Analysis of a program to promote Design Education in rural Queensland Secondary Schools

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This paper describes and analyses the goDesign program undertaken within 6 Queensland schools in 2009-2010, the impressions and comments of the students, teachers and staff across the schools who participated, and various comments which provide evidence of the development of their design thinking as a result of the program’s implementation. It also outlines some of the recommendations arising from the program.

The program aimed to test a model for design education and immersion in secondary schools and its potential impact in helping to shape student’s dispositions and understanding of design thinking. It also sought to develop recommendations on directions for the greater implementation of design thinking within the secondary school curriculum. It focused on building conceptual understandings of design and practical hands-on knowledge in areas relating to artefact design, interior design and architecture.

Key words: Design and Technology education, design thinking, Immersion design projects, design in secondary schools.

Overview of the program
The project was implemented is six sites across Queensland by a visiting teams of personnel which included: academic and professional staff with a background or teaching role in design, various industry based designers, tertiary students drawn from the university who were studying design in areas such as interior, landscape or industrial design. It was undertaken as a three day intensive course with volunteer secondary students from across the school with a particular emphasis on industry technology and design as well as the Arts.

During the three days of the program teams of senior secondary students and staff were provided with a series of developmental, hands-on, immersive design activities. These were intended to engage and develop student’s understandings and depth of ‘design thinking’. They focused on team building and the processes of creative design and design thinking. The number of students from each rural school varied usually involving between 6-25 students together with one or more teachers. Other teachers and the school principal were often involved in some aspect of the three day program.

The model used was used as an ‘enrichment’ program, seeking to change student’s perceptions of the processes of design and themselves as potential designers. It required students to work in ‘design teams’ and use ‘design thinking’ in ways that parallel the types of activities they might undertake in first year university while also mirroring those processes used by expert practitioners from the commercial world. It provided them with opportunities to explore design concepts, exhibit their work and have their work
recognised and critiqued by peers, their teachers, lecturers and design experts.

Program overview

Day one - activities focused on three main activities;

- **Introduction and building trust** between the presenters and the participating students,
- **Postcard design** - developing an understanding of place and using this as a focus for creative design, each student used photos and digital images collected by themselves, other students and staff from their local area to generate a postcard that represent their space/community. This simple task was used as a catalyst to discuss the role and purpose of design as well as some of the key factors which influence the thinking of designers and their work.
- **Prototype T-shirt design** (using two pieces of T-Shirt shaped pieces of paper) - this task built upon the development of the 'post card' design activity and as well as drawing upon an important local issue for inspiration. The T-shirts were displayed in a short fashion parade and ideas as well as inspiration discussed across the class.

Day two - focused on the processes and practices of design and designers. High lighting the ways in which they work to;

- **Memento and product design** – The students documented, shared and refined their design ideas to generate plans and 3D prototypes and test these with potential customers and clients. Students were asked to work in design teams to generate a series of product ideas for mementos that could be sold at a local fete or shop. The notion of 'inspiration from the local community' was used with the artefacts each being designed based on ideas from the local area.
- **Selling their ideas and communicating with others** - In the afternoon they were asked to produce a sales pitch for their ideas and share them with the class for critique and discussion. The viability, creativity and form and function of designs was discussed and evaluated by their peers with prompting questions from their teachers, the principal, and utilising the guest lecturers

Day three - involved two types of guest speakers;

- **Working with a professional designer** talking about their practice and how their passion for design was developed including information on their current business. This provided the students with an authentic view of the processes of design thinking and enabled them to consider their paralleled use in the classroom and workplace. It also provided them with an understanding of the professional pathways available to the designer and the tertiary study which they might undertake. Each professional designer showed a range of design artefacts, plans and diagrams. They spoke in detail about a range of product design projects which they had undertaken and showed examples of the products created for the community.
- **Working with university students** studying in design also addressed the students. During this discussion they outlined their career aspirations and
described some of the activities which they had undertaken at university which studying design.

- **Designing Outdoor design installations** - The final design task involved the secondary students and guest speakers working together to design, create and collaboratively critique a temporary outside structure using a combination of cardboard, plastic, cloth and found materials.

**Program aims**

“Designers spot potential and how to work with a client or space”.... “there’s a process that designers go through for each project and this process isn’t linear.”

Student, Spinifex State College – Senior Campus Mt Isa

The program sought to develop three key concepts with students and school staff. To broaden their:

- **understandings and capabilities of ‘design thinking’** and their awareness of various vocations and learning pathways which may lead to careers in different design related fields.
- **knowledge and understandings** of the processes and practices of real designers by enabling them to meet professional designers, design staff from the university and by gaining a better understanding of the courses available to them for tertiary study in design.
- **design confidence** and ability to apply the design process and have them demonstrate and share their knowledge with peers, staff and the community though the display of their work in the local art gallery with the work of award winning young Queensland designers.

**The program’s key features**

The program was characterised by the following six distinct features:

1. **Place Based learning** – the design tasks drew on the student’s personal interpretation of issues and inspiration from their local area. This helped to contextual the students learning, making it meaningful. Howard Middleton(2005) in his article *Creative Thinking, Values and Design and Technology Education* notes the importance of ‘meaningfulness’ and contextual knowledge to students stating that

   ‘A key feature of any good design and technology classroom is that the activities that students engage in are meaningful. They are meaningful because they have a contingent relationship with the real world that is both inside and outside the classroom.’ That is, the ideas and processes that the students engage with are connected to the lived world rather than abstracted from it.

   (Middleton, 2005, p67)

2. **Interdisciplinary Practice** – knowledge from the students local communities, personal lives, as well as knowledge and skills from across the curriculum were drawn together to help generate creative and often dynamic solutions. The program aimed to be immersive, engaging teams of students in design thinking through practical and developmental appropriate activities with a range of designers, tertiary design students and lecture staff over three days.
3. **Utilising Real Designers** – Real design practitioners were incorporated into the program – usually drawn from the local community. Sharing their stories and providing a model for students in rural areas. The descriptions of their practice in local industry validated the student’s activities and the processes which they undertook. They also provided an authentic audience for the student’s designs providing feedback to the students and offering suggestions.

4. **Exploring career and learning pathways** – Real world learning was emphasised with students as was the range of pathways which people can follow to pursue their interest in design. This helped to contextualise the learning as meaningful and valid, allowing the students to potentially see themselves as pursuing one of these alternatives in the future.

5. **Authentic audiences** – At the same time as the program was being run at the school, leading design winners from the DIAQ awards were displayed at the local gallery. This enabled students to visit the local gallery, peruse the winning designs and participate in the local DIAQ event. Moreover it provided a display space enabling the design solutions of local students to be displayed alongside those of accomplished designers. This provided students with an immense sense of pride and accomplishment as well as providing an opportunity for local community members to see the design work of both local students and innovative young designers from across the state.

6. **Product development through design thinking** – students were expected to collaborate to develop a product based on a broadly defined and locally contextualised design brief. The notion of a tangible product provided an item which could be shared across the class and evaluated and commented upon by the students themselves and their peers. The students were provided with opportunities to document their ideas and create models or prototypes of their designs.

7. **The projects academic underpinnings**

The project commenced with a literature review which considered; senior and junior secondary syllabuses across Queensland; prior programs on school based design projects undertaken across the world; and literature on design related learning in schools. This process sought to build links between the proposed program and existing syllabus programs and enable the development team to consider the learnings of previous landmark programs.

Clear curriculum linkages were identified with Design and Technology syllabus documents and the Arts.

**Five other key documents were used to shape the theoretical base of the program.**

1. The IDESIGN model of design thinking, developed by Dr Charles Burnette in 1989 (see attachment) and was utilised to inform the process model. This program was originally developed during a Design Based Education K-12 Program at the University of the Arts in Philadelphia by Dr. Burnette entitled, *Design With Kids*. This placed tertiary design students in classrooms to help teachers undertake design projects related to their educational goals. In
partnership with Dr. Janis Norman, Director of Art Education at the University, a national pilot program was launched in 1990.

2. *The Shape of the Australian Curriculum* (2009), a scoping paper from the ACARA, identified ten important general capabilities which it endeavours to develop. Aspects of five of these principles were naturally incorporated into the program. These included: Thinking skills, Creativity, self management, teamwork and social competence. Each became an important process element to the implementation and operation of the program within the classroom.

3. *The National Framework for Rural and Remote Education*, developed by MCEETYA, provided some reflection on issues facing rural and remote students including lower participation rates in higher education and a need to recognise that country communities are often places of great innovation, expertise and resilience. They stress the need to consider the following essential enablers for the provision of quality education in rural and remote locations:
   - Personnel- teachers, administrative and classroom support, specialists
   - Relevant curriculum
   - Information and communication technologies
   - Multiple modes of delivery
   - Environments formed through effective community relationships and partnerships
   - Resourcing

Each of these areas was considered in the programs development and implementation.

4. *The Educational Goals for Young Australians; goal 2;* developed as a part of the Melbourne declaration describes successful learners in terms of eight key characteristics. A summary of these includes aspects of active participant in their own learning, development of essential skills, ability to think deeply and logically, being creative, innovative and resourceful problem solvers, being able to plan activities independently, collaboratively and in teams to communicate ideas, making sense of their world, being motivated to reach their potential and understand pathways to continued education. Each of these elements was explicitly developed and fostered through the program through the hands-on problem based learning activities and the negotiation and customisation of the student’s learning within each design task.

5. *The Intellectual and policy foundations of the 21st century skills framework* provides insight into the importance of the learning and innovations skills, critical thinking and practical problem solving. ‘In a world in which good design is increasingly used as a means of differentiating objects of mass production, creative design skills are highly desired in the labour force.’ Furthermore they state that ‘It is important to see problem solving as encompassing a set of skills. To successfully solve a problem, we must first be able to formulate it as a problem – that is, understand what makes up its essential elements. Thus critical thinking skills are key.’

Data gathering, workshop samples and outcomes
The program gathered information and data through;
   - informal video of learning activities in the classroom,
• video interviews (Students, teachers, staff and program presenters) and student work samples specifically relating to development of design projects.
• student diaries that were kept progressively over the three days and in which students recorded their personal reflections.
• Still photos were also taken progressively throughout each day of the three day program.

Analysis of these and the personal reflections of the facilitators have provided a range of data and some interesting findings which are outlined below and have been used to generate the summary and recommendations for this paper.

**Views of the program by participants**

**Student impressions and comments**

“This program has helped me widen my thinking on design. This will help me not only in my art subjects, but many other aspects of my schooling. It encourages me to ‘think outside the box’, to try many methods before deciding one path and the vital necessity of teamwork.”

Student, Spinifex State College – Senior Campus Mt Isa

“There was a lot more thinking and brainstorming and it actually got me thinking more about the world around me and how certain things or products come about. Thanks guys.”

Student, Spinifex State College – Senior Campus Mt Isa

Three days of intense design thinking, even with a focus on fun and active engagement can be challenging for students. Certainly the comments of the students indicate the significant impact that the program had on their understandings about themselves as potential designers, the role of designers in society and the complexity of the design process. The student's comments reflected a changed understanding of the build environment and the design products around them. They could see how they could potentially play a role as a designer and felt empowered to make changes in their designed world. They enjoyed working in teams and felt satisfied that they had generated, refined and shared a range of creative design ideas which appeared viable and potentially feasible at a commercial level. They enjoyed the opportunity to meet designers and design students and talk to them about their work. They were generally appreciative of the opportunity to display their work at the local gallery and share it with peers, the school community and the local community including their parents.

1. **Staff and principal’s impressions and comments**

“The students have broadened their horizons so that they’re looking at different opportunities that they may not have thought of previously.”

Principal, Chinchilla State High School

Often, due to the pressures of school management, principals don’t have the opportunity to work with students and consider their learning at an activity and curriculum level. Rather they tend to see students activities in terms of discipline areas. This program gave them the opportunity to see the students undertaking tasks in an interdisciplinary way, integrating knowledge and building deep understanding while being actively engaged in the project.
“This kind of teaching that you guys are doing is exactly what teachers should be doing. Giving it over to the students, students develop their own learning as well as learning a bit more independence, so that they are not relying on the teacher or their parents... that is the way I think classrooms should be run”.

Teacher, Emerald State High School

This program provided teachers with the opportunity to reflect on the nature of learning and the ways in which interdisciplinary, problem based tasks can engage students in group problem solving. Its activities provided students with the opportunity to think creatively about problems which are meaningful to them and become self guided learners. They could see that real practitioners don’t work within subject defined boundaries and that the narrow nature of learning within ‘subject areas’ often contributes to student’s disengagement and lack of interest.

2. Visiting Design Practitioners
The visiting practitioners often commented on the richness of the students imaginations and the thoroughness of their design processes given the limited time within which they had to conceptualise and develop their ideas. They obviously enjoyed the notion of working with young designers and sharing their experience and knowledge of the commercial world of design and its challenges. Their real world perspectives helped students contextualise the work they were undertaking, making it more authentic and meaningful.

3. Community Impressions
While community feedback was not directly recorded individual comments from parents and general members of the community were very positive. These particularly related to the public exhibition of the students work and the way in which the students were able to work so well in creative teams to generate highly creative and yet very meaningful design ideas and solutions.

Reflections on the value of program
Clever design is the catalyst, the oil, which lubricates the wheels of the manufacturing industry, providing the opportunities to value add to raw resources and generate real jobs in new and emerging industries. It makes Australia more inventive, creative and competitive, enabling us to tackle the demands of a changing world and respond effectively to major challenges like climate change and rising population pressures through the development of new and improved products and systems. Through design thinking students are empowered to generate new solutions, see new connections, and create the next generation of smart technologies that are needed to be economically and successfully build our place in an increasing competitive international market. Simply put, design thinking = clever thinking and opportunity for students and this will translate into new opportunities for rural and remote communities if properly fostered within the educational community.

This program found that design thinking is a critical way for students to holistically understand, and be able to actively participate, in the build environment. That it enables them to understand how products are conceived, designed and manufactured, leading to an increased appreciation for the designed world and the role they, as active designers,
may play shaping future products and their community.

**Summary and recommendations**

Design activities are interesting and engaging for students, enabling them to incorporate their own ideas and creative thinking and utilise that together with other learning to create meaningful and useful products. The ‘soft skills’ fostered through these programs are as important to the students as the practical design based knowledge which they develop. The following recommendations be considered for incorporation into school based curriculums to support the greater uptake of design thinking within the curriculum.

1. **Design thinking** programs should be introduced as a pedagogical tool, supporting practical, problem solving methodology in our schools though integrated STEM (Science, Technology, Engineering and Mathematics) related learning materials and those of the Arts. Integrated learning opportunities for cross-curricular problem solving activities should be encouraged between classes particularly in the Technology and Arts domains with a common focus on product design, development and prototyping.

2. **Opportunities for students to meet and work, either directly or indirectly, with real designers and industry representatives** should be fostered in secondary schools. Such programs develop student’s self-image enabling them to see themselves as potential designers and creators within their local community, increasing the likelihood that they will pursue design related fields of study in tertiary education and employment in this area.

3. **Problem based curriculum with hands-on, practical design activities** should be implemented to foster creative thinking, practical program solving, esteem and literary and numeracy skills of students. Such multidisciplinary projects enable students to see learning as meaningful and authentic, linked to the real world.

4. **Teacher professional development** should be implemented for key teachers from across the disciplines of Industrial Technology and Design, Science and the Arts. It should be developed in such a way as to assist teachers in developing and implementing creative, problem based learning activities for students.

In a world of rapid change much of the content knowledge developed by students will be obsolete even before it is taught to them. They must develop ‘process’ related skills and design thinking which will enable them to understand and actively participate in shaping the designed world in authentic and meaningful ways. Such programs are intuitively more engaging and interesting for students enabling them to develop a balance of social, cognitive and intellectual skills and capabilities for the 21 century.

“A designer’s role in society is huge, impacting on everything around us. Beyond this, a designer’s role can be one of fun, interesting and innovative designs.”

Student, Chinchilla State High School
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References