



# Design thinking

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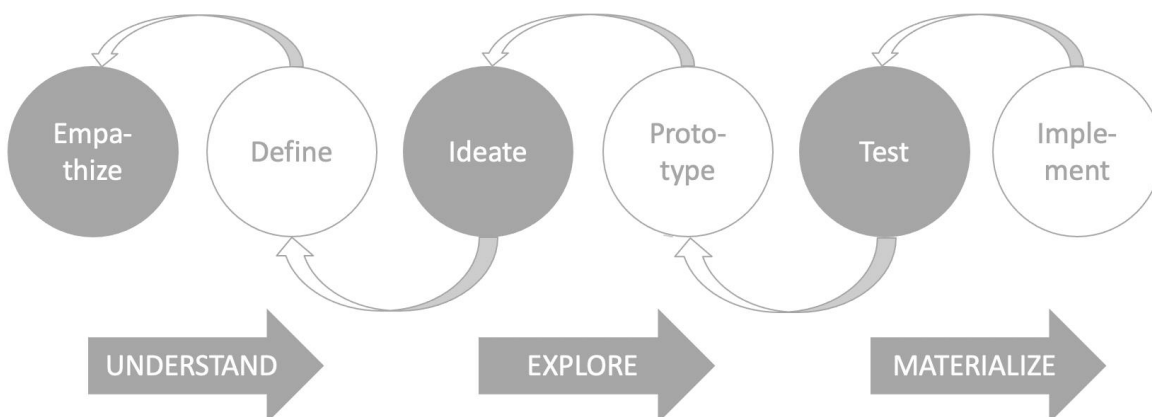
# Design thinking

(This is a chapter from I. Goller and J. Bessant, 'Creativity for innovation management', Routledge, London, 2017).

Design thinking (DT) is a popular and widely-used framework approach to creativity . It uses many of the competences we have been discussing in an explicit way and deploys various tools and techniques to help with this. Importantly it has emerged as a methodology which can be taught and practised – there are many training programmes and several universities now have a 'D-School' on their campuses. Many organizations have begun to embed this as an innovation approach, both in the public and private sector. And it lies at the heart of many consulting offerings, providing client companies with a systematic approach to finding novel solutions to product, service and process innovation.

[You can find a link here to the 'd.school' at Stanford \(its correct name is the Hasso Plattner Institute of Design\) which offers a free a 90-minute video-led cruise through their methodology for anyone interested](#)

DT is an approach to innovation which involves building and testing ideas in a sequential developmental fashion. Its origins lie in the work of the US Nobel Prize winner Herbert Simon who worked on various aspects of decision-making. He defined it in his 1969 book *The Sciences of the Artificial* as the 'transformation of existing conditions into preferred ones' [1]. He originally suggested a seven step process for this: *Define, Research, Ideate, Prototype, Choose, Implement, Learn*.

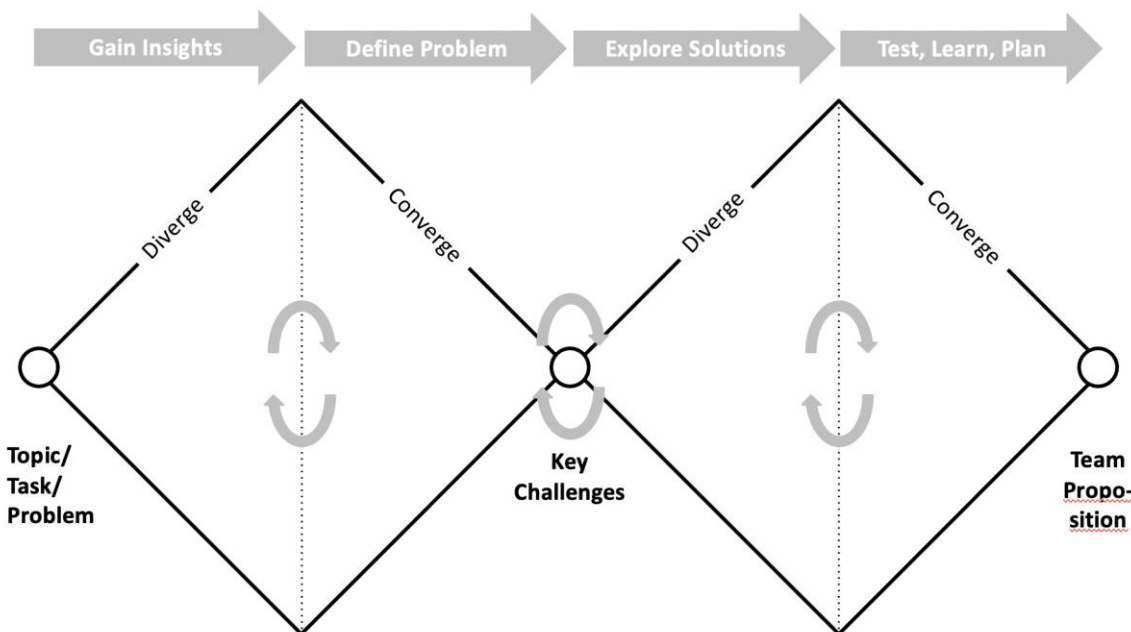


But the number of stages is less important than the idea of building towards a solution by a formal method. In essence it takes human creativity and focuses it via a process to solve a problem – in other

words it is a methodology for innovation. Many writers have contributed to the approach from a number of different disciplines including Nigel Cross (architecture, one of the founders of the journal *Design Studies*), Sydney Gregory (engineering, author of *The design method* (1967)), Rachel Cooper (industrial design) and Robert McKim (*Experiences in Visual Thinking* (1973) [2-3]. The approach drew on many of the tools and techniques for industrial design but applied them to more generic forms of problem-solving, extending the range of application from making products look and feel more interesting and attractive to applying creativity in structured fashion to solve a wide range of business and social problems.

One of the pioneering firms in this field was IDEO , founded by an engineering professor at Stanford University, Dave Kelley [4].

But there are others models out there as well. One which we think equally noteworthy is the double diamond model by the British Design Council, developed in 2005 on the basis of case studies of 11 global firms. It describes in four phases the design process from problem to solution. The way the phases are visualized clarifies the way of working in these phases. Starting from a defined problem or challenge, we open up and ‘discover’ (phase 1) the problem in more detail; just after that a convergent process is going on (define). The problem is clearly described and boiled down to a key challenge. This is again the starting point for another divergent phase: develop. Here it is about collecting ideas, opening up to see all kinds of possible solutions. And then another convergent phase is starting to emerge: deliver. It’s about testing and evaluating, about making the concept ready for implementation. At the end stands a solution to the initial problem.



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Design thinking follows certain ‘ground rules’ regardless the modelling of the phases. For example, all innovation is based on the need of the user, innovation is develop best in teams, and iterations are necessary in order for a successful innovation. Group processes like sharing insights and knowledge, supporting ideas of others, pushing the frontiers of an idea to make it ‘wow’, getting and receiving feedback from the group and from potential users, felt psychological safety within the ‘design team’ are all vital elements to the idea of design thinking. So, competencies are the back bone of design thinking.

### **Overview of the phases**

Typically DT involves working through a series of stages, but it is also about recognizing the *cyclic* nature of creativity – learning from testing and implementation helps refine and elaborate. We describe the key phases of the IDEO model in the following section. The phases are:

- Empathise
- Define
- Ideate
- Prototype
- Test
- Implement
- (and repeat)

**Empathy** – drawing on fields like anthropology emphasis is placed on understanding how people actually behave in a situation, what their experiences of a problem are, creating solutions which work for them in their context. One of the problems in innovation is that we often make assumptions about what users want rather than developing a clear understanding of their context. This is complicated by the fact that what people say – for example in response to a market survey or in a focus group – is not necessarily what they actually do!

Tom Kelley of IDEO explains the DT approach they take in this area; *‘We’re not big fans of focus groups. We don’t much care for traditional market research either. We go to the source. Not the ‘experts’ inside a (client) company, but the actual people who use the product or something similar to what we’re hoping to create...we believe you have to go beyond putting yourself in your customers’ shoes. Indeed we believe it’s not even enough to ask people what they think about a product or idea...customers may lack the vocabulary or the palate to explain what’s wrong, and especially what’s missing.’*

#### ***Creativity in action: Users know best***

*One of the dangers in humanitarian innovation is that well-intentioned providers make assumptions about what end users actually need, and what will actually work in their context. Inappropriate*

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*solutions provided with the best intentions litter the sites of disasters – complex equipment which cannot be maintained, supplies used for different purposes. (For example researchers from the Oxford University’s Humanitarian Innovation Project found that in Ugandan refugee camps people were using emergency mosquito nets not as an anti-malarial aid but as a source of rope with which to build the shelters which they felt were a more urgent need).*

*Underpinning this is an assumption that solutions can be designed far from the context in which they are to be implemented. What is needed is a recognition of the importance of user perspectives – for example how people actually behave under crisis conditions, how they prioritize their emergency needs, how best they can support themselves, etc.*

*And empowered users are a rich source of ideas – many important humanitarian innovations arose in this bottom up fashion. For example the crisis-mapping app Ushahidi emerged from users mashing up Twitter and other social media feeds to help provide a reliable information platform in the post-election violence in Kenya. The app has subsequently been used all around the world including in the Brisbane floods and the Fukushima disaster.*

Developing a deep understanding can generate new insights – for example Tim Brown of IDEO writes about the company’s work with the Japanese cycle manufacturer Shimano. Working to try and understand why so few (less than 10%) of US adults rode bicycles they uncovered a variety of concerns including intimidating retail experiences, the complexity and cost of sophisticated bikes, and the danger of cycling on heavily trafficked roads. This led to a new concept ‘coasting’ – which drew on people’s happy memories of childhood biking and which influenced various aspects of the subsequent offering including new in-store retailing strategies, a public relations campaign to identify safe places to cycle, and a reference design for cycle companies to use in producing ‘coasting’ bikes [5].

***Creativity in action: Understanding user needs in Hyundai Motor***

*One of the problems facing global manufacturers is how to tailor their products to suit the needs of local markets. For Hyundai this has meant paying considerable attention to getting deep insights into customer needs and aspirations – an approach which they used to good effect in developing the Santa Fe, reintroduced to the US market in 2007. The headline for their development programme was ‘touch the market’ and they deployed a number of tools and techniques to enable it. For example, they visited an ice rink and watched an Olympic medallist skate around to help them gain an insight into the ideas of grace and speed which they wanted to embed in the car. This provided a metaphor – ‘assertive grace’ – which the development teams in Korea and the US were able to use.*

*Analysis of existing vehicles suggested some aspects of design were not being covered – for example,*

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*many sport/utility vehicles (SUVs) were rather 'boxy so there was scope to enhance the image of the car. Market research suggested a target segment of 'glamour mums' who would find this attractive and the teams then began an intensive study of how this group lived their lives. Ethnographic methods looked at their homes, their activities and their lifestyles – for example, team members spent a day shopping with some target women to gain an understanding of their purchases and what motivated them. The list of key motivators which emerged from this shopping study included durability, versatility, uniqueness, child-friendly and good customer service from knowledgeable staff.*

*Another approach was to make all members of the team experience driving routes around Southern California, making journeys similar to those popular with the target segment and in the process getting first-hand experience of comfort, features and fixtures inside the car, etc.*

A good example of the DT approach comes from work in the UK's Luton and Dunstable hospital (L&R) which involves using design methods to create a user-led solution to the challenge of improving patient care amongst neck and head cancer sufferers. Part of this project involves patients and carers telling stories about their experience of the service; these stories provide insights which enable the team of co-designers to think about designing *experiences* rather than designing services. Importantly the role of designer includes all of those involved in the collaborative process: patients, staff, researchers, improvement leaders as well as design professionals [6].

Experience-based design (EBD) of this kind involves identifying the main areas or 'touch points' where people come into contact with the service, and tries to identify areas of exceptional practice, and areas where systems and processes need to be redesigned to create a better patient experience of health services [7]. These touch points effectively help to prioritise actions. Working together patients, carers, doctors, nurses, and hospital administrative staff can begin to design experiences rather than just systems or processes. The process is enriched by taking into consideration the different skills, views and life experiences of the patients, carers and others involved.

In the L&D such co-design has led to changes – for example patients and carers have changed project documentation so that it better reflects their needs, and clinic staff and patients have worked together to redesign the flow of outpatients in the consulting room. Various methodologies were used to encourage patient involvement in the process, including patient interviews, log books and film-making. This enabled patients to show their experience of the service through their own lens, and bring their story to life for others. In total 38 improvement projects were identified.

**Definition** – recognising that what appears to be the problem may in fact be a symptom of a wider problem and that exploring and playing with different definitions can help set up the conditions for successful solution. As we saw in chapter 2 problem exploration and discovery is a key part of the creativity journey and DT provides a systematic way of managing this. There is a particular link with the

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competency around building shared vision, gaining agreement about and commitment to the problem we are trying to solve.

Taking time out to redefine the presented problem in different ways and from different perspectives is an essential part of Design Thinking. Tools like 'how to' statements, problem redefinition, root cause analysis (fishbone technique), process mapping and levels of abstraction are used. But again trying to express different viewpoints reflecting the concerns of the defined stakeholders is core to the process.

In the double diamond model a key challenge from the standpoint of the user is defined at the end of the second phase. So, at the end we do not only have defined the user we are looking to 'help' to satisfy his/her needs but also defined the challenge we have to overcome to have a successful 'product' at the end. This will be the starting point for our ideation process in the next phase.

**Ideation** – in this stage various approaches are used to come up with suggested solutions and pathways to be explored. These include the use of 'wild ideas' as a stimulus for others, 'brainstorming' as a careful process of suspending/postponing judgment and the use of visual aids to capture and make people's ideas available to others. Again this stage draws extensively on creativity research including the powerful role played by unconscious processes in forming novel associations. But it also builds on group competences like striving for excellent ideas and the constructive controversy within that.

DT is not about a single technique but about skilled teams able to open the ideation toolbox and find different resources to help – they recognise the difficulties around setting effects, functional fixedness and other barriers to creativity and can deploy techniques to help counter them. Similarly although brainstorming is a central approach it is carried out in a way which allows for extensive challenge and debate but in a supportive context. And diversity is seen as an important element in team composition to try and maximise the range of experiences and domain expertise on which the team can draw.

An important element in DT is the explicit recognition of users as central to the process – both in terms of understanding their needs (empathy) but also as sources of relevant ideas which will also be compatible. The previous chapter on user innovation highlights this key role.

**Prototyping** – rather than seeking to plan and develop a perfect solution, design thinking involves a series of interactive experiments which allow for learning around prototypes.

We saw the importance of this approach in earlier chapters; it provides a way of moving from vague notions, hunches, half-formed ideas towards something more workable. Prototypes offer a series of stepping-stones, bridges, scaffolding – essentially playing with ideas about the problem. As James Dyson, reflecting on his company's approach, points out, '*..... prototypes allow you to quickly get a feel for things and uncover subtle design flaws.*'

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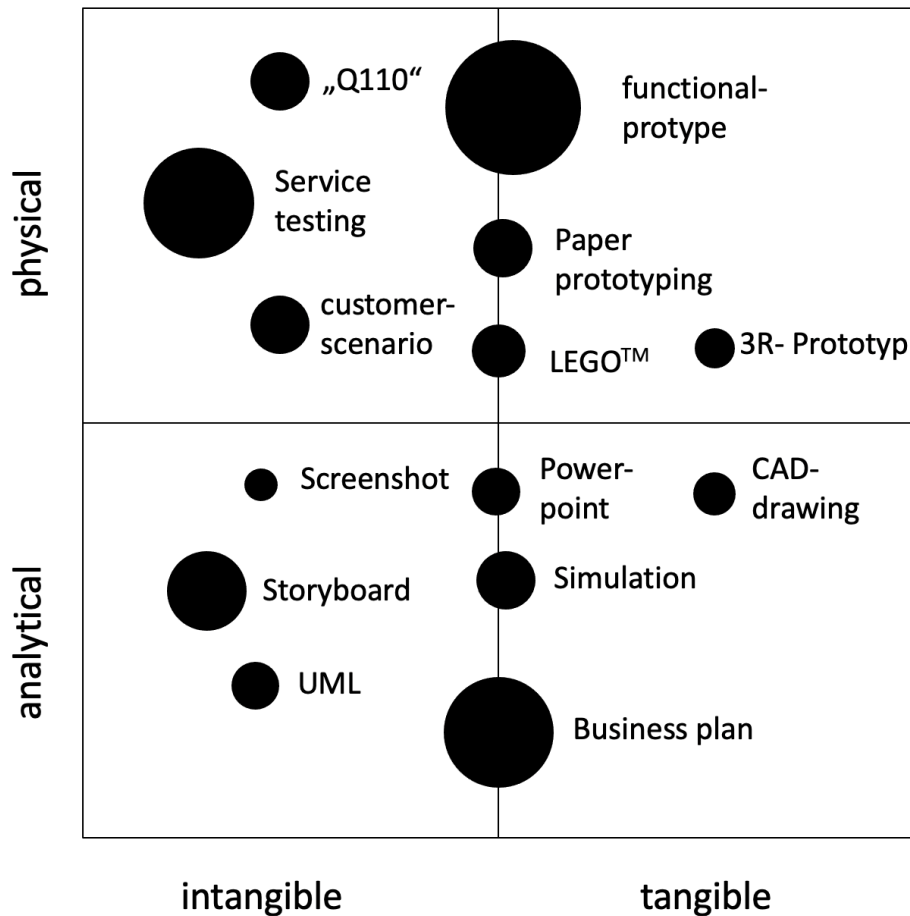
The clue is in the name – proto-type. It’s not about the finished object but a stepping-stone, a test-bed for learning, some way of exploring in laboratory/experimental mode. Kids do this naturally - from the moment they can start to hold and examine an object they begin to explore it, trying out all its possibilities. And when they play together they multiply the possible options in inspiring fashion – a humble cardboard box can become a spaceship, a shop, a stage, an article of clothing, and it can change its identity with impressive speed!

Prototyping offers some important features to help in the creative process:

- It creates a ‘boundary object’, something around which other people and perspectives can gather, a device for sharing insights into problem dimensions as well as solutions
- It offers us a stepping stone in our thought processes, making ideas real enough to see and play with them but without the lock-in effect of being tied into trying to make the solutions work – we can still change our minds
- It allows plurality – we don’t have to play with a single idea, we can bet on multiple horses early on in the race rather than trying to pick winners
- It allows for learning – even when a prototype fails we accumulate knowledge which might come in helpful elsewhere
- It suggests further possibilities – as we play with a prototype it gives us a key to open up the problem, break open the shell and explore more deeply.
- It allows us to work with half-formed ideas and hunches - enables a ‘conversation with a shadowy idea’...
- It allows for emergence – sometimes we can't predict what will happen when different elements interact. Trying something out helps explore surprising combinations

Prototypes can take many forms, from simple sketches and models through to complex simulations. German researcher Bernhard Doll offers a helpful map on which different kinds of prototype can be mapped – the important point in DT is not the form but the way in which the prototype is used to help build shared ideas. This approach also helps draw in user experience since the prototype becomes a ‘boundary object’ around which various people can provide their ideas and input [8].





**Test** – the next stage from prototyping is trying those ideas out on end users. *‘Fail often to succeed sooner’* is a motto not only used at IDEO which characterises this approach of learning through testing; it builds on the idea of rapid cycles of experimentation rather than planned launch of an exhaustively developed idea. The core idea is around hypothesis testing and gradually learning through a series of build-test-refine loops which allow for fast learning.

Examples can be found in beta testing in software and the ‘lean start-up’ approach where a core tool is the ‘minimum viable product’ – an early test of the idea designed to get feedback and information. We’ll discuss these ‘agile’ approaches in more detail in chapter 15.

**Implement** – put the idea into practice. Although this might appear to be the end of the journey the reality is that moving an idea into implementation restarts the process, allowing refinements and improvements, identifying other dimensions of the problem which could be addressed. One of the key lessons around diffusion of innovations is that as ideas spread out and scale so they are changed by the interactions with the adopting population [9].

It’s easy to see DT as a simple and logical progression through a series of stages. But innovation in real life is not like that – it is a meandering journey involving backtracking, blind alleys and sudden sprints. So DT as a framework methodology should be seen as something involving multiple cycles and

extensive feedback between these stages.

**Tools for design thinking**

DT is a framework methodology with some core underlying principles like empathy, constructive controversy and prototyping. The underlying competences are very much those which we have explored in the book and the good news is that there is plenty of equipment in the gym to help train and develop skills. Table 13.1 gives some examples and you can find details of all the tools and techniques on our website.

Table 13.1: Useful tools and techniques for design thinking

Stage in DT Cycle	Useful tools and techniques
<b>Empathize</b>	Ethnography User led innovation Lead user methods Customer journeys Storytelling Outcome driven innovation Empathic design Netnography Kano methods Repertory grid Personas
<b>Define</b>	5 whys Fishbones How to statements Process mapping Value curves Competitiveness profiling Abstract driven search Value curves Value stream analysis
<b>Ideate</b>	5Rs Brainstorming Lateral thinking Analogy and metaphor Recombinant innovation Attribute listing Morphological analysis TRIZ

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<b>Prototype</b>	Prototyping methods Serious play, simulation, storytelling Lean start-up Living Labs
<b>Test</b>	Lean start-up and hypothesis design 5x5x5 Lead user methods Getting Feedback
<b>Implement</b>	Beta to scale Building communities Learning logs