flipstream

THE LAW SOCIETY OF NSW
IN COLLABORATION WITH UNSW LAW

THE SUSTAINABILITY OF LAW AND LAWYERS

LEGAL DESIGN
A PRIMER

Dr Felicity Bell

THE LAW SOCIETY OF NEW SOUTH WALES

UNSW SYDNEY

WHAT IS FLIP STREAM?

A strategic alliance between the Law Society of NSW and UNSW Law aims to tackle the challenges of technological change and its impact on lawyers, law and the legal system.

In 2016 the Law Society of NSW established the Future Committee and, in turn, the Future of Law and Innovation in the Profession (FLIP) Commission of Inquiry. In March 2017, the inquiry culminated in the Law Society's ground-breaking FLIP Report, which discusses the future of the legal industry in the digital age.

The Report recognised the legal profession is undergoing change at a pace never before experienced and in unforeseen ways. This change has major ramifications for not just the legal profession, but for clients and society more generally, particularly in relation to access to justice.

In November 2017, the Law Society entered into a strategic alliance with University of New South Wales (UNSW) Law to generate a stream of research to consider and respond to the issues raised by the FLIP Report, such as legal technology, clients' needs and expectations, new ways of working, community needs and legal education, artificial intelligence and the practice of law and technological solutions to facilitate improved access to justice.

This dedicated research stream will also tackle some of the increasingly complex challenges presented by digital and other technological transformations and its impact on lawyers, law and the legal system.

This strategic alliance, forged between a world-class university, UNSW, and the Law Society is a milestone of progress for both institutions and for the entire legal profession.

Our organisations are meeting the challenges and opportunities presented by technology and innovation in our operating environment head on, driven by a shared mission:

To help equip Australian lawyers with the tools they need to confront the future with confidence and ease.

Each year the FLIP Stream, as it has become known, will undertake research into an annual topic that will then be disseminated through the academy, the profession and society. In 2018 the annual topic was Artificial Intelligence and the Legal Profession, led by Professor Michael Legg and Dr Felicity Bell. The 2019 topic on Change Management was led by Dr Justine Rogers. The 2020 topic on The Sustainability of Law and Lawyers was led by Professor Michael Legg and resulted in two primers: The Future of Legal Costs and Legal Fees - Time Based Billing and Alternative Fee Arrangements by Professor Michael Legg, and Legal Design Thinking by Dr Felicity Bell. The FLIP Stream will also engage in and respond to other areas of research and law reform.

The Law Society is encouraged and excited by this alliance, knowing that our members and the people we serve will be the ultimate benefactors.

THE SUSTAINABILITY OF LAW AND LAWYERS

LEGAL DESIGN
A PRIMER

Dr Felicity Bell

The ultimate, hidden truth of the world is that it is something we make and could just as easily make differently.
(David Rolfe Graber)

The law is a material. And just like other materials … it is malleable, and it can change.
(Gordon Ross)

THE LAW SOCIETY OF NEW SOUTH WALES'S
FUTURE OF LAW AND INNOVATION IN THE PROFESSION
RESEARCH STREAM, UNSW LAW (FLIP STREAM)

2020

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1. INTRODUCTION

Legal design has recently been making its way into lawyers' consciousness. Yet legal design is still 'nascent',[1] and there is not always consensus as to what it means, what it looks like, and what it can achieve. Perhaps the best known advocate of legal design is Margaret Hagan, Director of the Legal Design Lab at Stanford University. In *Law by Design*, Hagan's online book on design thinking, she says that the benefits of legal design are:

1. Improved Problem Solving
2. Client-centred Services
3. Better Communication
4. Richer Legal Profession
5. Better Legal Organisations and Worklife
6. New Products and Services.[2]

She argues that in combination, these approaches can improve the legal system and the way that people interact with it.

Legal design has different meanings, emphases and applications (which are explored below) but a working definition is that it is the use of design methods and tools to rethink and improve legal processes and solve problems through innovation, including complex or 'wicked' problems. Legal design is typically associated with human-centred design and process improvement for both clients and lawyers. While *design thinking* and *human-centred design* are often used interchangeably or to describe similar processes, the term *design thinking* is more widely used.[3] Usually, human-centred design is characterised as a subset or element of design thinking.

Design thinking can be used for access to justice goals, for client satisfaction when dealing with the uncertainties of complex legal issues, through to refining or redesigning internal workflows and improving communications. Legal design has been employed in multiple ways, including to increase lay understanding of contracts and legal advice, improve civil justice services,[4] and redesign courts.[5] Legal design thinking is inherently client focussed, or put another way, concerned with drawing on the users who will be using the system or product. Legal academic Amanda Perry-Kessaris says that design thinking as a particular cognitive style that can be used in 'management, business, policy, and, increasingly, legal contexts'.[6]

In this Primer, section 2 gives a background on design thinking and its key ideas. Section 3 sets out Hagan's legal design process. Section 4 gives some additional examples of legal design projects.

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1 Amanda Perry-Kessaris, 'Legal design for practice, activism, policy and research' (2019) 46 *Journal of Law and Society* 185, 186.

2 Margaret Hagan, 'Introduction' in *Law by Design*, https://www.lawbydesign.co/. Note that by 'Richer Legal Profession' Hagan is referring to legal professionals having greater diversity of opportunity and more fulfilling roles, rather than monetary benefits.

3 Fredrick Baker and Sarah Moukhliss, 'Concretising Design Thinking: A Content Analysis of Systematic and Extended Literature Reviews on Design Thinking and Human-Centred Design' (2019) 8(1) *Review of Education* 305, 320 (emphasis added).

4 Melissa Moss, 'The Escambia Project: An Experiment in Community-Led Legal Design' (2020) 36(3) *Design Issues* 45.

5 Shannon Salter and Darin Thompson, 'Public-Centred Civil Justice Redesign: A case study of the British Columbia Civil Resolution Tribunal' (2016-17) 3 *McGill Journal of Dispute Resolution* 113, https://mjdr-rrdm.ca/articles/v3/public-centred-civil-justice-redesign-a-case-study-of-the-british-columbia-civil-resolution-tribunal/

6 Perry-Kessaris, 'Legal design for practice' (n 1) 189.

2. DESIGN THINKING

The meaning of design thinking has evolved and taken on different emphases at different points in time. Originally, it was the term given to the unique type of problem-solving which designers engage in – what Nigel Cross called 'designerly ways of knowing'.[7]

In the late 80s, Peter Rowe, a Professor of Architecture and Urban Design, wrote a book called *Design Thinking*.[8] In it, Rowe identified three ways that the design of buildings could be analysed. First, the physical structures could be examined in light of 'the historical record of production… interpreted according to various aesthetic canons, social circumstances, and technical opportunities'.[9] Second, a normative lens could be applied, to consider whether a structure constitutes '"good" design'.[10] Third, Rowe said, 'study can take the form of observing what designers do and how they undertake their tasks'.[11] Rowe went on:

> *Seen in this last way, design has often occupied an ambivalent position, being characterized as either a form of fine art or a form of technical science. From all perspectives, however, design appears to be a fundamental means of inquiry by which man realizes and gives shape to ideas of dwelling and settlement.*[12]

At the time Rowe was writing, there was a focus on bringing to light the cognitive processes of designers, especially their own, idiosyncratic approaches to problem-solving.[13]

The term *abductive reasoning* means the process of inferring a best available hypothesis from whatever data is known/available.[14] The nature of many problems which designers are called upon to solve means that the problem itself cannot be adequately defined until finding its solution has been attempted. 'Solution-focused' strategies may therefore be necessary to tackle 'ill-defined problems'.[15]

Rowe said that there was 'no such thing as *the* design process in the restricted sense of an ideal step-by-step technique'[16] but he considered that even among many different styles and approaches, there were commonalities. Professor of Design Lucy Kimbell has described some of these as follows:

- Having a human-centred approach to problem solving (as opposed to being technology- or organisation- centred)
- Using an iterative process of generating insights, generating ideas, testing, and implementing
- Using visual artefacts and prototypes
- Asking 'what if' questions.[17]

Many of these phrases – *human-centred, iterative, visual artefacts* and *prototypes* – may be familiar from current, well-known applications of design thinking, such as those promoted by the Design School at

7 Nigel Cross, *Designerly Ways of Knowing* (Springer, 2006).

8 Peter G Rowe, *Design Thinking* (MIT Press, 1987). See also Kees Dorst, 'The Nature of Design Thinking' in *Proceedings of the 8th Design Thinking Research Symposium* (Sydney University of Technology, NSW, 2010) 131-39; Lucy Kimbell, Applying Design Approaches to Policy Making: Discovering Policy Lab (University of Brighton, September 2015) https://researchingdesignforpolicy.files.wordpress.com/2015/10/kimbell_policylab_report.pdf.

9 Rowe, *Design Thinking* (n 8) 1.

10 Rowe (n 8) 1.

11 Rowe (n 8) 1. See also Cross (n 7) 17-20.

12 Rowe (n 8) 1.

13 See Lucy Kimbell, 'ReThinking Design Thinking: Part I' (2011) 3(3) *Design and Culture* 285, 290–92.

14 Jon Kolko, 'Abductive Thinking and Sensemaking: The Drivers of Design Synthesis' (2010) 26(1) *Design Issues*.

15 Cross (n 7) 18–20.

16 Rowe (n 8) 2.

17 Kimbell, 'ReThinking' (n 13) 287.

Stanford University[18] and IDEO.[19] Yet they have their roots in earlier-identified processes and methodologies. In 1969 Herbert Simon, a 'foundational father of design research',[20] published *The Sciences of the Artificial,* refining his views in two later editions. Often now described as technocratic, Simon's vision was of a unifying design science that could be applied across fields. In the 1970s, Horst Rittel, a design theorist, coined with Melvin Webber the term 'wicked problem'.[21] Rittel and Webber set out ten characteristics of wicked problems. Wicked problems are found in complex and interconnected systems, where there is no way of knowing what the solution to any one issue may be. Part of this is due to the nature of the problem not becoming apparent until solutions are trialled. Further, a 'satisfactory' solution – rather than a perfect resolution – might be all that can be expected.

Rittel developed his analysis of wicked problems in design thinking in reaction to the 'linear' approach being explored in the 1960s.[22] This linear approach had two phases: defining the problem, and finding the solution to the problem.[23] While attractive for its logicality and simplicity, there are two main criticisms that can be levelled at this kind of model – firstly, that this is not how designers themselves work.[24] Figure 1, for instance, shows how a design team moves between clarifying the task (defining the problem to be solved) and searching for concepts (coming up with a design solution).

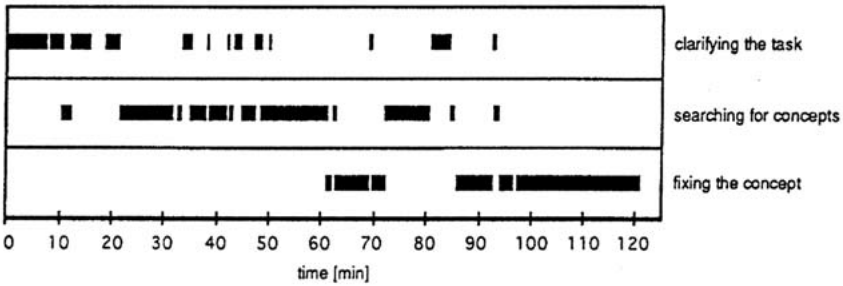

Figure 1: 'Principal phases of the team's design process'.[25]

Secondly, Rittel argued, a linear approach is not actually capable of solving the wicked problems and challenges with which design is concerned.[26]

These early explorations of design thinking established the idea of design as its own discipline or form of knowledge, and one which was capable of solving complex problems. Simultaneously in the 1960s the idea of participatory design (associated especially with the Scandinavian countries' cooperative design) came into being – describing a process by which the end user is involved in the stages of designing.[27]

18 Horst W Rittel and Melvin M Webber, 'Dilemmas in a general theory of planning' (1973) 4(2) *Policy Sciences* 155. Rittel is usually credited as the 'principal architect' of the 'wicked problem' concept.

19 https://www.ideo.com/.

20 Ulla Johansson-Sköldberg, Jill Woodilla and Mehves Çetinkaya, 'Design Thinking: Past, Present and Possible Futures' (2013) 22(2) *Creativity and Innovation Management* 121, 124.

21 Rittel and Webber (n 18).

22 Richard Buchanan, 'Wicked Problems in Design Thinking' (1992) 8(2) *Design Issues* 5, 15.

23 Buchanan, 'Wicked Problems' (n 22) 15.

24 A topic pursued in the 1980s and 90s with theories of design cognition, described above.

25 Attributed to J Günther, E Frankenberger, and P Auer, 'Investigation of Individual and Team Design Processes in Mechanical Engineering' in Nigel Cross et al. (eds) *Analysing Design Activity* (John Wiley and Sons, 1996).

26 Buchanan, 'Wicked Problems' (n 22) 15–16.

27 Peter Asaro, 'Transforming Society by Transforming Technology: The Science and Politics of Participatory Design' (2000) 10(4) *Accounting Management and Information Technologies* 257, 257 (referred to as the 'methods movement'), https://peterasaro.org/writing/Asaro%20PD.pdf.

Design as inescapably 'human-centred'[28] continues as a foundational, underpinning idea in more contemporary iterations of design thinking.

Kimbell argues, though, that much popular work involving design thinking today 'mostly ignores' this earlier work from the 1960s up to the 1990s.[29] She describes a move from a focus on design thinking as a cognitive style, to a general theory of design, and finally to its current and most pervasive state, as an organisational resource (see Table 1), where the purpose is primarily as a tool for innovation.[30] This can also be seen as a split between academic study of design thinking, and practice.[31]

	Design thinking as a cognitive style[32]	**Design thinking as a general theory of design**[33]	**Design thinking as an Organisational resource**[34]
Focus	Individual designers, especially experts	Design as a field or discipline	Businesses and other Organisations in need of innovation
Design's purpose	Problem solving	Taming wicked problems	Innovation
Key concepts	Design ability as a form of intelligence; reflection-inaction, abductive thinking	Design has no special subject matter of its own	Visualisation, prototyping, empathy, integrative thinking, abductive thinking
Nature of design problems	Design problems are ill-structured, problem and solution co-evolve	Design problems are wicked problems	Organisational problems are design problems
Sites of design expertise and activity	Traditional design disciplines	Four orders of design[35]	Any context from healthcare to access to clean water[36]

Table 1: 'Different Ways of Describing Design Thinking'. From Lucy Kimbell, 'Rethinking Design Thinking'.

28 L Bruce Archer, *Systematic method for designers* (Council of Industrial Design of Great Britain, 1965), reprinted in Nigel Cross (ed) *Developments in Design Methodology* (Wiley, 1984). Stefanie Di Russo explains that 'Design management has recently come to the forefront of design thinking and, as Archer predicted, design thinking has become intertwined with management discourse in the design for Organisational transformation today': *Understanding the Behaviour of Design Thinking in Complex Environments* (Doctoral Thesis, Swinburne University, 2016) 20.

29 Kimbell, 'ReThinking' (n 13) 293.

30 Kimbell, 'ReThinking' (n 13) 293, citing as key texts Brown, *Change by Design* (n 34); and Martin, *The Design of Business* (n 34). See also Sabine Junginger, *Change in the Making* (Doctoral Thesis, Carnegie Mellon University, 2006) and similar arguments made by Johansson-Sköldberg, Woodilla and Çetinkaya (n 20).

31 Lisa Carlgren, Ingo Rauth and Maria Elmquist, 'Framing Design Thinking: The Concept in Idea and Enactment' (2016) 25(1) *Creativity and Innovation Management* 38.

32 Key texts: Nigel Cross, 'Designerly Ways of Knowing' (1982) 3(4) *Design Studies* 221; Donald A Schön, *The Reflective Practitioner* (Basic Books, 1983); Rowe, *Design Thinking* (n 8); Bryan Lawson, *How Designers Think: The Design Process Demystified* (Architectural Press, 3rd ed, 1997); Cross (n 7); Kees Dorst, 'Design Problems and Design Paradoxes' (2006) 22(3) Design Issues 4.

33 Key text: Buchanan, 'Wicked Problems' (n 22).

34 Key texts: David Dunne and Roger Martin, 'Design Thinking and How It Will Change Management Education: An Interview and Discussion' (2006) 5(4) *Academy of Management Learning & Education* 512; Robert Bauer and Ward Eagen, 'Design Thinking: Epistemic Plurality in Management and Organization' (2008) 2(3) *Aesthesis: International Journal of Art and Aesthetics in Management and Organizational Life* 64; Tim Brown, *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation* (Harper Collins, 2009); and Roger Martin, *The Design of Business*: *Why Design Thinking Is the Next Competitive A*dvantage (Harvard Business Press, 2009).

35 See Richard Buchanan, 'Design Research and the New Learning' (2001) 17(4) Design Issues 3. Buchanan describes the four orders of design as Problems of Communication, of Construction, of Action and of Integration.

36 See Tim Brown and Jocelyn Wyatt, 'Design Thinking and Social Innovation' (Winter 2010) *Stanford Social Innovation Review* 30, https://ssir.org/articles/entry/design_thinking_for_social_innovation

The recasting of design thinking as 'competitive advantage' for business[37] is associated with more explicitly profit-driven motives and, correspondingly, more structured phases or sequences, though entirely 'linear, milestone-based processes' are still disavowed.[38]

This shift in focus has led to design thinking being described as 'a force of innovation in business, and a point of contention in design'.[39] A point of contention is that while the success of design thinking is widely reported on there is disagreement about its measurable impact. In the 1990s Cross thought that more empirical research was needed to demonstrate its effectiveness.[40] Fast forward several decades and researchers are still noting that most of the evidence about design thinking in management is anecdotal,[41] though this is not surprising given the contexts in which design thinking is likely being used.

There have also been shifts within design thinking itself, e.g. from *user-centred design* to *co-design* (also referred to as co-creation, co-development). *Co-design* is used to describe a process of users and designers working and designing together.[42] There has also been a shift from *product design* to *service design* or designing for services.[43]

Finally, we can understand design thinking as having different layers: we can think of *design methodologies*, *design methods* and *design tools* (Table 2). Design tools are the prompts by which people are assisted to apply design methods to solving a problem or generating ideas about a problem area that has been identified.

DESIGN METHODOLOGIES or PRINCIPLES/MINDSETS	DESIGN METHOD/S or PRACTICES	DESIGN TOOL/S or TECHNIQUES
The rationale for the approach or general research strategy. The methodology will impact the choice of method/s.	The means by which the research questions will be answered or strategy approached.	This might include programs, activities or exercises used to facilitate the design methods.
E.g., ethnography (exploration of the social world and culture)	E.g. ethnographic methods such as direct observation	E.g. exercises such as journey mapping or user profiling

Table 2: Design methodology, design methods and design tools

Researchers interviewed members of six large organisations (e.g. Procter & Gamble, Kaiser Permanente and Deutsche Bank) that were using design thinking.[44] They used this interview material to create a picture of how design thinking was being enacted in practice in the organisations, using the terms Principles/Mindsets, Practices and Techniques (the full description of the characteristics is set out in Appendix 2). This is a useful way of seeing how principles influence practices and how these may then be encouraged with specific tools or exercises.

37 Martin, *The Design of Business* (n 34); Tim Brown, 'When Everyone is Doing Design Thinking, is it Still a Competitive Advantage?', *Harvard Business Review*, 27 August 2015, 2.

38 Tim Brown, 'Design Thinking', *Harvard Business Review*, June 2008, 84.

39 Baker and Moukhliss, 'Concretising Design Thinking' (n 3) 305.

40 Nigel Cross and AC Cross, 'Observations of Teamwork and Social Processes in Design' (1995) 16(2) *Design Studies* 143, 170; see also Di Russo, *Understanding the Behaviour of Design Thinking* (n 28) 55; and Donald A Norman and Roberto Verganti, 'Incremental and Radical Innovation: Design Research vs. Technology and Meaning Change' (2014) 30(1) *Design Issues* 78, 80 (arguing that design thinking has *not* given rise to radical innovations).

41 Johansson-Sköldberg, Woodilla and Çetinkaya (n 20).

42 See Elizabeth Sanders, 'From User-Centered to Participatory Design Approaches' in Jorge Frascara (ed) *Design and the Social Sciences* (Taylor & Francis, 2002) 1.

43 Robert F Lusch and Stephen L Vargo, 'Service-dominant logic: Reactions, reflections and refinements' (2006) 6(3) *Marketing Theory* 281; Lucy Kimbell, 'The Turn to Service Design' in G Julier and L Moor (eds) *Design and Creativity: Policy, management and practice* (Berg Publishers, 2009) 157.

44 Carlgren, Rauth and Elmquist (n 31).

2.1 KEY CONCEPTS IN DESIGN THINKING

It's argued that there is confusion about the definition of design thinking – is it a mindset, a method, or a 'new field of design practice'?[45] Differing views and definitions of design thinking can be attributed to its history and changing forms.[46]

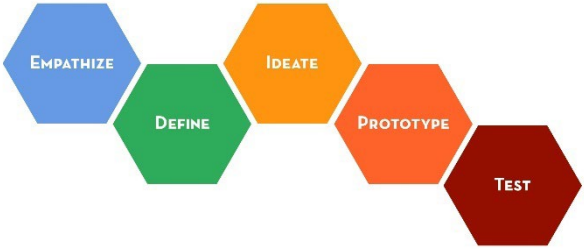

Figure 2: Representation of the design thinking process from the Stanford d.school

Often, the design thinking process and key elements are represented graphically. Some of the more well-known, popular approaches to design thinking are those of IDEO[47] (Inspiration, Ideation, Implementation[48]); the Hasso-Plattner Institute of Design at Stanford, referred to as the Stanford d.school (Empathise, Define, Ideate, Prototype, Test - which as Figure 2 illustrates, is typically represented as a sequence of coloured hexagons); and the UK Design Council (Discover, Define, Develop, Deliver), represented as the 'evolved double diamond' (see Figure 3). The double diamond shape is intended to convey, with points of widening and narrowing, a broad approach followed by a 'honing in' or focusing approach (this is then repeated).

45 Di Russo, *Understanding the Behaviour of Design Thinking* (n 28) 44.

46 Eg, as described by Kimbell (Table 1).

47 Created in 1991, IDEO have developed a number of innovation toolkits: see Brown and Wyatt (n 36); IDEO, http://www.ideo.com/images/uploads/news/pdfs/2010WI_Features_DesignThinking.pdf; Petra Badke-Schaub, Norbert Roozenberg and Carlos Cardoso, 'Design thinking: a paradigm on its way from dilution to meaninglessness?' (2010) *Proceedings of the 8th Design Thinking Research Symposium,* Sydney University of Technology, NSW.

48 Also referred to as the three steps of human-centred design.

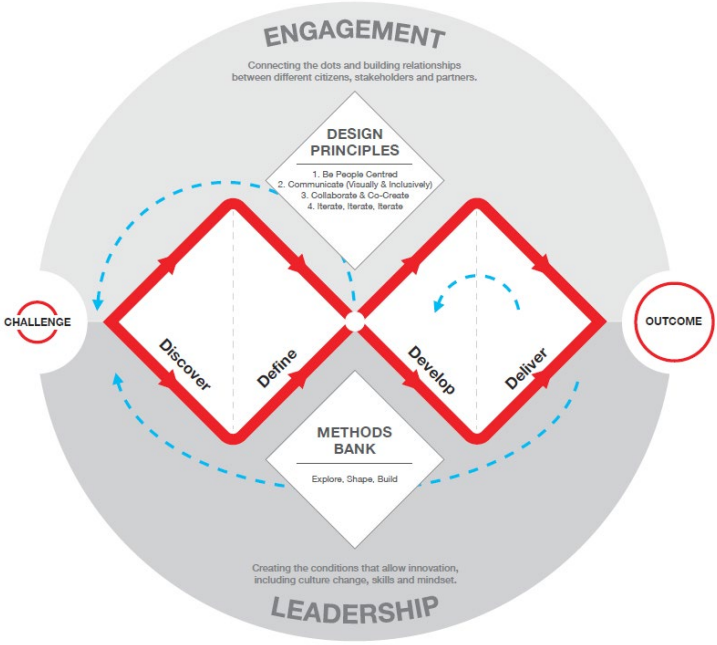

Figure 3: The Design Council's Evolved Double Diamond (2019)

This is sometimes referred to as engaging in firstly *divergent* and then *convergent* thinking. An interviewee from a design thinking research project described how this had changed their organisation's approach: whereas before, they would 'narrow down the choice very fast, and then to converge toward a kind of solution, [now, with design thinking] we open up much more in the beginning in terms of the number of choices and the number of insights, that maybe we didn't think about.'[49]

We now look more closely at key elements of various design thinking approaches.

Insights: Empathise, Inspiration, Discover

Tim Brown, the Chair of IDEO, describes inspiration as 'the problem or opportunity that motivates the search for solutions'.[50] In design thinking, it is important to seek the views of those directly involved about the nature of the problem as they experience it, as well as the wider environment. Familiarity with the organisation or system is needed.[51] Part of gaining this familiarity is seeking input from those people – customers, users, participants, clients – who will be using the system or product. Human-centred design processes emphasise the need to seek user input throughout the design process, but especially in early stages of problem definition.

49 Quoted in Carlgren, Rauth and Elmquist (n 31) 47.

50 Tim Brown with Barry Katz, 'Change by Design' (2011) 28(3) *The Journal of Product Innovation Management* 381, 381.

51 Antti Pirinen, 'The Barriers and Enablers of Co-design for Services' (2016) 10(3) *International Journal of Design* 27, 34.

The Design Council says that the point of 'discovering' is to 'understand, rather than simply assume, what the problem is.[52] This means talking with the people who are affected by the organisation, system or problem. Yet, despite its centrality, McKinsey reported in a study of design thinking that only about half of 300 publicly-listed companies surveyed had 'conducted user research before generating their first design ideas or specifications'.[53]

Understanding the user's point of view also means understanding in an emotional and not purely logical or rational way. This is encapsulated by the idea of 'empathising'. In the context of service design, bringing users into the centre of service development is key. Empathic methods are needed to assist 'non-designers' to articulate ideas.[54]

Idea generation: Define, Ideate, Develop, Prototype

Once the problem has been identified, if not completely defined, the next phase or phases concern wide-ranging generation of ideas. The Design Council writes of seeking out 'different answers… seeking inspiration from elsewhere and co-designing with a range of different people'.[55] The step termed 'ideating' refers to generating many possible solutions. This rapid development of ideas and 'prototyping' – creating models to assist with the thought process – is a central part of design thinking. Expressing ideas quickly and roughly through visual elements and prototypes signifies the value placed on open-mindedness 'exploration and experimentation'.[56] It also allows feedback to be quickly given. A person interviewed for a design thinking research project explained: 'We made [members of the large organisation] go back to the customers and get feedback on their ideas, I mean, it was transformative, these leaders were like "Oh my God, first of all, it's been forever since I talked to a customer, I can't believe these are their problems…"'.[57]

Implementation: Test, Iterate, Deliver

If design thinking is to be applied to problems which are ill-defined, the goal of the design may need to shift as the process evolves.[58] An important element in design thinking is the concept of *iterating*. Iteration refers to 'modelling, testing and modifying'[59] – a repetitious process of tweaking to modify the outcome, ideally moving closer and closer to the optimal solution.

Design is evaluated on the usefulness of its results.[60] At the same time, the goal is 'good enough' solutions: a designer cannot 'solve' problems but only 'resolve' them. This is sometimes described as optimization, or satisficing. It means that any design is naturally iterative, as the designer should continually seek to improve on it. Tim Brown and Jocelyn Wyatt, of IDEO, have explained:

> *Time and again, initiatives falter because they are not based on the client's or customer's needs and have never been prototyped to solicit feedback. Even when people do go into the field, they may enter with preconceived notions of what the needs and solutions are.*[61]

52 Design Council, https://www.designcouncil.org.uk/news-opinion/what-framework-innovation-design-councils-evolved-double-diamond.

53 McKinsey Quarterly, *The Business Value of Design* (Report, 25 October 2018) https://www.mckinsey.com/business-functions/mckinsey-design/our-insights/the-business-value-of-design#

54 Pirinen, 'The Barriers and Enablers of Co-design for Services' (n 51) 29.

55 Design Council (n 52).

56 Jon Kolko, 'Design Thinking Comes of Age', *Harvard Business Review*, September 2015, https://hbr.org/2015/09/design-thinking-comes-of-age

57 Carlgren, Rauth and Elmquist (n 31) 47.

58 Herbert A Simon, *The Sciences of the Artificial* (MIT Press, 2nd ed, 1981) 186–87; cited by Xinya You and David Hands, 'A Reflection upon Herbert Simon's Vision of Design in The Sciences of the Artificial' (2019) 22(Sup 1) *The Design Journal* 1345.

59 Cross (n 7) 16.

60 L Bruce Archer, 'The nature of research into design and design education' (Paper presented at the International Conference on Design and Technology, Department of Design and Technology, Loughborough University, 2007) 4.

61 Brown and Wyatt (n 36).

Jon Kolko writes that 'design culture is nurturing. It doesn't encourage failure, but the iterative nature of the design process recognises that it's rare to get things right the first time'.[62] The process of testing can illuminate 'underlying problems' and even restart the process.[63] This means that 'design never ends': 'Whenever a solution idea has been tested, questions will be posed about whether it contributes to a solution for the original problem brief and *whether the initial problem brief was the right one*'.[64]

As explained in the next section, these key concepts all find their way into the idea of legal design.

3. LEGAL DESIGN

Broadly, legal design is the application of design thinking to the provision of legal services. It is a recent development in the history of design thinking, going back about ten years.[65] The Legal Design Lab at Stanford commenced in 2013[66] and the first Legal Design Summit, encompassing visual design, product design, service design, and system design, was held in 2016.[67] Hagan says that legal design stems from 'human-centred and visual design, civic technology, and participatory policy-making'.[68] Some practices which are now associated with legal design, though, have longer histories – for instance, the use of visual elements in law goes back around twenty years.[69]

Hagan has written extensively on the ways that legal design can be used in conjunction with communities to design better legal services and promote access to justice. It's also argued that lawyers' own organisations and work practices can also be improved using legal design. One Australian legal design consultancy explains:

> *The brief was to assist a boutique law firm design an alternative workflow for an extreme type of matter that required excessive volumes of material to be collated and responded to within 10 days of receipt. We spent 4 days mapping the workflow with our client and redesigning the service delivery identifying pain points and moments that matter. We prepared a strategy for the firm including a new automated workflow and an agile approach to managing the matter.*[70]

Indeed, legal designer Charlotte Baker has written that 'any aspect of the law' may benefit from legal design, including internal workflows and legal organisations, as well as contracts and advice (Figure 4).[71]

62 Kolko, 'Design Thinking Comes of Age' (n 56).

63 Design Council (n 52).

64 Walter Brenner, Falk Uebernickel and Thomas Abrell, 'Design Thinking as Mindset, Process, and Toolbox' in Walter Brenner and Falk Uebernickel (eds) *Design Thinking for Innovation* (Springer International Publishing, 2016) 9 (emphasis added).

65 Genevieve Grant and Lois Lupica, 'Will Legal Design Improve Civil Justice Systems? And How Will We Ever Know?' (Unpublished paper, copy on file with author) 2.

66 Margaret Hagan, 'Design Comes to the Law School' in Catrina Denvir (ed) *Modernising Legal Education* (Cambridge University Press, 2019) 109, 111.

67 See also the website of the Legal Design Alliance, https://www.legaldesignalliance.org/

68 Margaret Hagan, 'Legal Design as a Thing: A Theory of Change and a Set of Methods to Craft a Human-Centered Legal System' (2020) 36(3) *Design Issues* 3, 4.

69 Camilla Baasch Andersen, 'Musings on the Comic Book Contract Project and Legal Design Thinking' (2020) *Journal of Graphic Novels and Comics*, doi: 10.1080/21504857.2020.1731563; citing Collette Brunschwig who started the Department of Legal Visualisation in Switzerland in the early 2000s: see https://www.ius.uzh.ch/de/research/units/zrf/abtrv.html

70 Inkling Legal Design Consultants, 'Our Projects', https://www.inkling.how/projects

71 Charlotte Baker, 'Legal Design Explained: Part 1 – What is Legal Design?', *Society for Computers and Law*, March 2019, https://www.scl.org/articles/10490-legal-design-explained-part-1-what-is-legal-design

Figure 4: Legal Design. From Charlotte Baker, 'What is Legal Design?', Society for Computers and Law, March 2019, https://www.scl.org/articles/10490-legal-design-explained-part-1-what-is-legal-design

The main benefits that Baker identifies are:

- improving relationships with clients;
- enhancing legal understanding; and
- fostering innovation within one's own organisation.

Perhaps the most important message of legal design is to focus on the needs and perspectives of the 'users' of the law, specifically lay users.[72] To do this, lawyers should resist making assumptions about a client's or user's 'problem' and instead seek to approach everything from the point of view of the participants.[73] Baker explains that this focus will allow the development of 'solutions that are exactly what our clients want'.[74] Hagan also identifies user-centricity as one of legal design's three fundamental principles. She aligns these fundamental principles with key benefits, as follows:

- Be experimental → generate an experimental culture
- Be user-centred → create user-centred innovations
- Be intentional in how you operate → find new paths for legal work and serving justice

In addition to increasing the centrality of the client through 'user-centred innovation', Hagan argues that there are two other primary benefits to be expected from legal design: the development of a more 'experimental culture'; and generating new ways of doing legal work and new legal roles.[75] Generally, she sees that this can benefit the legal system as a whole through making it 'more accessible, effective, affordable, comprehensible and empowering'.[76]

72 Marcelo Corrales, Mark Fenwick and Helena Haapio, 'Digital Technologies, Legal Design and the Future of the Legal Profession' in Marcelo Corrales, Mark Fenwick and Helena Haapio (eds) *Legal Tech, Smart Contracts and Blockchain* (Springer, 2019) 1, 7.

73 Ngosong Fonkem, 'Legal Design Thinking: Better Solutions to Client Problems' (2019) 92(8) *Wisconsin Lawyer* 16, 16.

74 Charlotte Baker, 'Legal Design Explained: Part 2 - Why do we do legal design?', *Society for Computers and Law*, April 2019, https://www.scl.org/articles/10504-legal-design-explained-part-2-why-do-we-do-legal-design

75 Hagan, 'Introduction' in *Law by Design* (n 2).

76 Hagan, 'Design Comes to the Law School' (n 66) 110.

3.1 LEGAL DESIGN PROCESS

For legal design, the general design thinking processes described in section 2 are used, adapted to the context of legal services. There are some parallels with process improvement. Common tools are found across process improvement and design thinking – for example, stakeholder maps and the 'Five Whys' method (credited to Sakichi Toyoda, founder of Toyota).[77] Six Sigma's[78] process methodology also has five phases: define; measure; analyse; improve; and control.[79] *Control* can be seen as iterative as it is supposed to incorporate continuous improvement mechanisms. Legal process improvement is focused on eliminating inefficiencies.[80]

Hagan's legal design model is based on the d.School model, with five stages:[81]

Discovery → Synthesising/Scoping → Building → Testing/Experimenting → Evolving

Discovery refers to a data collection phase involving the problem area. It emphasises research but also direct observation and speaking to impacted or potentially impacted people, whether they are potential clients or providers of services. Like the Design Council's 'discover' phase, the idea is to think as broadly as possible (engage in *divergent* thinking). Hagan refers to this as beginning with an 'expansive creativity'.[82]

Recently, legal design company Portable developed an app called amica,[83] based on the existing Family Court consent order form, intended to help separating couples to work out arrangements for dividing their property and for care of children.[84] Design was done with a multidisciplinary team that included designers and lawyers from the Legal Services Commission of SA, which supported the project. Portable's website explains the initial process of discovery:

> *Looking at online dispute resolution [ODR] was a logical next step for us. After researching the successes and challenges of [other, international] platforms … we saw an opportunity to build an accessible, cost-effective and user-centred method for resolving disputes with technology. A combination of research and informal chats with government clients led us to commence our own internal R&D [research and development] on what we could do to improve this experience for users.*[85]

Portable also interviewed people – potential users – who had themselves experienced the family law system.

Sythesising/Scoping is a narrowing process where the information gathered in the Discovery phase is filtered and organised in order to focus in on the "real problem".[86] This might involve identifying user groups, mapping and ranking exercises. Hagan says that this stage should result in a Design Brief.

Portable's research and initial interviews with people who had previously been through the family law system helped to learn what people would want from a mobile app like amica. This was translated into

77 Brenner et al (n 64) 14.

78 Six Sigma is usually attributed to engineer Mikel Harry at Motorola in the 1980s and was famously implemented by General Electric in 1995: Michael C Thomsett, *Getting Started in Six Sigma* (Wiley, 2005) 9.

79 Thomsett (n 78) 117-18.

80 Michael Callier and Achim Reeb, 'The Industrial Age of Law: Operationalizing Legal Practice through Process Improvement' (2015) 93(4) *Oregon Law Review* 853, citing Seyfarth Shaw as an early adopter of legal process improvement.

81 Hagan, 'Design Comes to the Law School' (n 66); Hagan, 'Design Process for Lawyers' in *Law by Design* (n 2).

82 Hagan, 'Legal Design as a Thing' (n 68) 6.

83 https://www.amica.gov.au/

84 https://www.portable.com.au/work/amica

85 https://www.portable.com.au/work/amica

86 Akin to the Design Council's 'define' phase, where 'convergent' thinking is used.

a list of key things which people wanted and needed from the app, such as 'clarity and transparency', a tone that was 'authoritative, but not stuffy or legalistic', and at times, 'an authoritative decision-maker to provide an objective benchmark'.

Building is the phase of, if not physical building, at least brainstorming, using visual tools such as drawing diagrams, and possibly even 'prototyping'. It should result in multiple ideas as to how to address the Design Brief. As with the phase of idea generation or ideating, the goal is to explore many potential solutions. Hagan refers to 'pausing feasibility' – creating a space to imagine that anything is possible, in order to think as broadly and creatively as possible. These ideas must then be narrowed down again – both in number and in complexity – before a process of mocking up, sorting ideas and possibly prototyping, is engaged in.

Portable explain that for their team, mapping out a 'generic' online dispute resolution process 'opened up the potential for opportunities to better understand the way people communicate in order to put their experience at the centre'. They could then move on to building prototypes.

Testing/experimenting is closely allied with building and refers to testing and critiquing the ideas and prototypes that have been created. Moving quickly into testing is a hallmark of design thinking methods. The aim is to quickly generate feedback and to test again, in a cyclical process, as necessary.

Portable engaged in six rounds of user-testing amica with a group of people who had previously been through the family law process: 'This allowed us to confirm our assumptions and design principles and modify the tone of voice, functionality, and content as needed'.[87]

Evolving (involving piloting, scaling and investing) is the phase encompassing testing out the refined prototype/idea, possibly leading to scaling up of the project and its implementation.

In the case of amica, for example, the focus is now on offering the app beyond South Australia.

3.2 LEGAL DESIGN – DOING OR THINKING?

There is ambiguity as to whether design thinking is best thought of as a way of *doing* or a way of *thinking*.[88] Many writers see design thinking as something more than a set of processual steps, but agree that steps or phases are needed (along with design thinking tools) to *support* a design thinking mindset.[89] But it's argued that design thinking is more than just a set of tools or techniques:

> *Design thinking is often equated to a toolbox: Sometimes the popular versions focus on the designer's specific methods taken out of context, as tools ready for use, but the person using the tools must have the knowledge and skill – competence that comes with training – to know when to use them.*[90]

Recently, Hagan has noted that, especially when designing for public justice sector services, design based on an evidence base is needed:

> *If the goal of legal design is to create not just new innovations, but innovations that can be piloted and can form the basis for evidence-based reforms and policymaking in the justice system, then a heightened level of attention to methodology is necessary.*[91]

She sets out several methodologies and corresponding methods which can be used to increase the robustness of legal design work. Primarily, her focus is on the *methods* to be used. She includes participatory design methods, applied ethnography, grounded theory, and the Delphi method.[92]

87 https://www.portable.com.au/work/amica

88 Di Russo, *Understanding the Behaviour of Design Thinking* (n 28) 44.

89 Brenner et al (n 64) 3.

90 Johansson-Sköldberg, Woodilla and Çetinkaya (n 20).

91 Hagan, 'Legal Design as a Thing' (n 68) 6.

92 Hagan, 'Legal Design as a Thing' (n 68) 7–11. See Appendix 2 for more examples. Kimbell argues that it's important to reflect on the methods used, as even the process of seeking to co-design still involves many decisions about how users or participants will be asked to contribute: 'Discovering Policy Lab' (n 8) 64.

Hagan's Legal Design Mindsets

A design mindset is one which questions everything and assumes that anything is possible.[93] Hagan sees it as an addition to lawyers' usual problem-solving methods:

> *By [using design thinking], we can get to ideas for new initiatives, tech, and organisational changes that we otherwise would never have thought of. Design can help us envision better ways of working, as well as better ways of serving our clients and the public generally...*[94]

Hagan sets out a list of 'Core Mindsets' to help guide legal design:[95]

- **Pause feasibility**: Hagan calls this both 'the most powerful design mindset' but also one of the hardest for lawyers. It means letting go of all the constraints that might impact on the project and imagining that anything is possible. In this ideal world, what would be the best way of doing things?
- **Everything is a prototype**: This encapsulates the idea of pulling ideas together quickly, seeking feedback early and then either improving on the idea or abandoning it early (fail quickly). This is challenging for lawyers because it means exposing ideas which are not yet fully formed, let alone perfected.
- **Welcoming criticism**: This is tough as criticism can be hard to hear, but 'this is where you can fix your current offerings and identify the best ways to develop something new'.
- **Lawyers becoming feedback-driven and iterative**: Abandon the idea that things should be perfect straight away and that feedback is a negative. Everything is a 'build-test-refine' process.
- **Being user-centred**: This means talking to real people, not just guessing or assuming what the 'user' might want or need.
- **Hold off on the perfect solution**: Don't assume that you understand the problem enough to design the perfect solution straight away.
- **Get specific, go for the extreme**: Try to avoid thinking about users generically but as complex, real people – in a specific way. Sometimes designing for the 'extreme user' is helpful. For example, the architects of BC's online court system focused on the most disadvantaged and vulnerable users.[96]
- **A beginner's mindset**: Questioning things like a beginner is an aspect of pausing feasibility – letting go of preconceived ideas that come with experience and expertise and seeing things afresh, or from the user's point of view.
- **Flipping our perspective from lawyer to layperson**: To design better solutions for clients, we need to try and see the world as laypeople see it – without the lawyer's analytic lens.
- **Working in a mixed team**: Interdisciplinary teams are 'essential' to improved problem-solving. This is about recognising others' strengths and seeing things holistically.
- **Going visual**: Communication is improved by the use of visual elements – it can be clearer and more engaging.
- **Bias to action and building to think: Hagan explains that this avoids getting stuck in planning or talking about stages – move straight to action by making a prototype.**
- **Embrace constraints:** Hagan says that 'Limits can force clearer thought and better focus' – like working to a deadline.

A critical question is how, lawyers might be encouraged to embrace and adopt both legal design mindsets and methodologies.

In *Law by Design,* Hagan writes that she has 'tried out many variants of the design process … with legal

93 Hagan, 'Design Mindsets', *Law by Design* (n 2).
94 Hagan, 'Design Mindsets', *Law by Design* (n 2).
95 Hagan, 'Design Mindsets', *Law by Design* (n 2).
96 See below at 4.2.

audiences' and considered how the process could be made more acceptable, accessible and useful for lawyers.[97] She perceives the main stumbling blocks to be the personalities of lawyers, who she describes as sceptical, risk-averse, and prone to unnecessary or overly harsh criticism.[98] While this is, to a degree, supported by research, there are also often structural, cultural and organisational barriers to change that must be addressed.[99] Many of the lessons of design thinking are intended to overcome barriers. For instance, the motto 'fail often and fail soon' emphasises that mistakes are not bad or a waste of time, but are valuable for what is learned and for improvement.

For individual legal organisations, a lot turns on what is needed or desired through the use of design thinking. It is to create a more innovative culture, to solve a specific problem or issue, or to redesign a workflow or user experience? Here, questions about methodology are likely less important. For example, it may be sufficient for the organisation's members to map out the 'user journey' to try and identify points of stress or weakness. If seeking to improve workflows or increase efficiencies, the organisation may look closely at its own internal processes, break these down, and consider where improvements might be made.[100] Similarly, an absence of existing data might mean that it will be difficult to immediately identify the impact of change, but most legal design processes involve an iterative process where data will be collected as part of continuous evaluation and improvement.

4. EXAMPLES

It is difficult to find in-depth, reported examples of legal design in action. The two which follow are some of the best known applications.

4.1 VISUAL ELEMENTS IN LEGAL DOCUMENTS AND ADVICE

One of the longest standing innovations in law that is often associated with legal design is the idea of using visual elements or visualisation in legal texts and documents in order to increase understanding of legal obligations.[101] Creative Contracts, founded by Robert de Rooy, specialises in simplifying an existing written contract and illustrating it to appear in the form of a comic strip. Its website explains:

- Comic Contracts are contracts written in pictures.
- They are legally binding contracts, in which:
- Parties are represented by characters
- Terms of the agreement are captured in pictures
- Parties sign the comic as their contract.[102]

The examples on the Creative Contracts page include contracts for South African farm workers setting out their obligations, rates of pay and so on; a financial services contract; and a non-disclosure agreement.

In Australia, the Comic Book Contracts Project[103] reports on various projects to develop simplified

97 Hagan, 'Design Process for Lawyers', *Law by Design* (n 2).

98 See also Perry-Kessaris, 'Legal design for practice' (n 1) 210.

99 See Justine Rogers and Felicity Bell, *Change Leadership for Lawyers* (Law Society of NSW, UNSW Law FLIP Stream, 2019).

100 See Charlotte Baker, 'Legal Design Explained: Part 4 – What does legal design look like?', 6 June 2019, https://www.linkedin.com/pulse/legal-design-explained-part-4-what-does-look-like-charlotte-baker (reporting on the legal design process used by Wavelength to make efficiencies in the way leases were reviewed).

101 Helena Haapio, 'Contract Clarity and Usability through Visualization' in Ebad Banissi and Francis T Marchese (eds) *Knowledge Visualization Currents* (Springer, 2013) 63; Adrian Keating and Camilla Baasch Andersen, 'A Graphic Contract: Taking Visualisation in Contracting a Step Further' (2018) 2(1-2) *Journal of Strategic Contracting and Negotiation* 10.

102 Creative Contracts, https://creative-contracts.com/

103 Comic Book Contracts, https://www.comicbookcontracts.com/; Baasch Andersen, 'Musings' (n 69).

contracts, expressed visually through comics, 'which… rely on behavioural drivers to create useable frameworks for agreements that are actually read and eliminate disputes'.[104] Through enhancing the parties' initial understanding of their obligations and promoting compliance, the contracts are intended to prevent disputes.[105] Reportedly, global engineering firm Aurecon was the first Australian company to use a visual employment contract: 'Aiming to create a succinct and meaningful visual contract, abiding by the company's principles, Aurecon replaced its traditional word-only employment contract with comic strip graphics'.[106]

There are also examples of redesigning agreements or advice to incorporate more visual elements, making them more accessible and readable for clients, but without a full comic-strip effect. For example, contract management company Juro designed a privacy policy with visual elements to more clearly explain the types of data collected from consumers, how the data would be used, and consumers' rights in relation to their data.[107] In 2012, Corrs won an Australian International Design Award for its 'Incisive Advice Template' which sought to reduce the length of advice given to clients and featured 'a front page summary that gives the answer and recommendation upfront and a "traffic light" risk analysis table that identifies and assesses legal risks'.[108]

4.2 USER-CENTRED CO-DESIGN FOR COURTS

The British Colombia, Canada, Civil Resolution Tribunal is now widely known for its incorporation of early online dispute resolution and commitment to serving the needs of lay participants in the civil justice system – indeed, for its goals of empowering people to be active participants in solving their disputes.[109] Principles of co-design underpinned its development, as Chair Shannon Salter has explained:

> *The [Tribunal] is the first known area of the Canadian justice system that has been co-designed with the public. At every stage…the [Tribunal] has worked with the public and key stakeholders, like community legal advocates, to make sure the [it] meets their needs. The [Tribunal]'s software has been, and continues to be, developed using an agile process that focuses on incrementally producing functional, user-tested software that works for the public.*[110]

A key way of seeking user participation and feedback was the Tribunal undertaking user testing, as part of its development phases, with people experiencing 'multiple barriers to accessing justice' as well as those supporting and advocating for them.[111] In other words, the assumptions made about the people who needed to be served by the system were that they were lay persons, without legal assistance, with significant vulnerabilities. If the system could be made functional and accessible for these people, it would likely be widely accessible to many.

104 Baasch Andersen, 'Musings' (n 69) 3.

105 Baasch Andersen, 'Musings' (n 69) 2.

106 Jenny Lin, 'Legal design and visualisation', *Lawyers Weekly*, 3 August 2020. See also Aurecon Group, https://www.aurecongroup.com/about/latest-news/2018/may/visual-employment-contract

107 See https://juro.com/policy.html: reported by Baker, 'Legal Design Explained: Part 4' (n 100).

108 https://corrs.com.au/news/2012/07/corrs-incisive-advice-honoured-at-australian-international-design-awards. See also the simplified term sheet, with icons, designed by Patroon Legal Design: https://www.patroonlegaldesign.com/index.php/showcase/increasing-transaction-speed-by-using-clear-and-short-term-sheets/

109 Salter and Thompson, 'Public-Centred Civil Justice Redesign' (n 5).

110 Shannon Salter, 'Online Dispute Resolution and Justice System Integration: British Columbia's Civil Resolution Tribunal' (2017) 34(1) *Windsor Yearbook of Access to Justice* 123, 123–24.

111 Salter (n 110) 124.

The processes for seeking user feedback in this setting tend to be resource-intensive, as they involve researchers, designers and courts working together, and recruitment of (in one example) litigants:[112]

> *[The Stanford Legal Design Lab] has worked with the University of Denver Court Compass project to run a series of divorce redesign workshops with former litigants, court staff, and lawyers in Massachusetts and Iowa. These were envisionment workshops in which participants reflected on the processes and experiences they went through, and then generated new concepts for divorce rules and service changes. Participants placed a high value on simplifying court processes for filing and disclosure of financial information, and expressed a strong interest in an online tool that would provide procedural updates, automated forms, and filings in one coordinated pathway. The lab's core design team will take these requirements and concepts into the next phase of co-design jams that will involve more technologists, professional designers, and policy experts to refine interventions based on what the former divorce litigants prioritized.*[113]

A further element is that, ideally, these 'users' would continue to be involved and have input as the prototypes or service changes are further developed. When the testing phase for the Civil Resolution Tribunal commenced, feedback was sought from users and improvements made, and importantly these changes were reported back to the users engaged in the testing. This, Salter reports, built 'trust and goodwill'.[114] She notes further that a large majority of users were satisfied with the technology:

> *This commitment to early public co-design has generated very positive results at later stages…. About 90 percent of respondents said the technology worked well and that it was easy to use, while 94 percent said the information was accurate. This overall feedback supports the theory that public co-design produces public justice processes that closely match public need and expectations.*[115]

There is an extensive literature about co-design for services[116] and the Civil Resolution Tribunal experience indicates that this can be effectively applied to legal and justice services, such as courts and tribunals.

112 Margaret Hagan, 'Participatory Design for Innovation in Access to Justice' (2019) 148(1) *Daedalus* 120, 123.
113 Hagan, 'Participatory Design' (n 112) 123.
114 Salter (n 110) 124.
115 Salter (n 110) 124.
116 See, e.g., Daniela Selloni, *CoDesign for Public-Interest Services* (Springer International, 2017).

APPENDIX 1: LEGAL DESIGN GLOSSARY

Compiled by FLIP Intern Jenny Lin

Abductive reasoning	A form of reasoning which uses incomplete observations or sets of information to infer the likeliest explanation. In other words, it is forming the best conclusion from the limited information available. One example is a jury using the admitted evidence in a criminal trial to determine their verdict on the defendant's innocence or guilt.
Co-design	A design thinking process where the intended users are involved throughout the development process, so that they shift from passive 'users' to equal co-designers.
Complex environment	A large-scale and multi-organisational system that requires multidisciplinary collaboration as no single person is able to understand the entire system or its operations. An example of a complex environment is a university. The building blocks of a university are divided into its functions, including teaching, learning, research, and administration. The sheer number of individuals and companies involved and their interconnected relations display the many unknowns in a complex environment.
Deductive reasoning	A form of reasoning based on 'premises', which are universal propositions or generally accepted statements or facts. As the premises are true, the conclusion drawn will also be true. An example of using deductive reasoning: All As are Bs. 'a' is an A. Hence, 'a' is a B. If the first two premises are true, the conclusion deduced will be guaranteed to be true.
Design thinking	An umbrella term used to describe a framework or approach, that focuses on the end user to re-design or improve the product of the process. The design thinking process involves gathering insights about the user's needs, and addressing those needs by generating and testing ideas in an iterative manner.
Empathy	The ability to recognise and understand another's thoughts, feelings or experience. Using this skill to imagine the world from the perspectives of different stakeholders, design thinkers are able to generate solutions that meet those stakeholders' expectations and desires.
Human-centred design	A form of design thinking specifically focusing on its target audience, that is, real human beings. This lens ensures human perspectives are considered in all steps of the process, with a focus on empathy or a 'people first' approach.
Ideation	One of the phases in the design thinking process. Ideation involves generating as many ideas as possible, without thinking of the merits of those ideas, no matter how obvious or unconventional they may be. The aim of this stage is to encourage creative thinking in a judgment-free zone.
Inductive reasoning	A form of reasoning which uses probability, based on specific observations, to predict a likely conclusion. Much of scientific research uses inductive reasoning, by gathering evidence to form a hypothesis or theory.
Innovation (by design)	The application of design thinking to inform creation, change, and improvement. Utilising design thinking to innovate allows the designer to identify people's needs and link those needs to what is technologically feasible and economically viable.

Iteration	Repeating an action or process to generate a series of outcomes, each process yielding an outcome closer to the desired result. Iteration is used in design thinking to receive feedback at every stage of the process, so that the prototype is continually being tested and amended. This allows for greater visibility of the design thinking process and ensures users are involved in each stage, so the outcome meets their needs and expectations. Iteration allows for regular testing and rapid incorporation of feedback, scoring high on the cost-effectiveness scale.
Legal design	The application of design thinking into law. This process involves identifying legal concerns and using design thinking skills, knowledge, and attitudes to address those concerns.
Participatory Design	[Part of co-operative design practice] A design thinking process which involves all stakeholders at each stage, including consumers, customers, employees, partners, and citizens. This ensures all stakeholders' needs are uncovered in this collaborative manner, which considers a more holistic approach.
Prototyping	A prototype is a tangible sample or model developed to test ideas from an early stage of the design thinking process. Prototyping is used to quickly and frequently test ideas, creating a bias towards action, rather than just researching or thinking. This provides first-hand insights into how users react to the product or service, usually displaying overt issues or flaws early on.
Satisficing	Derived from the combination of 'suffice' and 'satisfy', satisficing refers to the concept of users seeking to obtain the biggest reward for least amount of effort. This is relevant in design thinking as users will not consume a product or service unless the reward is obvious and substantial or there is minimal cost. By acknowledging these usability principles, design thinking focuses on developing a product or service that will be consumed by users.
Service design	The application of design thinking into improving the delivery and quality of service. Service design takes into consideration the needs of both users and providers, customers and businesses.
Sustainable design	This process focuses on the aim of reducing detrimental impacts on the environment, using the objects of sustainability in the design process and its products.
User-centred design	A form of design thinking where the users and their needs are focused in each phase of the design process, to ensure the outcome is created for the user. Users are involved in each stage of the design thinking process, rather than having them only view the outcome.
Wicked problem	An inherently complex issue with no definitive resolution. However, they can be 'satisfied' under the current conditions. They are often found and operate in complex environments. Wicked problems cannot be solved due to their ill-defined nature and ongoing causal chains. Solving one wicked problem may introduce a new problem, displaying the inability to truly achieve a finite resolution. Antonym: problems which may be resolved with a definite resolution, i.e. 'tame' problems. An example of a wicked problem is environmental degradation. This public policy issue involves many stakeholders, innumerable causes, and has no 'right answer'.

APPENDIX 2: CHARACTERISTICS OF DESIGN THINKING

Themes	Principles/Mindsets	Practices	Techniques
User focus	• Empathic • Curious • Non-judgemental • Social	• Seek to understand latent needs and pain points of users (Empathise) and let this understanding guide all work • Use a qualitative, context specific approach in user research. • Involve users in ideation, prototyping, testing	• Ethnographic research • Informal meetings with customers • Accumulate user stories and anecdotes • Journey mapping, empathy map, persona • User feedback sessions
Problem framing	• Unconstrained thinking • Comfortable with complexity and ambiguity • Open to the unexpected	• Challenge and reframe the initial problem to expand both problem and solution space • Synthesis of research insights: finding patterns, framestorming (ideation to find alternative problem formulations)	• 'How-might-we questions' • 'Five why' • 'The problem statement' (Point Of View), 'painstorm', 'FOG' (fact, opinion, guess)
Visualisation	• Thinking through doing • Bias towards action	• Make ideas and insights visual and tangible to externalize knowledge, communicate and create new ideas • Visually structure data • Make rough representations • Provide experiences to enable understanding	• Creation of rough physical mock-ups by using e.g. paper, card-board, glue and foam, Lego, or any available artefacts • Sketching, storyboarding • Storytelling, role-play, video • Writing 'ugly code', wireframes
Experimentation	• Curious and creative • Playful and humoristic • Optimistic and energetic • Learning-oriented • Eager to share	• Work iteratively (divergent, convergent) • Converge based on a diverse set of ideas • Prototype quickly and often to learn • Test solutions quickly and often: share prototypes with users and colleagues • Fail often and fail soon	• Brainstorming techniques • Creation of flexible and physical space that supports experimentation and visualization
Diversity	• Integrative thinking • Open to differences in personality type/ background • Democratic spirit	• Create diverse teams and let everyone's opinion count • Collaborate with external entities • Seek diverse perspectives and inspirations (variety of fields, broad research) • Take a holistic perspective into account	• Personality tests • Conscious recruitment • Analogies, study visits • '360° research': white space analysis, benchmarking, past failure and success, pattern recognition, demographics, etc.

Table 3: From Carlgren, Rauth and Elmquist

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