Design of Value and Value of Design: The roles of strategic design in (traditionally) non-design disciplines

Russell Thom
Edith Cowan University
r.thom@ecu.edu.au

Dr Christopher Kueh
Edith Cowan University
c.kueh@ecu.edu.au

Dr Hanadi Haddad
Edith Cowan University
h.haddad@ecu.edu.au

Keywords

Human-Centred Design, Strategic Design, Design Research

Abstract

Design skills such as Design Thinking, strategic design and service design are seen globally as skillsets that can help to innovate business, social, health, and environmental sectors in the 21st Century (see Martin, 2009; Mootee, 2013; Brown and Wyatt, 2010). However, there is a difference between the perceived value of design in design practice versus academic design research. After decades of philosophical and conceptual discussions, design research has not yet found its academic position among the science and arts (see Faste and Faste, 2012; Jonas, 2012; Krippendorff 2007). Focusing on design based research, this paper proposes the *Integrated People-Centred Design Model* as the means to contribute new knowledge that navigates the common ground between practice and academia. This model has been generated from an industry funded research project that explores design as the means to unpack and provide possibilities to complex service delivery challenges in the disability sector. The model explores the value of design through the lenses of experiential, behavioural, procedural and functional innovation. The objective of this paper is to explore ways to bridge the gap between the value of design in practice and academia. This paper also discusses an on-going PhD project that applies the Integrated People-Centred Model, that has to date, bridge the gap of value between design practice and academic research.

Russell Thom, PhD Candidate, Edith Cowan University
Russell is a social service designer who practices in Western Australia since year 1990. He is passionate about developing innovative solutions to complex problems. Russell is currently conducting his PhD research that focuses on applying design process to innovate public services in the disability sector.

Dr Christopher Kueh, Senior Lecturer, Edith Cowan University
Christopher's passion and expertise are in applying design process and methods to innovate social and organisational challenges. This has led him to winning community based research projects. Christopher's career objective is to expand the value of design through merging academic research with design practice.

Dr Hanadi Haddad, Lecturer, Edith Cowan University
Dr. Hanadi Haddad worked extensively with external clients for undergraduate and postgraduate design projects, including a current Industry Collaboration PhD project with the Executive Director of the Public Health Division of the WA Health Department. This involves the application of ethically designed co-creation methods with several health based organizations and their clients, classified as vulnerable.

Introduction

The value of design in the 21st Century has expanded from retail and form-giving to creating positive changes in the community, economy, and environment. Design is recognised as a way of addressing the challenges and complexities of the business environment and the wicked problems facing society today. For design to continue to create innovation and find solutions to these problems design practice must continue to develop (Leavy, 2011; Kimbell, 2011; Martin, 2009; Ney and Verweij, 2014). According to Norman (2014), there is a need for "radical reformation of design practice, education, and research." There has been much discussion and literature about design, its application to non-traditional design contexts, the expanded concept of design, the role of the designer, who we design for, who we design with and by who the solutions are created (Brown, 2009; Buchanan,1992; Sanders and Stappers, 2008; Sanders and Stappers, 2014; Johansson-Sköldberg et al, 2013; Norman, 2010; Moggridge, 2008; Kelly and Littman, 2006; Cross, 2011; Martin, 2009). As design moves outside traditional areas to be utilised for business innovation and provided new possibilities for the wicked problems of society today (Brown, 2009; Martin, 2009; Ney and Verweij, 2015).

While the industry, particularly traditionally non-design sectors, is embracing design practices and approaches to instigate innovation, the value of research through design practice is still not clear (Jonas, 2012; Jonas, 2016; Krippendorff, 2007). This paper takes the position that there is a gap in the value perceived in design practice and academic research, and proposes the *Integrated People-Cented Design Model* to explore the value of design through practice and academic research. Through the discussion of an on-going PhD project, this paper will explore the application of the model to bridge the gap of value between practice and academic research.

Design (Thinking) Research: Venture into Complexity

The changing landscape of design has seen an increased segmentation of design into disciplines, models, methods and tools. The past six decades have seen design practice being applied to service, health, experience, interaction and collaboration. Even though this has created positive promotion for design and its role, there is increased debate and confusion about design's relevance as a discipline and further segmentation (Norman, 2010; Nussbaum, 2011). This segmentation has devalued and over simplified the application of design and how designers work (Buchanan, 1992). The continued sub-specialisation of design approaches could cause silos of design disciplines that are unable or unwilling to work together (Gharajedaghi, 2011). There are a plethora of design approaches covering the way designers work, the way they think or their design focus. These include approaches that

have collaborative traits such as co-design, human centred design, participatory design, social design, service design and user centred design (Brown, 2009; Sanders and Stappers, 2008). "The thread that binds them is that each field takes a holistic cross-disciplinary approach that leverages systems thinking to complex human-centered problem solving" (de Guerre et al., 2013, p.264). It is not the difference but the similarities of design approaches that should be its strength (Dorst, 2011; Buchanan, 1992; Mattelmaki, Vaajakallio and Koskinen, 2013; Sanders and Stappers 2014). These discussions and standpoints points to the great value that design practice and the ways designers think have on tackling complex challenges of the 21st Century.

Design Thinking in practice and academic research
Design thinking is a term that has recently been widely adapted to address innovate challenges in various fields. Design thinking is recognised as a way to find new possibilities and solutions to contemporary problems (Brown, 2008; Design Council, 2015). Design thinking can be conceived as being a 'practice' comprising of models, processes, methods and tools or it can be a mindset. A mindset differs from practice. A mindset is not what the designer does, it is what the designer thinks when they approach a design problem (Buchanan, 1998; Mattelmaki, Vaajakallio and Koskinen, 2013; Sanders and Stappers 2014).

Bason (2010) suggested that using design thinking is a similar process to 'participatory design', 'co-design', and 'design attitude'. There are many design thinking models that have been published by various design philosophers, design companies and councils. For example the Human Centred Design Toolkit (IDEO, n.d.), Acumen HCD Workshop (Acumen Fund, n.d.), Design Thinking Business Innovation (Vianna et al., 2012), Design Thinking (Cross, 2011), Design Thinking for Educators (IDEO, 2011), Basic Design 08 Design Thinking (Ambrose, 2010), Double Diamond (Design Council, 2015), IDEO (Myerson, 2001), Leading Public Sector Innovation (Bason, 2010), Service Design (Stickdorn and Schneider, 2011), Collective Action Toolkit (Frog Design, 2013), Bootleg Bootcamp (dschool, n.d.), Business Model Generation (Osterwalder, Pigneur, and Clark, 2010) and Design For Growth (Liedtka and Ogilvie, 2011). These models are applied to complex challenges in the community and meet the needs of multiple stakeholders.

This paper proposes that the key difference between design practice and academic research is how the final outcome of the project is valued. Many times, both practice and academic research apply the same design processes and methods such as co-creation and prototyping of new social services. However, the difference between the two is that the

outcome of the project in practice would focus on the impact of its application in the immediate community, being of value to that community and it is people. Whereas, academic research emphasises the creation of new knowledge that adds to the body of studies through publications and citations, that is valued in the academic community and the researchers' peers. This difference, while each has its merits, is what this paper holds as the main reason for the difference of design values as being seen in practice and academic.

While the value of design activities are highly regarded as the driving force to innovation in non-design related sectors, design as a research discipline is still being questioned and debated in the academic realm. The differences between the value of design being perceived in practice and academic research can be summarised as follows:

	Design Practice	Academic Design Research
Processes and Methods	Design process and methods provide innovative platform for non-design fields to build empathy, embrace uncertainty, and prototype solutions that contribute to tackling wicked problems (Brown, 2008).	Design research methods are complicated and borrow from social and human sciences (Mathews & Brereton 2015). Design could also be argued as never being developed as a discipline (Jonas, 2016, p. 115). This might not be a total weakness to design research because the very nature of design is its flexibility, adaption and application of methods and processes. However, the lack of clearly defined and unified philosophical and empirical foundation in design lands itself to misunderstanding, and therefore vague measurement of the value and impact that design research would have otherwise contributed to various disciplines.
Design Perspectives	According to Martin (cited in Neumeier, 2009, p. 39) the value of design reasoning, in non-design sector such as business, is the abductive reasoning that promotes imagination on possibilities. While most business reasoning focuses on 'inductive' and 'deductive reasoning' that are suitable for "algorithmic" tasks with known formulas, complex challenges now require design reasoning that is not governed by fixed rules.	Design practice as academic research has been debated for many years. One of the unresolved discussions is whether design is considered as science or art. Jonas (2016) recognised that practice-based research or 'research through design' can sometimes be seen as *not* 'proper' research in academia. This is because 'research through design' can often lacks analytic observation and projective judgement. Krippendorf (2007) argued that the definition of

		design research is vague to many. This leads to the misunderstanding and misuse of design research, as people get confused comparing it to scientific research. These discussions and debates have resulted in discrepancies in academic activities such as the agreement in what constitutes PhD research in design, and, evaluation and recognition of design research and its impact in research.
Design Knowledge	The value of design as an activity to create new knowledge in non-design sectors is clear: it is to embed the 'design state of mind' into various sectors. According to Venkatesh et al. (2012), companies embraces design thinking through design orientation that allows them to strive with imagination and intuition. Howard (2015, pp. 252-254) also recognised that practices that see 'design as a way of life' embed curiosity and holistic thinking in their work, and these qualities are found to situate design knowledge in traditionally non-design sectors.	The expansion of design from object and form giving to intangible services and policies has grounded more debate on the creation of knowledge in academia. According to Cross (2007), design knowledge resides in people, processes, and products. These are broad, and at times vague ways of defining the contribution of new knowledge from design research. This, we argue, is because other well defined disciplines are contributing to these areas too. According to Dong, Maton & Carvalho (2016), claims from various disciplines that have created design knowledge could cause segmentation among context-dependant knowledge.

Figure 1 The difference of value of design in trans-disciplinary practice and design research in academia.

The 'gap' identified in Figure 1 illustrates the inconsistency of value between design practice and practice based research in academia. While there are discussions to define design as a new form of science (see Jonas 2015), the unified view of design as a discipline in academic research is still not commonly visible.

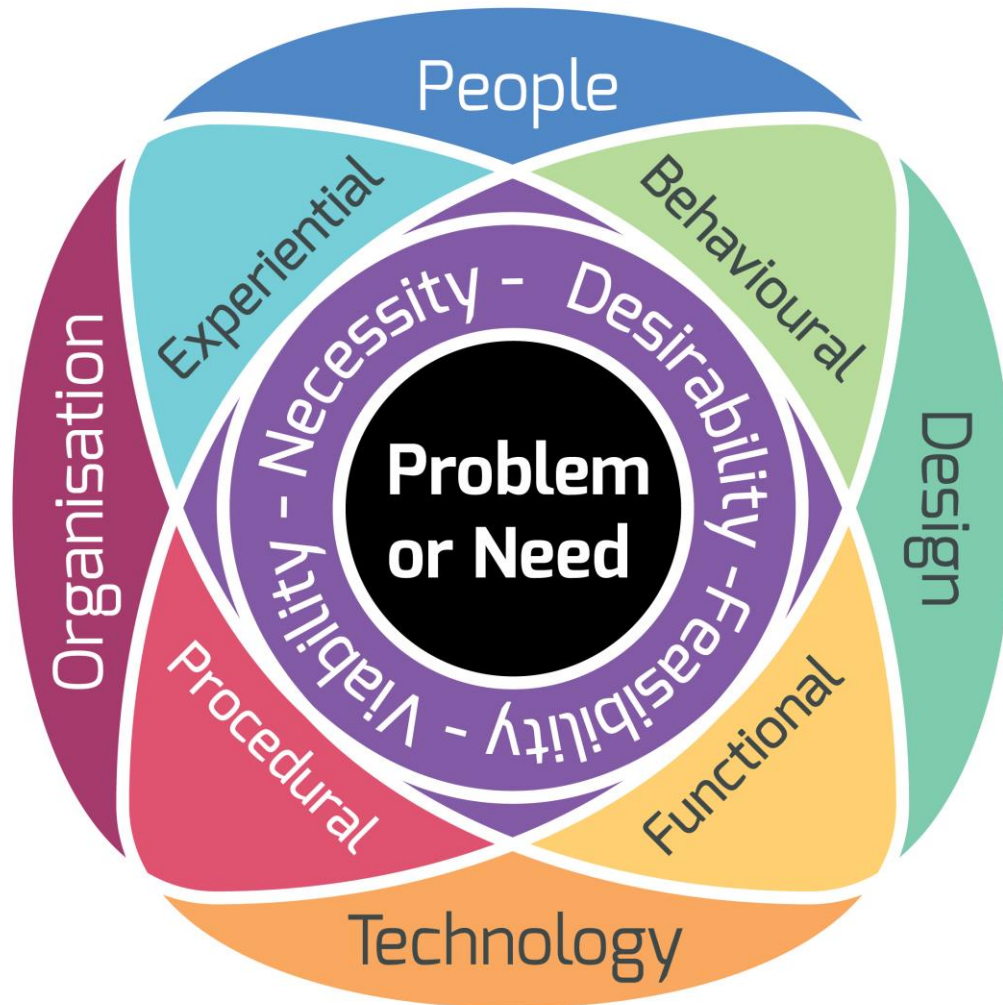**Integrated People-Centred Design Model**

Figure 2 Integrated People-Centred Design Model that balance the value of design in practice and academia.

The model (Figure 2) provides a framework to understand the "design ecology, to reveal blind-spots of knowledge and understanding, and maintain an empathetic approach to problems and needs. The model incorporates the intersection between people, design, technology and organisation. These intersections build understanding, but they also create space for innovation or new possibilities (see Figure 3). This reveals how and what is happening and what people do and feel which helps to build empathy for people that are within and affected by the problem and context.

Intersection	Activities
Behavioural	What people do
Experiential	What people think or feel
Procedural	How something is done
Functional	What something is done with

Figure 3 Intersections of innovation and activity.

Focus

The centre of the model is the focus. This is the identified design problem or need. The focus is not necessarily set it can change as understanding and clarity about the design ecology increases. The designer may return to the focus to reframe the problem with a new understanding from the context (Dorst, 2011). This allows different points of view that can reveal blind-spots. Archer (1965) alluded to the messiness of problem solving. He observed that obtaining data about real life problems was difficult and resulted incomplete information. He believed that there was a tendency to seek the root cause, use previous experience or solutions without consideration of current context or to use the first solution that arises without further consideration of alternatives. Archer's concept of the existing and non-existing problem gives consideration to the possibility that some problems only exist as a construct of a person's view point.

Surrounding the focus are the design constraints. Archer (1965) specifies that a "rigorous solution" needs to be feasible and desirable, however it must give due consideration to viability in terms of cost and complete information. He considered this as finding the right solution for the right problem. Brown (2009) would later propose the use of feasibility, desirability and viability as important constraints that are pivotal in providing design innovation (p.19). The inclusion of necessity in this ring acknowledges the subjective view point, it is the personal view that can, regardless of feasibility, desirability and viability, be the decision for or against a design. Necessity brings in emotion it could be the reason why the design is seen as feasible, desirable and viable. Necessity is the no-way back option, either do something or perish. When there is no necessity problems or solutions can be ignored. As the proverb says, "necessity is the mother of invention".

People

The wicked problems faced by the world today are fundamentally human problems (Rittell and Webber, 1973). As such we cannot remove people from any equation, model or frame

that is proposed to view these problems. People are at the core of the worlds complex problems. If "people" bring complexity then it makes sense to recognise them within the problem and develop empathy for them (Norman (a), n.d.; Palmas and von Busch, 2015). Having an understanding of what they do and how the experience the world.

Design

Archer (1965), like his later counterparts, advocated for an expanded view and role of design in society, inviting designers to reassess their own role in and influence on the design process. This is essential when design is not just the creation of an artefact as design can also create meaning (Krippendorff, 2006). Design is the interconnection of people with services, products, environments and each other. Fundamental to this is to understand that every person designs (Norman, 2013, p. xii). The act of design can be intentional or unintentional (Norman (b), n.d., para 3-4.). Design exist within problems, because the original design intention can be the reason for the current problem, and can have significant impact or causation upon the problem. Understanding what design elements are deliberate or accidental within a problem can give clarity to the context and situation. Further to this there could be mindful or mindless design elements. Mindful design, is more than deliberate, the designer has awareness, an intent and an understanding of the results that a design option will create; the good and the bad. Mindless design, is not accidental, the designer has the intent of design for design or change sake, deliberately ignoring the results it will create; the good or the bad (Brown, 2009; Niedderer, 2013; Thackara, 2006).

Technology

Human beings have been apt at creating technologies. The spoken language, the written word, printing press, digital technologies and the internet to name a view. The design of these technologies maybe for people or the technologies were created and people adapted to their use (Norman, 2005). What technologies are and are not being used can give insight if they are influencing the context and the problem.

Organisation

Organisation in its purest form, to lend from Foucault (2000), is the way that we govern ourselves and others. It is the arrangement of all the elements in the design ecology and their interactions. Organisation is not just the how but also the why. The why brings the dynamic of power to light. Power is not a conceived as a negative force in the model rather it is a relationship. Power could be both a positive and negative influence; being able to create and destroy (Foucault, 2000). The concept of power as a relationship would also suggest that power could influence and create equality within the context.

The model acknowledges the constraints of wicked problems meaning that " there are no 'solutions' in the sense of definitive and objective answers" (Rittel and Webber, 1973, p. 155). Wicked problems and the messiness of the design ecology means that designers may need to communicate future possibilities rather than solutions. If we try to provide solutions we may merely create new problems, rather we may need to provide new thinking, possible futures or frames of reference to enable the design ecology to be viewed and to possibly create change. More importantly in such a fast-paced changing world, we may need to give people time to catch up.

Theory to practice: Application of the Integrated People-Centred Design Model
The Integrated People-Centred Design Model bridges the gap between practice and academia. It provides a framework for practice based research allowing research knowledge to be used. The model is being used as part of an industry based PhD project. Co-funded by the industry partner, Disability Services, the research aims explore the research question 'In what ways do co-design methods and tools need to be adapted to meet the needs of the co-design participants?' The researcher, Russell Thom, who is a practicing service designer, is working in collaboration with the Department of Communities, Disability Services (previously the Disability Services Commission), Statewide Consultancy Program (SCP) on the redesign of their seating assessment process for people with complex wheelchair seating needs. This PhD project is a design research that is being applied in a non-design sector.

In practice the model is providing a reference point for development of the assessment process and conversation about the needs of those involved in the problem. Using co-design approaches, the team is redesigning the assessment process that includes understanding the training needs of the therapists using the process, the needs of the person being assessed, their support people and the integration of this process with the funding and procurement process. The model provides a way to build understanding with the team about people's experiences, behaviors and how to build process and functionality that meets these needs. Further to this it has allowed investigation into what is happening on a world stage and increasing knowledge of international standards and positioning their practice within an international context. The next stage of the research will use the model in practice to understand the needs of people with disability in the co-design process to ensure they can participate fully and the inclusion of therapist outside of SCP.

Section	Practice
Focus	The initial focus was to digitise an assessment form, the current focus is to understand the seating assessment process. This process has included the discovery of the tacit knowledge help by skilled practitioner enabling this to be translated into a training program for novice therapist.
Necessity, feasibility, viability and desirability	The research has revealed that overall knowledge across the sector and system about the necessity for an individual's rights to mobility, the importance of having a wheelchair assessment and ongoing maintenance needs to increase. Using criteria of what is most necessary, feasible, viable and desirable the team is able to focus on what and where to use rapid prototyping.
People	*Macro-level* Identify the different stakeholders who need to be involved in the stages of development *Micro-level* Identify and understand the activities, behaviours and experience of different individuals within stakeholder groups
Design	*Macro-level* Investigate, reveal and understand what influence the design of the current context and situation has on the problem *Micro-level* Investigate, reveal and understand what and why are parts of the context designed that way
Technology	*Macro-level* Investigate, reveal and understand what technologies are being used across the context *Micro-level* Investigate, reveal and understand what technology is present that has a knowledge base or has direct application to the assessment process
Organisation	*Macro-level* Investigate, reveal and understand how is the current system organised and how is this influencing the problem *Micro-level* Investigate, reveal and understand how do the different sections, organisations, stakeholders and individuals work together

Figure 4 Macro and micro views of the Integrated People-Centred Design Model as applied in a practice based research project.

Figure 4 illustrates how the macro and micro view in each section of the model informs practice. The sections help to guide the designer in choosing tools or methods to use based on the context, the need and the objective at that point in time. For example, at the micro-level in the organisation section the use of customer journeys and service blue prints gave insight into the technologies being used, the people involved and the design of the process, in particular what elements were mindfully or intentionally designed.

The research is demonstrating that the design ecology is having an influence on the co-design process. These changes include the Disability Services Commission merging with five other departments into the Department of Communities. The implementation of the WANDIS (Western Australia National Disability Insurance Scheme) instead of the national NDIS (National Disability Insurance Scheme) program. These changes are having and will have further effects upon the organisation, technology, design and people that are part of the new WANDIS. In practice the SCP team and the researcher have presented their progress and tools to other sections within the Disabilities Service, this has then raised further discussion that there could be use of the research and practice tools by these sections, which includes further modifications and co-design requirements. There has also been discussion that the co-design outcomes could also be used by other departments within the Department of Communities.

Immediate impact as creation of new knowledge

With its emphasis on people and the community, the Integrated People-Centred Design Model can therefore be seen as focusing on creating immediate impact, and to contribute new design knowledge to designers and design scholars. According Cross (2007), design knowledge is embedded in three things:

- **People:** This refers to the design behaviour resides in designer and everyone else in the community. This includes empirical studies on the ways people behave when changing their surroundings to fit to a more preferred manner;
- **Processes:** The process and strategies applied in design are important studies to understand the creation of design knowledge. Cross (2007) suggested that the major design research area is methodology that revolves around modelling for design purposes;
- **Products:** This includes the precedent studies of existing design objects. Cross (2007, p. 125) suggested that design objects embody design attributes that are useful for designers to solve design problems at hand.

The Integrated People-Centred Design Model focuses on creating immediate impact and new knowledge in these three areas. The model does this by emphasising on design ecology and all key elements of human society, therefore encourages immediate impact of a design project while emphasising the creation of new knowledge such as new human experience and design processes. This, thus provide a platform to breach the value of design in practice (by focusing on creating immediate impact) and value of design research (by creating new knowledge for designers and design scholars).

Conclusion

The expansion of design to traditionally non-design sectors such as social and disability sectors has generated great value in design practice. However, the value of practice based design research in academia is still not clear. This paper proposes the Integrated People-Centred Design Model that perceives design as an ecology to approach complex problems in holistic manner. The model, being applied in an on-going PhD project, has taken the abstract concept of empathy and provided a framework to understand what people do, think, feel, how and what they do it with. It has highlighted the dynamics of power relationships and the need to continually reflect upon the original focus to see if problem or need still stands true. We see there is a need, especially for Australian design universities, to continue to explore the value of design as a practice base academic research.

Reference List

ACUMEN FUND. n.d. Human Centred Design for Social Innovation (1st ed.). Acumen Fund. Available from:
    http://plusacumen.org/wpcontent/uploads/2013/07/Week1_readings.pdf. [25 January 2016]

AMBROSE, G. 2010. Basics Design 08 Design Thinking. Lausanne, London: AVA Academia.

ARCHER, L. B. 1965. Systematic Method for Designers. London: The Design Council.

BROWN, T. and WYATT, J. 2010. Design Thinking for Social Innovation. *Standford Social Innovation Review,* 8.

BUCHANAN, R. 1992. Wicked Problems in Design Thinking. Design Issues, 8(2), 5–21.

CROSS, N. 2007. *Designerly Ways of Knowing.* Basel: Birkhauser.

CROSS, N. 2011. Design thinking: Understanding how designers think and work. Berg.

dSchool,. n.d. The Bootcamp Bootleg. Available from: http://dschool.stanford.edu/use-our-methods/the-bootcamp-bootleg/. [25 January 2016]

de GUERRE, D., SEGUIN, D., PACE, A., and BURKE, N. 2013. IDEA: A Collaborative Organizational Design Process Integrating Innovation, Design, Engagement, and Action. Systemic Practice and Action Research, 26(3), 257--279.

DESIGN COUNCIL. (2015). Innovation by design. Available from:
    http://www.designcouncil.org.uk/sites/default/files/asset/document/innovation-by-design.pdf . [25 June 2017]

DORST, K. 2011. The Core of `Design Thinking' and Its Application. Design Studies, 32, 521--532.

FASTE, T. and FASTE, H. 2012. Demystifying "Design Research": Design is not research, research is design. *IDSA Education Symposium 2012.* Boston.

FOUCAULT, M. 2000. *Power: The Essential Works of Foucault.* (J. D. Faubion, Ed.). New York: The New Press.

FROG DESIGN. 2013. Frog Collective Action Toolkit. Available from:
    http://www.frogdesign.com/work/frog-collective-action-toolkit.html. [25 June 2016]

GHARAJEDAGHI, J. 2012. Chapter Two - Systems Principles, 29-55. Available from:
    http://www.sciencedirect.com/science/article/pii/B9780123859150000027. [17 August 2017]

HOWARD, Z. 2015. *Understanding Design Thinking in Practice: A Qualitative Study of Design-led Professionals Working with Large Organisations.* (PhD), Swinburne University, Melbourne.

IDEO n.d.. Human Centred Design ToolKit. e-book http://www.hcdconnect.org/. Available from: http://www.hcdconnect.org/toolkit/en/download. [17 August 2017]

JOBST, B., KOPPEN, E., LINDBERG, T., MORITZ, J., RHINOW, H., and MEINEL, C. (2012). The Faith-factor in Design Thinking: Creative confidence through Education at the Design Thinking Schools Postdam and Standford. In H. Plattner, C. Meinel and L. Leifer (Eds.), *Design Thinking Research: Measuring Performance in Context.* Heidelberg: Springer

JOHANSSON-SKOLDBERG, U., WOODILA, J., and CETINKAYA, M. 2013. Design Thinking: Past, Present and Possible Futures. Creativity and Innovation Management, 22 (2), 121-146.

JONAS, W. 2012. Exploring the swampy gound: An inquiry into the logic of design research. *In:* GRAND, S. and JONAS, W. (eds.) *Mapping Design Research.* Basel: Birkhauser.

JONAS, W. 2015. A Cybernetic Model of Design Research: Towards a Trans-Domain of Knowing. *In:* RODGERS, P. A. and YEE, J. (eds.) *The Routledge Companion to Design Research.* London: Routledge.

JONAS, W. 2016. Social Transformation Design as a Form of Research Through Design (RTD): Some Historical, Theoretical, and Methodological Remarks. *In:* JONAS, W., ZERWAS, S. and ANSHELM, K. V. (eds.) *Transformation Design: Perspectives on a New Design Attitude.* Basel: Birkhauser.

KELLEY, T. and LITTMAN, J. 2006. The ten faces of innovation: IDEO's strategies for defeating the devil's advocate and driving creativity throughout your organization. Crown Business.

KIMBELL, L. 2011. Rethinking Design Thinking: Part I. Design and Culture, 3 (3), 285-306.

KRIPPENDORFF, K. 2007. Design Research, an Oxymoron? *In:* MICHEL, R. (ed.) *Design Research Now: Essays and Selected Projects.* Basel: Birkhauser.

LEAVY, B. 2011. Roger Martin explores three big ideas: customer capitalism, integrative thinking and Design Thinking. Strategy and Leadership, 39 (4), 19-26.

LIEDTKA, J., and OGILVIE, T. 2011. Designing for Growth: A Design Thinking Tool Kit for Managers. New York: Columbia Business School Pub., Columbia University Press.

MARTIN, R. L. 2009. *The Design of Business: Why Design Thinking is the Next Competitive Advantage*, Harvard Business Review Press.

MATTELMAKI, T., VAAJAKALLIO, K., KOSKINEN, I., and ALLEN, D. (2014). What Happened to Empathic Design? *Design Issues*, *30* (1), 67–77.

MATTHEWS, B. and BERETON, M. 2015. Navigating the Methodological Mire: Practical Epistemology in Design Research. *In:* RODGERS, P. A. and YEE, J. (eds.) *The Routledge Companion to Design Research.* London: Routledge.

MOGGRIDGE, B. 2008. Innovation Through Design. In International Design Culture Conference.

MOOTEE, I. 2013. Design Thinking for Strategic Innovation: What They Can't Teach You At

Business or Design School. New Jersey: John Willey and Sons.

MYERSON, J. 2001. Ideo: Masters of Innovation. London: Laurence King.

NEUMEIER, M. 2009. *The Designful Company*. Berkeley: New Riders.

NEY, S., and VERWEIJ, M. 2015. Messy Institutions for Wicked Problems: How to Generate Clumsy Solutions?. Environment and Planning C: Government and Policy, 33(6), 1679-1696.

NIEDDERER, K. 2013. Mindful Design as a Driver for Social Behaviour Change. *5Th International Congress of International Association of Societies of Design Research*, 4562–4572. Available from: http://niedderer.org/1961-1b.pdf. [17 August 2017]

NUSSBAUM, B. 2011. Design Thinking is a Failed Experiment. So What's Next?. Co.Design. Available from: http://www.fastcodesign.com/1663558/design-thinking-is-a-failed-experiment-so-whats-next. [2 August 2016]

NORMAN, D. 2010. Design Thinking: A Useful Myth - Core77. Available from: http://www.core77.com/blog/columns/design_thinking_a_useful_myth_16790.asp_. . [17 August 2017]

NORMAN, D. A. 1990. *The design of everyday things*. New York: Doubleday.

NORMAN, D. (a) n.d. Emotional Design: People and Things. *jnd.org*. Available from: https://www.jnd.org/dn.mss/emotional_design_pe.html. [17 August 2017]

NORMAN, D. (b) n.d. *Design as Communication. jnd.org*. Available from: http://www.jnd.org/dn.mss/design_as_communicat.html. [17 August 2017]

OSTERWALDER, A., PIGNEUR, Y., and CLARK, T. 2010. Business Model Generation. Hoboken, NJ: Wiley.

PALMAS, K. and von Busch, O. 2015. Quasi-Quisling: Co-design and the Assembly of Collaborateurs. Codesign, 11(3-4), 236--249.

RITTEL, H. and WEBBER, M. 1973. Dilemmas in a General Theory of Planning. Policy Sciences, 4, 155-169.

SANDERS, E. and STAPPERS, P. 2008. Co-creation and the New Landscapes of Design. CoDesign. 4(1), 5-18.

SANDERS, E. and STAPPERS, P. 2014. Probes, Toolkits and Prototypes: Three Approaches to Making in Codesigning. CoDesign. 10(1), 5-14.

STICKDORN, M., and SCHEIDER, J. 2011. This is Service Design Thinking: Basics, Tools, Cases. Hoboken, NJ: Wiley.

THACKARA, J. 2006. In the Bubble: Designing in a Complex World. MIT press.

VENKATESH, A., DIGERFELDT-MANSSON, T., BRUNEL, F. F., and CHEN, S. 2012. Design Orientation: A Grounded Theory Analysis of Design Thinking and Action. *Marketing Theory, 12*(3), 289-309.

VIANNA, M., VIANNA, Y., ADLER, I., LUCENA, B. and RUSSO, B. 2012. Design Thinking Business Innovation. Rio de Janeiro: MJV Press.