

Design thinking in Learning and Teaching for ICT

Professor Neil Anderson
James Cook University

National Study supported by OLT

- Mixed method case study involving four examples in different discipline areas at JCU and cases from other Australian universities



Australian Government
Office for Learning and Teaching

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Grants and Projects

The Australian Government has committed \$58.65 million in program funding over four years towards the Promotion of Excellence in Learning and Teaching in Higher Education which is administered by the Office for Learning and Teaching (OLT) in the Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE).

In 2013, \$8 million (indicative) has been allocated to Grants programs to provide funding for academics and professional staff to investigate, develop and implement innovations in learning and teaching.


a) Higher Education: Office of Teaching and Learning supported project

Three core research areas

- How is design thinking defined or conceptualised by stakeholders?
 - What do stakeholders think about the potential of design thinking to assist lecturers across disciplines to meet the new wave of graduate attributes that emphasise innovation, creativity and problem solving.
 - What examples are there of design thinking use in higher education that have led to success in meeting these attributes.
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Results of pilot study and DT events

<https://sites.google.com/site/jcudesignthinkingframework/outcomes/outcomes>



The screenshot shows the homepage of the Design Thinking website. At the top left is the James Cook University Australia logo. The main heading is "Design Thinking" followed by the subtitle "frameworks as transformative and cross disciplinary pedagogy". Below the heading are six colorful arrows pointing right. A search bar is located in the top right corner. On the left side, there is a navigation menu with the following items: "What is Design Thinking?", "Rationale", "Approach", "Outcomes", "Staff", "Events", "Publications", and "Latest News". The main content area features the heading "What is Design Thinking?" followed by a paragraph: "This project explores design thinking models as transformative cross-disciplinary pedagogy to meet undergraduate and postgraduate generic attribute requirements in the area of innovation, creativity and problem solving." Below this is another paragraph: "Here are some links to tell you more about Design Thinking and how it is being used around the world." followed by three links: "Stanford University", "Postdam University", and "Steven Bell". At the bottom of the main content area, it says "Subpages (1): Rationale".

Navigation

- What is Design Thinking?
- Rationale
- Approach
- Outcomes
- Staff
- Events
- Publications
- Latest News

What is Design Thinking?

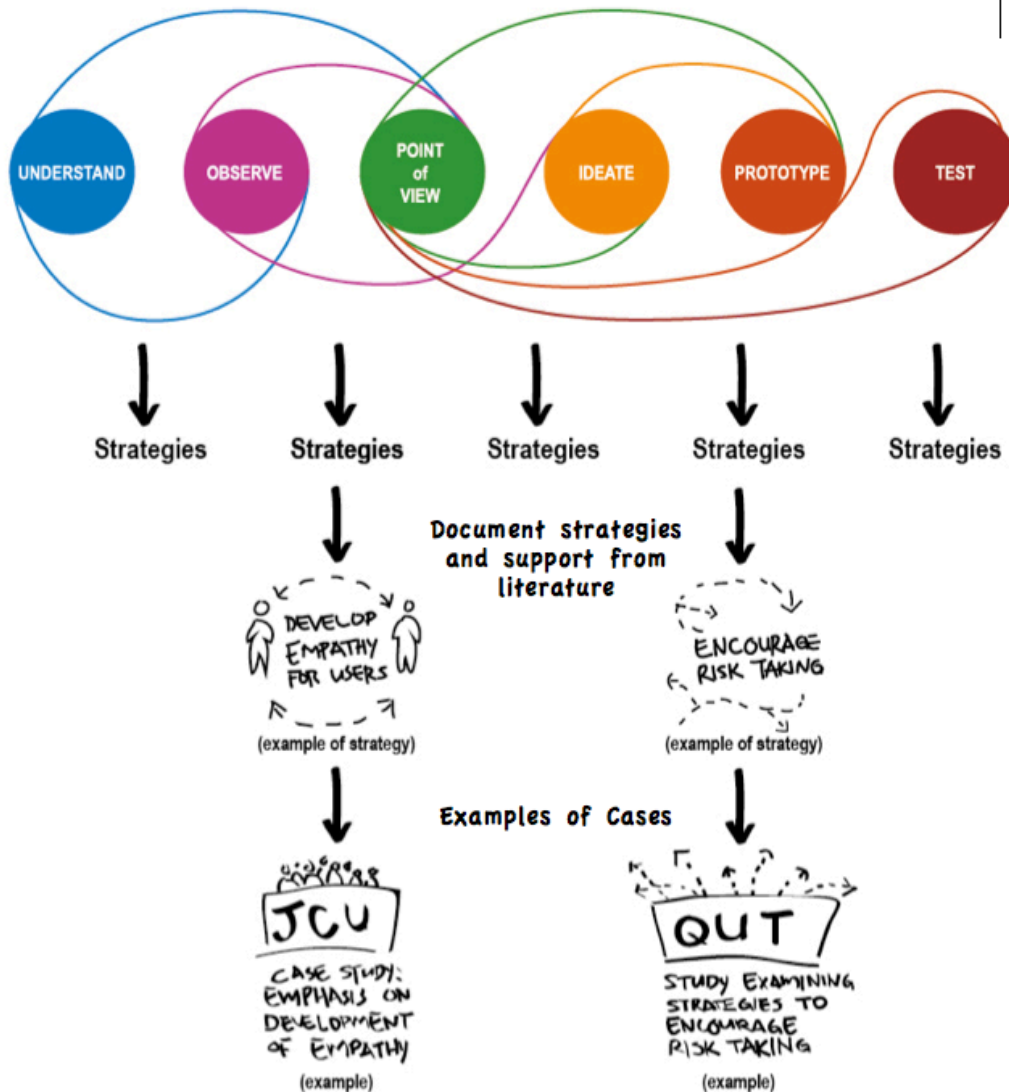
This project explores design thinking models as transformative cross-disciplinary pedagogy to meet undergraduate and postgraduate generic attribute requirements in the area of innovation, creativity and problem solving.

Here are some links to tell you more about Design Thinking and how it is being used around the world.

- [Stanford University](#)
- [Postdam University](#)
- [Steven Bell](#)

Subpages (1): [Rationale](#)

Pilot study to full study



Creative Australia Policy

The Creative Australia Policy (p.3) states that we need to “recognise that **creative talent and design thinking** need to be at the heart of our innovation, technological development and national economic growth”. “Australia’s creative industries to **embed design thinking** and contribute to the economy as leaders in innovation and drivers of productivity and competitiveness across all industry sectors” (p.22). One of the two main aims of the policy was to enable “**strong recognition of design as a ubiquitous capability for innovation by embedding design thinking** within Australia’s innovation system “ (p.90).

Innovation in higher education: Bradley Review of Australian Higher Education



Australian Government

Review of Australian Higher Education

Final Report



“Research and innovation play a pivotal role in Australia’s international competitiveness and ongoing prosperity.”

“Australia is losing ground against a number of its competitor countries on a range of indicators. To go further, to build new economic and social arrangements which might allow us to exploit both our natural resources and the potential for innovation by Australia’s people and institutions”

“Cognitive and creative skills to exercise critical thinking and judgement in identifying and solving problems with intellectual independence” AQF, 2nd edition, 2013, p.48)

This work has been produced by the Australian Qualifications Framework Council with funding from the Australian Government through the Department of Industry **Innovation** Science Research and Tertiary Education and each State and Territory Government through the National Training Funds.



Review of the National Innovation System plus Rupert

- “We have known for several generations that innovation pre-eminently determines our prosperity.”
- “We speak of Australia's natural resources, but energy and creativity are the greatest of our natural resources”

Rupert Murdoch Lowy Institute
lecture



b) National Curriculum for Australian Schools

Two new subjects for early years to end of year eight with design thinking at the core

“10.5 Apply design thinking, creativity, innovation and enterprise skills to develop, modify and communicate design ideas of increasing sophistication”

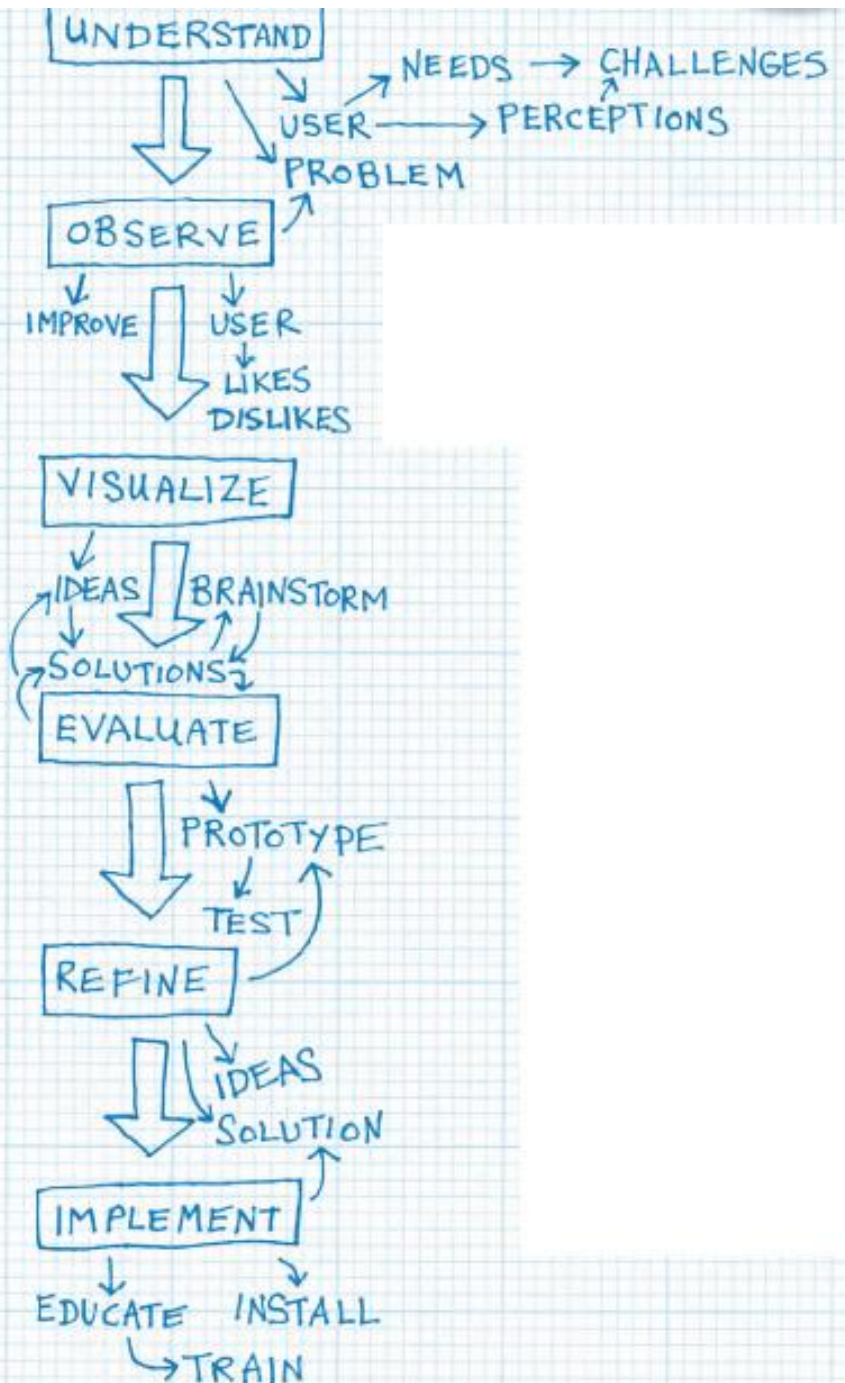
“Critical and creative thinking are integral to activities that require students to think broadly and deeply using skills, behaviours and dispositions such as reason, logic, resourcefulness, imagination and innovation in all learning areas at school and in their lives beyond school.”

Design Thinking Definitions

- Dunn and Martin (2006) claim that “Design thinking is the way designers think: the mental processes they use to design objects, services or systems, as distinct from the end results of elegant and useful products” (p. 517).
 - A designer mentality results from the nature of design work: a project based work flow around problems.
-

Design thinking approach –
linear approach (steps) by
Bell – also similar for
Carroll et al

From the core
concept of design
thinking – various
models have
emerged to scaffold
the process in
different discipline
areas and business



DT in School- Based Graphic Design

Toolkit: Graphics-Design Process

Design Minds and Graphics Reference Group



A toolkit designed to facilitate greater understanding of the role of the design process in the new Queensland Studies Authority (QSA) Graphics syllabus. Focusing on the built environment, this toolkit uses the three Design Minds phases to work through design challenges for use in assessing students under the Graphics syllabus. This toolkit is designed to be used in conjunction with the Graphics-Design Factors Toolkit.

David Kelley: non-linear approach

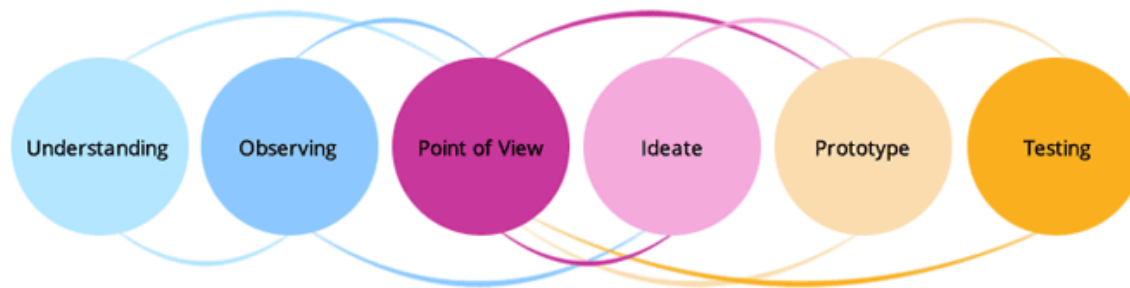


“Design thinking is really a methodology or mindset that designers have always used in trying to come up with new to the world ideas”

It makes available a suite of strategies that allow people to ‘routinely innovate’.

Stanford D-School, School of Design Thinking at Potsdam University, Design Thinking Academy, KL

Developing our future generation to be Innovation Ambassadors
and integrating them in taking ownership for nation building



Impact of design thinking on ICT business

Design Thinking and Innovation at Apple

by Stefan Thomke, Barbara Feinberg

13 pages. Publication date: Jan 09, 2009. Prod. #: 609066-PDF-ENG

Describes Apple's approach to innovation, management, and design thinking. For several years, Apple has been ranked as the most innovative company in the world, but how it has achieved such success remains mysterious because of the company's obsession with secrecy. This note considers the ingredients of Apple's success and its quest to develop, in the words of CEO Steve Jobs, insanely great products. Focuses on: 1) design thinking; 2) product development strategy and execution; 3) CEO as chief innovator; and 4) bold business experimentation.



IDEO

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Design thinking in ICT Examples

ICT *days* 2013

Information & Communication Technologies

INNOVATE - CONNECT - TRANSFORM

WORLD BANK

Overview

ICT Solutions Day

ICT Learning Days



Join the [World Bank ICT team](#), our country clients, and global thought leaders in co-creating smart solutions across the sector. sdfs

The ICT Solutions Day (February 28, 2013) was a day-long session where client countries and internal and external experts came together to get hands-on experience in developing Smart Solutions using information and communications technologies (ICT) to tackle development challenges. This event was centered around leveraging the best global thinking to explore the power of collective intelligence and the latest technology enablers to co-create smart solutions across the sectors. Selected countries presented their challenges and the audience, together with experts, engaged in design thinking – a client-driven, open, collaborative process of building up meaningful ICT-enabled solutions that will address the challenges in a new way.

ICT Learning Days (February 27 & March 1, 2013) included sessions on "smart development" topics such as Smart Cities, Cloud Computing, Open Data, Digital Inclusion, and Design Thinking.



Information and Communications for Development

Promoting Information and Communications for Development (IC4D)

Design Thinking for Government Services: What happens when the past limits our vision of the future?

Government Services in
ICT4D

V viewpoints



DOI:10.1145/2535915

Peter J. Denning

The Profession of IT Design Thinking

Design thinking is the newest fashion for finding better solutions to problems. Combining it with computational thinking offers some real possibilities for improving software design.

Software Design

HAVE YOU NOTICED design thinking? In recent months a spate of news reports, *60 Minutes* segments, and TV news reports have told how the IDEO Company and its founder.



Design thinking in ICT Examples

Professor Igor Hawryszkiewicz At UTS

Ways of organizing design processes to create business networks, social structures, knowledge management and collaboration to provide dynamic capabilities.

Application of **design thinking** in ways to use information technologies in addressing business problems.

Find out more about [Professor Igor Hawryszkiewicz](#).

National Curriculum

Students develop understanding of the relationship and interconnectedness between the components of digital systems in authentic situations, taking into account social, legal and ethical considerations. They develop conceptual and technical skills to systematically create information processing solutions for specified audiences, end-users, clients or consumers such as artificial intelligence, communication, databases, digital media, robotics, transactions and websites. They learn to operate and manage ICT systems in order to locate, manage, organise, analyse, represent and present information; to create digital products; to control and monitor processes and devices; to communicate with others; and to support computational and **design thinking** and production.

Design thinking in ICT Examples

DESIGNING AS REFLECTIVE CONVERSATION WITH THE MATERIALS

OF A DESIGN SITUATION

Keynote Talk for the Edinburgh Conference
on Artificial Intelligence in Design

June 25, 1991

Donald A. Schon

23 Years ago – Artificial
Intelligence

A designer's knowing-in-action involves sensory, bodily knowing. The designer designs not only with the mind but with the body and senses -- a fact that poses an interesting challenge to computers. As Herbert Simon once remarked, computers are sensorily deprived (although Simon has not drawn from this observation the same conclusions I have drawn).

- The label's emphasis on 'thinking' doesn't capture the most important aspect – 'doing'
 - Definitions vary too much
 - Oversimplifies design practice and design education
 - Cannot completely capture the process since tacit knowledge cannot be made explicit
-

Multidisciplinary research in Design Thinking

Engineering Design Thinking, Teaching, and Learning

CLIVE L. DYM
*Department of Engineering
Harvey Mudd College*

Using design thinking to improve patient experiences in Japanese hospitals:
a case study
design et al. draw Taisuke Uehira and Carl Kay

Embedding innovation: design thinking for small enterprises

Antonia Ward, Ellie Runcie and Lesley Morris

Making Computer Games and Design Thinking

A Review of Current Software and Strategies

Elisabeth R. Hayes

Digital Learning, Digital Scholarship, and Design Thinking

Anne Burdick

Graduate Media Design Program, Art Center College of Design, Pasadena, California, United States

Helpful Literature and Links

- **Anderson, Neil** (2013) Design thinking as a means of enhancing the creative and innovative abilities of undergraduate students when creating web based learning activities. *Proceedings of Society for Information Technology and Teacher Education 24th Annual Conference Society for Information Technology and Teacher Education 24th International Conference.* , 25-29 March 2013, New Orleans, Louisiana, USA.
- **Anderson, N. and Courtney, L.** (2011). 'Students Using Indigenous Knowledge in Video Game Creation to Develop Design Thinking Skills' in *Handbook of Research on Improving Learning and Motivation through Educational Games: Multidisciplinary Approaches*. Editor, Felicia, P., IGI Global, Hershey, PA.
- **Anderson, N. (2012)**. Achieving higher education graduate attributes in the area of creativity and innovation through the use of design thinking frameworks. *Proceedings of QSAPPLE Conference*, Manila, 2011.
- **Anderson, N. (2012)**. Design thinking: Employing an effective multidisciplinary pedagogical framework to foster creativity and innovation in rural and remote education. *The Australian and International Journal of Rural Education*, 22(2).

Helpful Literature

Carroll, M., Goldman, S., Britos, L., Koh, J., Royalty, A., & Hornstein, M. (2010). Destination, imagination and the fires within: Design thinking in a middle school classroom. *International Journal of Art & Design Education*, 29(1), 37-53. doi: 10.1111/j.1476-8070.2010.01632.x

Hayes, E. R., & Games, I. A. (2008). Making computer games and design thinking: A review of current software and strategies. *Games and Culture*, 3(3-4), 309-332. doi: 10.1177/1555412008317312

For our complete reference list for the study see:

https://docs.google.com/document/d/1Alcvm_PwywbGCbHQ75uFc8aiJEWH1zkxS93DoUMQs4/edit?usp=sharing

Tim Brown video on design thinking: <http://www.youtube.com/watch?v=UAinLaT42xY>

James Dyson on DT: <http://designthinking.ideo.com/?tag=james-dyson>

Design Thinking Toolkit for Teachers:

<http://designthinkingforeducators.com/>
