating the value of *Design Minds* is the ability to measure its positive impact in meeting the challenges of "a new culture of learning" and enacting cultural change. One key response addressing existing gaps in knowledge has been the development in 2013 of a standardised questionnaire proforma that is now a standard inclusion as an addendum to newly published toolkits. This broad ongoing feedback loop provides valuable ongoing access to data to support the future development of the platform. The completion of this questionnaire is also incentivised by offering a book reward for the school, provided by the State Library of Queensland. The questionnaire includes a range of performance measures including:

• age, location and number of participants;
• feedback on the success of the toolkit in aligning with existing learning benchmarks;
• feedback on usability of toolkits, particularly in regard to the design phases and language used;

• anecdotal feedback gauging levels of student enjoyment/reward in relation to traditional learning programs and environments; and
• an option to be contacted to provide further ongoing feedback, to volunteer as an Ambassador for the program, or to author future toolkits.

More directly, the challenge for design thinking to have a greater cross-curriculum impact is currently being addressed through a project to develop a year-long design thinking foundation subject and aligned action research project, in conjunction with Pimpama State Secondary College, to be launched in 2014. The design thinking foundation subject, unique within the Australian education system, will introduce the *Design Minds* methodology and demonstrate how higher order thinking skills developed in the design process can be applied to other non-design related subjects as part of the overall curriculum. The design thinking foundation subject will be fully documented and made available for download from *Design Minds*, allowing *Design Minds* to have a stronger cross-curriculum impact across the State. This will be supported by a coordinated research agenda coordinated in conjunction with academic assistance.

## Design Minds Ambassadors

The ongoing growth of the *Design Minds* community will be supported through expansion of the early adopter network. The current role of the early adopters will be reviewed and formalised in 2014 with the title of *Design Minds* 'Ambassador'. This role will include a range of responsibilities for actively promoting and developing the *Design Minds* platform. *Design Minds* Ambassadors will be educators who possess the 'effective qualities of a 21st century citizen' and have a broad network of influence, ideally through a teaching association or member organisation. Up to twelve *Design Minds* Ambassadors will be selected each year, broadly representing the vast geographic spread of the state.

In supporting the strengthening of this network and the dissemination of the *Design Minds* platform amongst the networks of Queensland teachers, a range of professional development opportunities have been be instigated since 2012. In 2013, two professional development sessions were held to capacity audiences.

Commencing in 2014, three professional development sessions will be held each year. One professional development session will be held to allow the *Design*

# Developing 'Design Minds' for the 21st Century Through a Public Sector Initiated Online Design Education Platform

*Minds* Ambassadors to gather in a central location to share the latest design education knowledge and support its dissemination throughout the regions. Two additional professional development sessions will also be offered each year through an open invitation to teachers across the State, with some support offered to finance regional teachers' attendance. This targeted training, complemented by an open invitation to all teachers, aims to support the strategic, as well as organic growth, of the platform across the State.

*Design Minds* Ambassadors will also be expected to facilitate one professional development session per year amongst their member association or organisation. *Design Minds* will provide mentoring support and resources to assist the facilitation of these sessions, and action research survey instruments to allow data capture for ongoing development of these important sessions.

The success of the development of the *Design Minds* community will also be measured by tracking participation in professional development and capturing data on geographic reach and engagement with the *Design Minds* website.

## Implications

The initial aim of *Design Minds* was to provide resources to increase the capacity of Queensland teachers to teach creativity and design (Arts Queensland 2009). However, given the surprising lack of international evidence-based research on the impact of design education on national innovation and education systems, and the role of design thinking in K-12 classrooms (McGimpsey 2011; Miller 2011), there is a huge potential for this program to also facilitate a long-term research agenda with internationally significant outcomes. In particular, it represents a unique opportunity to measure the success of online platform delivery for design education through open innovation (Bentley 2008, 206). This involves the adaption and testing of new practices generated at a local level through action research, within an open collaborative network, with co-ordinated results able to incorporated into larger scale reform strategies.

While the initial focus of this research is short-term, it is not finite and is expected to expand in scope and direction over time. It is therefore essential to establish yearly evaluation points where research to date can be gathered, synthesised and presented for the purpose of supporting public and private sector investment in the platform. In pursuing the 'Community Partnerships and Engagement Model', requests for future funding and support should also look to focus on opportunities for mutual benefit in key areas of the project that will strengthen and support sustainable growth. This allows for various funding models, not only through government investment, but also private sector project-based support of the following priorities:

• Resourcing ongoing regional engagement
• Investment in further evidence-based research
• Investment in ongoing professional development and capacity building amongst educators

Beyond the short-term focus of this future research agenda there are obviously areas of significance outside the scope of this study that will have medium to long-term implications within "a new culture of learning". For example, what role might *Design Minds* play in facilitating student collectives? How might students use *Design Minds* as a secure and safe 'third place', separate from the school and teachers, to create their own learning networks?

Additionally, the medium-term research agenda should aim to explore the impact of school design education in the uptake of design education at a tertiary level. The long-term research agenda should further aim to measure the impact of school design education at a business and GDP level, measuring and assessing the degree to which design contributes to Australia's shift from a commodity to a creative economy.

## Summary

The continually expanding impact of technology is having an increasingly destabilising effect on traditional models of education. Globally, it is becoming widely recognised that a shift toward "a new culture of learning" is required to operate successfully within 21st century paradigms. In an Australian context, a parallel shift is required in the national economy, as demand decreases for commodity exports and opportunities arise to develop a creative economy in response to the demands of the Asian Century. In terms of education and business, Australia faces the challenge of enacting deep cultural change to grasp these opportunities. Within this context, Queensland faces a unique challenge in connecting remote and disparate communities through technology, and mobilising and empowering the next generation to benefit from the opportunities of the Asian Century.

# Developing 'Design Minds' for the 21st Century Through a Public Sector Initiated Online Design Education Platform

Design, a process for creatively and rationally exploring complex challenges, provides an ideal framework for facilitating this cultural change. *Design Minds* represents a key initiative in changing the culture of learning in Queensland and connecting geographically remote communities. Building on the success of a participatory design process used to create the platform, and the growth of its user community through the establishment of a community partnership model and an ambassador network, the program provides rich opportunities to extend current theory on distance design education, in particular the value of community engagement, through case study methodology, employing action research. The challenge in sustaining the platform and having a genuine impact in enacting cultural change lies in the successful measurement and demonstration of its value and reach, in order to seek further support from government, in the form of Federal and State policy and funding. This requires the development of a coordinated and integrated research agenda for the platform, enlisting assistance from an aligned research community.

While a 'top-down', Government approach to cultural change is necessary, the future research agenda outlined in this paper builds on emerging evidence that cultural change can also be facilitated in a 'bottom-up' way through community engagement. Design Minds therefore seeks to enact cultural change by empowering a 'bottom-up' network of community partners, while advocating through evidence-based research, for future 'top-down' support from Government.

## References

Ambrose, G. and P. Harris. 2009. *Design thinking*. London: Ava Publishing.

Queensland Government Department of Education Training and the Arts, Arts Queensland. 2009. *Queensland Design Strategy 2020*. Accessed January 30, 2013. http://www.arts.qld.gov.au/policy/design2020.html

ABS (Australian Bureau of Statistics). 2013. "Schools Cat. 4221.0 Report 2011". Accessed October 30, 2012. http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousprod ucts/4221.0Main%20Features202011?opendocument&ta bname=Summary&prodno=4221.0&issue=2011&num=& view=

Australian Design Alliance. 2012. *National Design Policy*. Accessed 12 February 12, 2013. http://australiandesignalliance.com/nationaldesignpolicy

Australian Government. 2012. *Australia in the Asian Century White Paper*. Accessed January 30, 2013. http://asiancentury.dpmc.gov.au/white-paper

Bentley, Tom. 1998. *Learning beyond the classroom*. London: Routledge.

Bentley, Tom. 2008. "Open Learning: A systems-driven model of innovation." *Innovating to Learn, Learning to Innovate* 205-229. Accessed November 4, 2013. http://www.oecd-ilibrary.org/education/innovating-to-learn-learning-to-innovate_9789264047983-en

**RESEARCH**

# Developing 'Design Minds' for the 21st Century Through a Public Sector Initiated Online Design Education Platform

Brocato, K. 2009. "Studio based learning: Proposing, critiquing, iterating our way to person-centredness for better classroom management." *Theory into Practice* 48: 138-146.

Brown, Tim. 2008. *"Design thinking"*. Harvard Business Review 86: 84-92.

Brown, Tim. 2009. *Change by design: how design thinking transforms organizations and inspires innovation*. New York: HarperCollins Publishers.

Commonwealth of Australia. 2013. *Creative Australia: National Cultural Policy*. Accessed July 18, 2013. http://creativeaustralia.arts.gov.au/

Cox, George. 2005. *Cox review of creativity in business: building on the UK's strengths*. Accessed January 30, 2013. http://www.designcouncil.org.uk/publications/The-Cox-Review

Design Commission. 2011. *Restarting Britain: Design education and growth*. Accessed January 30, 2013. http://www.policyconnect.org.uk/apdig/design-education-inquiry

Hajkowicz, S., H. Cook. and A. Littleboy. 2012. *Our Future World: Global Megatrends That Will Change the Way We Live*. Accessed 31 October 31, 2012. http://www.csiro.au/en/Portals/Partner/Futures/Our-Future-World.aspx

Hasso Plattner Institute of Design. 2010. *An Introduction to Design Thinking: Process Guide*. Stanford: Stanford University Institute of Design. Brochure.

Hattie, John. 2012. "Finnish education guru Pasi Sahlberg In Conversation: full transcript", Accessed September 27, 2012. http://theconversation.edu.au/finnish-education-guru-pasi-sahlberg-in-conversation-full-transcript-9836

Hooley, Neil. 2012. "Australia has much to teach Asia about progressive education." Accessed 27 April 27, 2012. https://theconversation.edu.au/australia-has-much-to-teach-asia-about-progressive-education-6251

IDEO. 2012. *Design Thinking For Educators*. Accessed October 21, 2012. http://www.designthinkingforeducators.com/

Koskinen, Ilpo, John Zimmerman, Thomas Binder, Johan Redstrom, and Stephan Wensveen. 2011. *Design research through practice: From the lab ,field, and showroom*. Burlington: Morgan Kaufmann.

Kvan, T. 2001. "The pedagogy of virtual design studios." *Automation in Construction 10:* 345-353.

Lloyd, Peter. 2012. "Embedded creativity: teaching design thinking via distance education." *International Journal of Technology and Design Education* 1-17. doi: 10.1007/s10798-012-9214-8.

Lockwood, T. 2009. *Design thinking: Integrating innovation, customer experience, and brand value*. New York: Allworth Press.

MacLeod, Douglas, Larissa Muller, David Covo and Richard Levy. 2007. *Design as an instrument of public policy in Singapore and South Korea*. Vancouver, BC: Asia Pacific Foundation of Canada.

Martin, R. 2009. *Design of business: Why design thinking is the next competitive advantage*. Boston: Harvard Business School Press.

McCollow, John. 2012. *Queensland Schools Key Statistics in Brief 2012 Update*. Brisbane: Queensland Teachers' Union of Employees.

McGimpsey, I. 2011. *A Review of Literature on Design Education in the National Curriculum*. Accessed January 30, 2013. http://www.thersa.org/projects/design/design-in-the-school-curriculum

Miller, J. 2011. *What's Wrong with DT?* Accessed January 30, 2013. http://www.thersa.org/projects/design/design-in-the-school-curriculum

Ministry of Education and Culture of Finland. 2007. *OECD PISA 2006: excellent results for Finnish students*. Accessed 12 February 12, 2013. http://www.minedu.fi/OPM/Tiedotteet/2007/12/pisa.html?lang=en.

OECD. 2010. *PISA 2009 results: Executive summary*. Accessed January 30, 2013. http://www.oecd.rg/edu/pisa/2009.

Queensland Design Council. 2011. *National Cultural Policy Discussion Paper: Response by the Queensland Design Council*. Accessed January 30, 2013. http://culture.arts.gov.au/submissions

RESEARCH

# Developing 'Design Minds' for the 21st Century Through a Public Sector Initiated Online Design Education Platform

Seif, Farouk. 1998. "Design Education". Accessed 30 January, 2013. http://www.silvia-austerlic.com/designeducation.htm

Smithsonian, Cooper Hewitt Design Museum.2011. "Ready Set Design". Accessed February 12, 2013. http://www.cooperhewitt.org/search/ready%20set%20design

The State of Queensland. 2012. "Queensland-Smithsonian (Cooper-Hewitt) Design Museum Fellowship guidelines." Accessed February 12, 2013. http://www.business.qld.gov.au/industry/science/international-science-partnerships/queensland-smithsonian-cooper-hewitt-design-museum-fellowship-guidelines

The State of Queensland, Arts Queensland. 2010. "Unlimited: Designing for the Asia Pacific." Accessed November 4, 2013. http://unlimitedap.com/

The State of Queensland Arts Queensland. 2011. "Queensland Design Council.". Accessed February 12, 2013. http://www.arts.qld.gov.au/policy/qld-design-council.html

The State of Queensland, Arts Queensland. 2013. "QUEENSLANDERSIGN™ Designing a Better Queensland." Accessed February 12, 2013. http://www.queenslandersign.com.au/

The State of Queensland (Department of Education, Training and Employment). 2010. *Action Plan for Rural and Remote Education for 2011-2015*. Accessed February 12, 2013]. http://education.qld.gov.au/ruralandremote/

The State of Queensland (Department of Education, Training and Employment). 2012. "The Learning Place." Accessed February 12, 2012. http://education.qld.gov.au/learningplace/

The State of Queensland (State Library of Queensland). 2012a. "Design Minds." Accessed  February 12, 2013. http://designminds.org.au/?categories=resources,community

The State of Queensland (State Library of Queensland). 2012b. "Asia Pacific Design Library." Accessed 12 February 12, 2013. http://www.slq.qld.gov.au/about-us/corporate/asia-pacific-design-library

The State of Queensland (State Library of Queensland). 2012c. "Sit-Art." Accessed February 12, 2013. http://designminds.org.au/sit-art/

The State of Queensland (State Library of Queensland). 2012d. "Inspire: Kevin Collins." Accessed February 12,2013. http://designminds.org.au/inspire-with-kevin-collins/.

The State of Queensland (State Library of Queensland). 2013. "The Edge." Accessed February 12, 2013. http://edgeqld.org.au/

Thomas, Douglas and John S. Brown. 2011. *A new culture of learning: Cultivating the imagination for a world of constant change*. Lexington, KY: CreateSpace.

Wright, Natalie, Rebekah Davis and Sam Bucolo. 2013. *Knowledge Economy Market Development Mapping Study*. Accessed November 3, 2013. http://www.queenslandersign.com.au/index.php/queenslands-knowledge-on-the-map/

Yamashita, Keith. 2012. *Why CEOs are the world's best designers*. San Francisco, CA: SYP Partners.

Christian.Duell@slq.qld.gov.au