Chapter 7

Mapping Design Thinking Resources Outside of Higher Education – An Exploratory Study

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Abstract For over a decade, design thinking has been gaining traction beyond design practice and higher education. This is reflected in the growth of varied Internet-based resources that seek to enable design thinking. However, there is neither systemic evidence about nor an analysis of this development, specifically with regards to the claims that underpin the rise of design thinking. This chapter fills this gap and critically maps the proliferation of learning resources through which 'design thinking' is configured outside of or on the edges of academia. It reviews the English-speaking landscape of Internet-based design thinking resources and their claims and assesses the links between them. It showcases the intensity of these links in a 'typology of design thinking resources'. The discussion highlights the homogeneity of Internet-based design thinking resources, despite the diversity of sites and situations they claim to be relevant to. The chapter argues that the implications of this development for professional design practice is a needed shift towards criticality, through stronger connections to higher education and research. The chapter concludes with an extended set of questions to prompt more critical and reflexive research into the growth of design thinking resources online and their wider socio-economic contexts.

1. Introduction

'Design used to be big. But then designers got preoccupied with creating small, nifty objects,' said IDEO president and CEO Tim Brown in an interview in 2010, soon after the consultancy made a shift from offering expertise in design towards 'design thinking' (Ong, 2010). His message was that it was time to make design 'big' again by way of positioning the process behind professional designing as an organisational innovation capability across all types of business and social problems[1]. This statement can be seen as a proxy for the

[1] Space does not allow a fuller discussion of the origins of design thinking and the links to product, interaction and service design more generally in particular to developments in Silicon Valley as discussed for example in Katz and Maeda (2015).

proliferation of 'design thinking', far beyond the IDEO[2] and Silicon Valley ecosystem and with numerous intersections with higher education. Variants of design thinking, with associated tools and resources are now found in global management consultancies and technology firms (Maeda, 2017) as well in the OECD's collection of tools for government innovation (OPSI, 2018). What these resources share is a bold claim: namely that 'design thinking' is not, as Brown outlines, focused on object-creation, but that it presents a conceptual framework and applied methodology that enables individuals and organisations to continuously innovate and enable change in whatever arena.

This chapter takes this statement as a cue to critically map the proliferation of learning resources through which design thinking is configured outside or on the edges of academia and assesses the claims this is fuelled by. It reviews the English-speaking landscape of such resources and asks who produces them, based on what kinds of rationales and principles and in what kinds of formats. The aim of the chapter is to provide evidence of the growth of design thinking resources outside or on the edges of higher education and to provide future directions for more research in this area. To do so, the chapter is framed as an exploratory, rather than conclusive, mapping study of Internet-based design thinking resources.

2. Conceptual Framework and Methodology

Despite its growing visibility, design thinking remains poorly defined. To date there have been few academic reviews of design thinking in design research and management literatures and few systematic empirical studies of how design thinking is enacted in practice beyond individual cases (e.g., Johansson-Sköldberg 2013; Elsbach and Stigliani 2017). While scholarly research about design thinking is limited, there are numerous commercial organisations prominently advocating design and design thinking producing and publishing case studies and analyses which tend to either rest on claims that are problematic (see Iskander, 2018) or that are predominantly financial (e.g. Forrester 2018; Sheppard et al 2018)[3]. Further, there are government and non-profit bodies promoting training in human-centred design for social change (e.g. Acumen 2018). Such discussion and use of design thinking resources is very often skewed to normative accounts. Against that backdrop, our starting point is to situate this exploratory study within a landscape of numerous accounts of 'design thinking' in which various academic fields, such as design scholarship and management studies, intersect with practitioner case studies and knowledge exchange, marketing materials and policy agendas.

[2] Whilst the turnover of IDEO Inc. for 2017 was $37.5m (Orbis, 2018), specialised 'design sectors' within the European Union providing 'design' services to other businesses and to consumers accounted for EUR 8.8 billion gross value added in 2011, vis-à-vis the engineering and architectural services sectors of EUR 126 billion (Galindo-Rueda and Millot, 2015).

[3] Despite advocacy for design expertise by commercial, public sector and intermediary organisations and professional bodies, academic analysis about design being applied to organisations remains partial (Lancaster University 2016); similarly with the more specific case of design thinking. There is a notable distinction here with studies of the application of 'experience based co-design' in healthcare systems, which have strong social science foundations, see for example Robert et al (2015).

2.1. Design Thinking: Organisational Capacity and Management Fashion

Reviewing the design thinking landscape, Kimbell (2011) identifies three versions of design thinking: describing the cognitive style of design professionals; defining an organisational resource or capacity; and offering a general theory of design. For the analysis in this chapter, we focus on the second because it offers a broad setting that helps explore *how* online design thinking resources are framed[4]. Furthermore, we suggest seeing this emergence of design thinking as an organisational capability particularly as an example of a 'management fashion' (Abrahamson, 1996). Abrahamson defined management fashions in relation to earlier examples of efforts to build or change organisational capabilities such as Quality Circles[5] in the 1980s. He described how, at the time, such management fashions were created, selected, processed and disseminated, and how they were shaped by economic, technological and 'psycho-social' factors. Although this notion of management fashion is rooted in rather narrow conceptualisation of 'social' factors as well as on hierarchical accounts of management practice, we use the concept here to analyse the reconfiguring through which design thinking has come to be prominently *treated* as an organisational capacity within online design thinking resources.

Against that backdrop, calling design thinking a 'fashion' does not trivialise its origins and significance. On the contrary, it is useful for this study in two ways. First, it directs attention to the *doing* of actors as well as the narratives and processes through which design thinking finds resonances with a wide range of settings. Second, it links in with our empirical focus onto the ways in which design thinking is constructed as organisational capacity. In other words, we take the notion of management fashion as a cue to *make a methodological point* of recognising the actors, narratives and occasions which bring design thinking into view as a response to organisational challenges in an increasingly networked and globally digitized world. Symptoms of these developments include significant growth in diverse higher education offerings including by non-university providers, which are increasingly evident online[6]. In this context it is reasonable to state that the Internet is a major arena in which promotion and production of and participation in learning about design thinking takes place. Therefore, we position the Internet as a key site for studying the growth of design thinking resources. This means that we build this study as an investigation of design thinking in the form of *online* resources rather than as examination of the databases of published articles. Some of these online resources have explicit links to the academy but we here examine diverse and often informal learning resources rather than focussing on those requiring significant technological and institutional infrastructures such as MOOCs (e.g. Wrigley et al 2018). This allows us to study the spread of design thinking within a distinct circuit of organisational narratives and claims, and to draw out implications for design thinking in higher education.

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[4] We here want to underline that this lens does not preclude devices and platforms used by individuals (including people who think of themselves as designers), nor does it close off the possibility of examining such accounts in search of a general theory of design.

[5] Quality Circles involve small groups of employees gathering in work time to identify problems and potential solutions. This organizational practice emerged in Japanese and US businesses and grew rapidly in the 1980s (see Lawler and Mohrmann, 1985). However as discussed by Cole (1998) there was a striking disconnect between academics who thought quality circles had sunk without a trace and practitioners who claimed to have expertise in and success from using them.

[6] A report to the European Commission (2014) on new modes of learning and teaching in higher education foresaw a rise in online learning as means to meet the growth in learners from 100 million in 2000 to 250 million by 2025.

2.2. Towards Critical Mapping of Design Thinking Resources

Framing the Internet as empirical site for a critical mapping study brings up a number of epistemological issues. First, given the vastness and the flux of the digital design thinking landscape, particularly in practitioners' worlds, we must position this study as open-ended and *exploratory*. Second, despite this exploratory character, we aim to *map patterns* within this ever-changing landscape. And third, as research-led intervention, this mapping exercise must retain a level of *criticality* to aid further investigations and theorisations of design thinking.

Building entirely on the Internet for the data collection process points to questions regarding biases, (personalised) directions and links that are engrained in the fabric of the digital world and that are reinforced through the algorithms that underpin search engines, such as Google. That is to say that we must acknowledge and take into account that a 100% neutral version of an online search tool is impossible. This is important on both an empirical and a conceptual level (whereby both are, of course, intertwined): empirically, because Internet-searches clearly influence and possibly limit search outcomes (e.g., because they could replicate existing power relations) and therefore the dataset; and conceptually, because it affects how criticality can be achieved here and what kinds of scientific knowledge or 'truth' can be laid claim to.

Against this backdrop, it is useful to deconstruct the notion of 'mapping' (as opposed to listing[7] or ranking) in the context of this study's aim of reviewing the spread of design thinking tools outside of higher education: presenting those narratives and knowledges relating to design thinking that are accessible on the Internet, patterning them to find the *links* between them. This conceptual deconstruction of 'mapping' underlines the significance of the relationship *between* items to understand how management fashions, such as design thinking, evolve. The importance of the in-between, in turn, affects how the issue of bias in qualitative Internet-research can be approached: it means that the leading question in *critical* mapping is not how we can circumnavigate search engine bias and replace them with other search tools, but *how* search engines (and/or other tools) process, rank and link online content. Because it is impossible to get to the bottom of this in technical terms, it is helpful to revert to a strategy traditionally deployed in qualitative research to address bias in critical research: reflexivity. Therefore, this study sets empirical transparency and reflexivity as *conditio sine qua non* for more critical research into the proliferation of design thinking resources.

Based on that, we here deploy a *two-fold approach to reflexivity to achieve criticality*: (a) conceptual criticality through locating this exploratory study within existing research into design and design thinking; and (b) methodological criticality through reflexivity, i.e., accounting for how we produced this analysis. This approach seeks to clarify the conditions of the investigation to help build epistemological capacities for reflexively generating theory.

[7] This would be based on standard mapping studies that are based on an existing database (as, for example, in Krysinska et al., 2017) which in this case is not feasible due to the lack of an existing database of Internet-based design thinking resources.

We propose that examining the basis taken to develop a universal theory[8] (of design) based on a specific inquiry (of Internet-based design thinking resources) helps general theorisation efforts in design studies. In addition, we believe that (methodological) criticality can be achieved through reflexivity. Here, we commit to practicing thick description, informed by methods and concepts of traditional ethnography, digital sociology and anthropology and critical data studies.

2.2.1. Conceptual Criticality: Critical Design Research as Context

Our starting point is not to accept the emergence of design thinking online resources as an inevitable and necessarily positive development, but rather as a phenomenon to study. To work towards a *critical* understanding of design thinking as management fashion, we empirically focus on the *claims* made in the design thinking resources we examined. To enable this on a conceptual level, we set our study against the backdrop of voices and approaches that examine the conditions in which design and design thinking emerges and circulates. A significant part of this body of work is comprised of voices stemming from practitioners commenting on the increased visibility of design and design thinking and its entanglement with society, commerce and policy. These commentaries lay the foundation for assessing the claims made about design *thinking*. Some of these commentaries predominantly circulate within the circuits of social media (see Nussbaum 2011; Jen 2016). Given their contributions to the critical design studies discourse, we subsequently treat these practitioner analyses with equal weight as their academic counterparts.

Within the overall body of design critique, one strand of research situates the growing visibility of design as expertise within the context of a *neoliberal economy*. Here, the production of 'design culture' has been positioned as historically emerging in tandem with neoliberalism (see Julier 2017). Similarly, design practice has been critiqued as particularly implicated in the development of specific modes of capitalist reproduction through its expertise in generating and using symbolic forms (see Lury 2004). Another relevant strand of critical design research examines the *ontological* dimension of design. It investigates how designing can produce not just products, services or 'solutions', but new socio-material practices and ways of living and being. Some scholars emphasise the ecological dangers that can result from the lack of understanding design as world-making capacity, particularly as designers and their designs constitute unsustainable futures (see Fry 1999) whilst others emphasise the positive consequences of 'making futures' through design practices in relation to addressing social issues (Ehn et al 2014). With specific focus on design *thinking*, other scholars have foregrounded the political limitations of design thinking's claims when it is used to construct compliance with capitalism, support elites and preserve existing power relations, cautioning that practitioners 'will have to come to terms with how the cybernetic foundation of design thinking may gravitate towards practices where feedback is used to preserve systemic status quo' (von Busch and Palmås 2016, p. 20).

A third and growing concern within critical design research tends to efforts to *de-colonise design practice, research and education*. Here, the de-colonising design movement is described as a political project to subvert and transform Eurocentric thinking in design (Abdulla in Schultz et al 2018). It has also been positioned as a way of 'undoing' design praxis, research

[8] For a deeper exploration of this point within sociology as 'reflexive science' and through the body of Pierre Bourdieu's work, see Robbins (2007).

and pedagogy by 'unlearning' it to recognise the multiple temporalities and spatialities that designing (and studies of design) produce and attend to how they privilege certain configurations of bodies over others (Canlı in Schultz et al 2018). For example, a study of using design thinking toolkits within Pakistan conducted by Ansari (2016) reveals and critiques the assumptions of universality and the benefits of economic growth embedded with them. Escobar (2018) argues for an 'autonomous' design that combines collaborative and place-based approaches with decolonizing efforts by indigenous peoples and people of African descent in Latin America to reconfigure designing.

Correspondingly, another theme within critical design research is rooted in *broader framings of innovation* and developments in science and technology. These are rooted in sociological accounts of how innovations emerge and stabilize, decentering the claims made by or on behalf of designers and engineers (e.g. Molotch 2003; Wilkie 2011). For example, Vinsell (2017) challenges the assumption of some advocates of design thinking in development or humanitarian contexts that design thinking is uniquely or particularly equipped to come up with novel solutions to social issues or that it will result in innovations.

Critical takes on 'design thinking'

What cuts across these critiques and makes them a fertile ground for this study is a distinct concern for deconstructing **narratives about design thinking** specifically in terms of **assumptions about economic growth, statements about universality, and the privileging of some knowledges over others.** This perspective is essential for critically analysing how the claims of design thinking resources outside of higher education relate to how they proliferate.

2.2.2.Methodological Criticality: Reflexivity through Description

Ethnography has long built on the notion of thick description (see Burawoy, 2003) as way to do reflexive qualitative research[9]. More recently, digital sociology and digital anthropology scholars have explicitly built on this approach, arguing for a critically reflexive approach to examining the technologies, systems and contents that make up 'the digital' within and across society[10]. Related to that, critical data studies have turned their focus on the question of whether data can truly be objective, particularly in the context of data ethics, to suggest that both data science scholars and practitioners must engage in *making transparent* the steps of making and using data (see particularly Neff et al, 2017). Drawing on traditions of thick description, digital sociology and anthropology and critical data studies, we aim to achieve methodological criticality as reflexivity through description within this study. Based on this,

[9] See also Burawoy (1991) on the reflexive science approach as basis for the extended case study method or Back (2007) who powerfully states that ethnographic research builds on the notion that there cannot be a 'truth outside of the telling' (p. 164).

[10] For example, Miller and Horst (2012) argue that digital anthropology must be grounded in 'digital materiality' as comprised of the materiality of digital infrastructure and technology, the materiality of digital content and the materiality of digital context. Marres (2017) underscores the importance of fine-grained description in doing digital sociology but warns of an inward looking reflexivity that could emerge when building on the new 'digital ways of knowing society'. This is where the object of investigation becomes the sociological practice itself, rather than the digital ways of knowing society across social life, not just social research.

the subsequent section reflects on our own positions within the wider field of design scholarship as well as this study in particular and narrates the data collection and analysis process that combines our multiple identities and disciplines.

Positioning The first author is an English-speaking educator based in London who has been teaching design thinking in management education contexts for over a decade[11]. As a researcher studying design thinking and service design, including its recent emergence in government, she aims to develop a critical understanding of the emergence, growth and evaluation of design thinking and its variants (e.g., Kimbell and Bailey, 2017). As a practitioner and occasional consultant, she has also been involved in advising organisations, including government bodies, in adapting design thinking and service design. She has also assembled and published her own design thinking toolkits, one co-authored with an intern (Kimbell and Julier, 2012) and one within a book (Kimbell, 2014) used widely within MA design programmes. In all four roles, owing in part to the privileges associated with employment at well-known UK institutions, the first author has had opportunities to meet and talk with numerous leading practitioners and researchers for over a decade. This social capital has allowed her to directly shape particular accounts of design thinking in UK higher education and some organisational practices. The second author is a sociologist and brings expertise and insights from social sciences methods training and her doctoral research into a specific design practice, architecture. With a different institutional and intellectual history, architecture associates itself less with design thinking as an organisational capacity whose origins, as we shall see, are closely tied to firms with origins in industrial and product design. Further, the second author brings perspectives from conducting research into urban lighting design and working with lighting design, housing and city planning practitioners. As part of that, she co-authored a handbook for social research in lighting design. She also builds on expertise of how inequalities are (re-)produced through design practice.

Data Collection and Analysis The data forming the material for this exploratory study consists of the set-up and presentation, as well as the self-description and visual representation of all the English Internet-based design thinking resources that could be found within a 12-day research process conducted in early 2018. The process of collecting data began when the first author created a research briefing. This briefing positioned the research as critical and reflexive which the second author then approached through her sociological training and based on works in traditional ethnography, digital sociology, anthropology and critical data studies. The briefing also contained an initial list of Internet-based design thinking toolkits known to the first author, as well as an initial list of basic categories to organise the data (such as name, URL, producer, publication year). The second author began reviewing the resources and categories suggested by the first author through an online search. Here, she used Google's Browser 'Chrome' as well as Google's search engine. The keywords she used for the search were 'design thinking', 'design thinking tools' and 'design thinking toolkit'. Through some of the search results, she found websites (primarily blog posts) with collections of links to other design thinking resources. To balance out dependence on Google's search engine and its bias, the second author also used a

[11] This includes designing, delivering and assessing an elective on 'Designing Better Futures' on an MBA programme at Said Business School, University of Oxford since 2005; designing, delivering and assessing a design module within an undergraduate management science degree at University College London between 2015-2018; and developing the strategy for, teaching on and assessing a joint MBA run between Central Saint Martins, University of the Arts London and Birkbeck College, University of London launched in 2017.

Google Chrome Plug-In called 'SimilarSites' (a tool for online marketing practitioners to find competitors) to find sites 'similar' to design thinking resources she had already found. She also used Alexa.com, a website that analyses user traffic on websites and shows audience geography as well as related sites and keywords. A service she used in a similar manner was Amazon.com's suggestion algorithm. Here, she searched for relevant design thinking publications or cards and followed suggestions in the 'Customers who bought this item also bought…' category. This snowballing strategy led the second author to finding new resources to add to the list. Both authors were also active on Twitter including through #designthinking, which allowed them to identify participants and resources in the landscape. All data was gathered in a large spreadsheet[12] which also contained a section in which the path to finding these particular resources was narrated as part of conducing reflexive Internet-research. When researching the Internet-based design thinking resources, the second author gathered any data available, particularly design thinking toolkit documents, and also conducted a partial visual analysis by generating full-page screenshots that served as a basis for investigating the visual language of design thinking tools. As the data were being collected, clear links began to appear between the Internet-based design thinking resources: they were all configured through specific rationales and principles, which we subsequently analysed and then assessed their intensity. Here, the second author's newness to 'design thinking' as a subject of focused study enabled her to identify these links based on a close reading of these resources and some broad qualitative coding. The initial list of categories and themes produced by the second author was continually revised in dialogue with the first author, building on the latter's multiple roles as an educator, researcher, practitioner and toolkit-maker. Overall, the data were analysed as they were gathered in research meetings between both authors. Through this iterative process of gathering and categorising data, the final dataset comprised over 80 digital resources[13].

Formats The formats in which the Internet-based design thinking resources were offered represent a secondary taxonomy within the landscape of Internet-based design thinking resources. Here, we can distinguish between ten different formats which we define as follows[14]:

Toolkit	Toolkits are collections of design thinking 'tools' (exercises, techniques or methods) which are usually offered in the format of downloadable PDF documents (such IDEO.org's 'The Field Guide to Human-Centered Design', the 'DIY Toolkit' or Frog's 'Collective Action Toolkit').
Card Deck	Card decks are collections of design thinking methods or exercises which are presented in the form of playing cards (such as IDEO.org's 'Design Kit Travel Pack', LUMA Institute's 'Innovating

[12] This spreadsheet contained the following categories: Name, Type, URL/s, Access Date, Found how, Year started/published, Country, Producer/Publisher, Description, Funder, Partners, Scope, Core concept/s, Format, Main Features, Target Users, Business Model, Number of Participants, Usage/Downloads/Views, Learning Assessment, Accreditation, Contact, Notes. Due to the diversity of the cases, these categories were subject to continuous discussion between the two authors.

[13] This dataset of 80 resources was specifically compiled for this study and was the core of the analysis.

[14] The types of formats emerged from classifying the resources based on their set-up and presentation.

	for People: Human-Centered Design Planning Cards' or the 'ZIG ZAG Creativity Cards').
Platform	A design thinking platform is a website where resources are available, but where online-discussion and exchange about design thinking is facilitated and encouraged, i.e., where people interested in the topic can engage with a broader community. This can, for example, happen through a 'challenge' (such as on OpenIDEO.com) or in discussing different design thinking cases (Design Thinkers Academy Network). Here, the creation of a profile is usually required.
Directory	A design thinking directory is a domain-specific directory about design thinking, listing all kinds of resources and programmes, not just toolkits (such as 'Design Thinking in Schools' or the OECD list of government innovation toolkits).
Training/Informal Learning	Design thinking training courses are opportunities for informal learning, often in non-accredited workshops or seminars offered by non-HE institutions (such as the 'Design Thinkers Academy'), for both individual and corporate clients.
Book/Publication	A design thinking book or publication is a piece of writing and associated website on design thinking, typically entailing a number of design thinking tools, that has been published by a professional publisher (such as 'Creative Confidence' by Tom and David Kelley).
MOOC	A 'Massive Open Online Course' (MOOC) is an online course in which a potentially unlimited number of people can sign up and participate (such as the +Acumen/IDEO MOOC 'Introduction to Human-Centred Design), often consisting of several sessions.
Webinar	A design thinking webinar is a seminar conducted via the Internet. It can either be streamed live or be recorded and then published online such as (such as 'Stanford Webinar - Design Thinking = Method, Not Magic').
Blog Post	Blog posts on design thinking contain user-directed guidance on design thinking tools (such as 'Understanding how Design Thinking, Lean and Agile Work Together') and often link to other Internet-based design thinking resources.
Design Jam/Sprint[15]	A design thinking jam or sprint is a time-constrained workshop on design thinking, similar to a hackathon, and is often themed (for example, 'Jam Berlin' hosts service design, government and sustainability jams).

3 A Typology of Online Design Thinking Resources

The Internet-based landscape of design thinking resources is diverse and continuously expanding. It includes digital platforms and toolkits, printable resources, videos, contributions using publication services such as Blogger and Medium, social media

[15] The term 'design sprint' was introduced and popularised by Google Ventures' employee Jake Knapp and describes a five-day design thinking process for early-stage exploration of a new venture, product or service.

including Twitter and LinkedIn, videos, and websites associated with published books, consultancies, think tanks and agencies. Many of the resources are closely associated with organisations, some higher education, some commercial, some public sector, voluntary or government; most are free to use.

The three concerns from critical design studies (assumptions about economic growth, claims for universality and privileging of some bodies and knowledge over others; see section 2.2.1.), served as a lens through which we processed the data. This lens helped us to identify the links between the resources and categorise them into *rationales* and *principles* (both of which are deeply entangled)[16]. It also helped us to establish what we call a 'typology of design thinking resources'. This typology provides an account of the links between the resources (i.e. rationales and principles) and their intensity and is summarised in **Figure 1**.

3.1 Rationales

The link that we call 'rationale' refers to recurring themes and clusters of claims we identified within the narratives underpinning the resources and rationalising design thinking as ideal approach for any given situation[17]. Based on the data we gathered, we can distinguish between three rationales of design thinking: innovation, experimentation and capacity building.

Innovation A dominant claim made within Internet-based design thinking resources is that design thinking enables innovation of both outcomes (e.g., products or services) and processes (e.g., ways of organising). This often related to notions of improved competitiveness and growth (particularly in terms of gaining market share or entering new markets). The narrative of design thinking as an engine of innovation and growth, furthermore, dominates the ways in which many design thinking resources are presented online. For example, the first Internet research result retrieved by the second author (on 28.03.2018) was a short publication called '10 Design Thinking Tools: Turn Creativity into Growth'. Another design thinking toolkit, a card deck, was branded as 'Design a Better Business: New Tools, Skills, and Mindset for Strategy and Innovation Cards'. At the same time, the innovation claim rationalizing the use of design thinking resources extends beyond the commercial realm within a wider set of discussions about design. For example, a report by the European Design Leadership Board (European Commission, 2012) argues for design (and implicitly design thinking) as being an enabler for 'people-centred innovation', which resulted in a number of initiatives within the European Commission (European Commission, 2018)[18].

Experimentation The second rationale is a cluster of claims made about design thinking and creative experimentation to reduce risk. This is often closely linked to the first rationale of innovation. It asserts that using design thinking resources can enable

[16] The types of rationales and principles (see 3.1. and 3.2.) emerged from the qualitative coding of the data.

[17] We focus here on the rationales in the claims made by online resources, which in some cases make explicit reference to design, innovation studies and management literatures. However it is beyond the scope of this chapter to trace all these in detail.

[18] Some of the cases discussed in this section are could not be featured in the table due to the limited scope of this chapter. However, they still were part of the data analysis and conceptual work that went into this chapter.

organisations to try out new ways of working. A key element of this rationale is '(rapid) prototyping' which is framed as iterative design approach based on experimentation and immediate (user) feedback. For example, IDEO.org's 'Design Kit' is comprised of three phases, the second of which is focused on 'prototyping possible solutions'. Another example is the OECD's 'Observatory of Public Sector Innovation' (OPSI) which has produced a list of 'government innovation' resources which includes design thinking toolkits, some produced specifically for/by government and the public sector. Associated within the 'open government' agenda (Opening Governance, 2016), the design thinking here is associated with claims that it enables experimentation and reduces risk by trying ideas out early on. Interestingly, the visual language of many of the design thinking resources we examined was largely focused on stereotypical representations of 'creativity' and 'experimentation', e.g. in the form of people writing on post-its[19] (see Figure 2).

Capacity-building This third rationale locates design thinking within efforts to build capacities (on a micro or individual level) and/or to effect organisational change (on a macro level), including in multi-organisational complex systems such as education. For example, IDEO developed 'The Design Thinking for Educators Toolkit' aimed at those working in school education in the United States. This version of design thinking aims to effect systems change. Here, the key claim made about design thinking is that it can affect change on a macro level by putting educators and their students at the 'centre' in order to change the nexus of 'teacher', 'school', 'district' and 'community'. The positioning of capacity-building as central rationale for design thinking on a micro level is exemplified through the growth of design thinking training courses. These open enrolment training courses position design thinking as individual competence to achieve success in any given area, ranging from development aid to policy making or product development. Many such face-to-face training courses are available outside of higher education and seldom present themselves as grounded in academic research (Stanford's d.School being a notable exception); in contrast several online training courses such as MOOCs have links to universities (Wrigley et al 2018).

3.2 Principles

Whilst the notion of 'rationales' was focused on clusters of claims made about the effects of design thinking, 'principles' here refers to the routines and expertise that the design thinking resources describe themselves as being grounded in and that links them up in the wider design thinking landscape. Based on our data, i.e. the self-description of ca. 80 online design thinking resources, we identified four *principles* articulated in the resources: design thinking as human-centred, creative, problem-solving and participatory.

Human-Centred Design The principles of 'human-centred' design thinking emphasise the) 'experiences' of future users and/or advocate the notion of 'empathy'. For example, the 'Development Impact and You (DIY)' toolkit produced by UK innovation agency Nesta on behalf of the Rockefeller Foundation in collaboration with UNDP includes resources that claim to enable a group of people exploring an issue from different stakeholders' perspectives to generate solutions that are rooted in their experiences.

[19] The dominance of this particular image of design thinking is underscored by its prominence in the Internet: a quick image search under the keyword 'design thinking' produces endless lists of images featuring people writing on post-its.

Creativity A second principle by which design thinking resources are aligned is an emphasis on enhancing 'creativity'. In particular, this emphasises the visual, material and performative aspects of design practice, often aimed at people who do not think of their practice as designing. For example, the 'Stanford Design Thinking Bootcamp Bootleg' encourages visual research via a camera study while other resources encourage drawing, sketching and model-making as part of 'unlocking' creative capabilities to foster innovation.

Problem-solving Many design thinking resources described a grounding in the principle of 'problem-solving'. For example, IDEO's platform DesignKit.org promotes design thinking as 'creative approach to solving the world's most difficult problems' whilst the 'Frog Collective Action Toolkit' claims to 'empower communities of all shapes and sizes to find and design their own solutions to any problem, any time'.

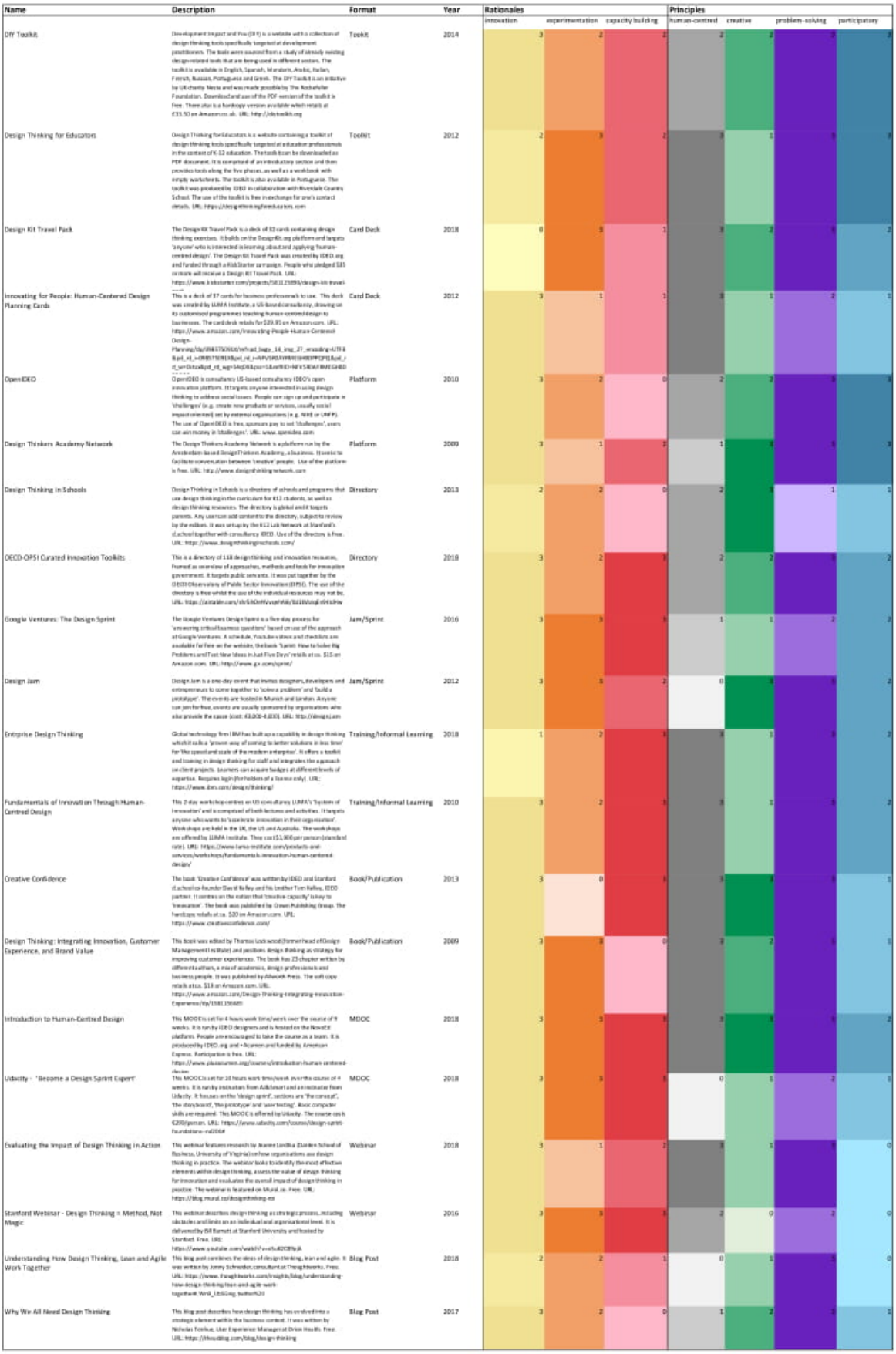
Participation The fourth principle is associated with using design thinking to enable participation in organisational change and innovation processes. Many of the resources we identified describe how to organise and facilitate workshops and activities to involve stakeholders into the process of designing. For example, the 'Design Thinking for Libraries' toolkit describes how design thinking tools may enable understanding the needs of distinct groups of library users, such as children.

3.3 Typology

The figure below maps a selection of Internet-based design thinking resources taken from our sample of over 80 resources. Here, we are aiming for an equal spread across all ten design thinking formats and chose to showcase two examples per format (i.e., 20 in total). Within that, we want to illustrate the links between the resources (rationales and principles) and their intensity[20]. The colour-coding in the typology indicates the intensities of the rationales and principles within the selected resources and therefore visualises the strength of the links between the resources. Through iteratively reviewing the materials and in discussion, we gave a score between 0-3 for rationales and principles for each of the selected resources[21]. For example if we found that a resource made several mentions of 'training' we would give a higher score in the 'capacity building' rationale. We also assessed and scored the prominence of placement in the overall narrative. For example a resource that has 'human-centred' in the title would score high in the 'human-centred' category, even if the term was not used as much in the body text of the resource. Through this scoring process, we were able to identify the intensity of the links between the resources. In developing this approach our discussions were shaped by the professional positions and personal histories of both authors (see section 2.2.2.)

[20] At this point, it is important to acknowledge that organisational clusters of density and dominance clearly do exist within the landscape of Internet-based design thinking resources. For example, IDEO has significantly shaped the growth of design thinking beyond the corporate realm and has invested in a number of non-profit ventures that promote design thinking for different sectors (the 'Design Thinking for Educators' project is a good example of that). However, it is beyond the scope of this study to take into account such links and power structures within the design thinking discourse.

[21] Here, the we iterated our reviewing, categorising and marking of the resources against the rationales and themes until we reached consensus.



Name	Description	Format	Year	Rationales			Principles			
				innovation	experimentation	capacity building	human-centred	creative	problem-solving	participatory
DIY Toolkit	Development Impact and You (DIY) is a website with a collection of design thinking tools specifically targeted at development practitioners. The tools were sourced from a study of already existing design-related tools that are being used in different sectors. The toolkit is available in English, Spanish, Mandarin, Arabic, Italian, French, Russian, Portuguese and Greek. The DIY Toolkit is an initiative by UK charity Nesta and was made possible by The Rockefeller Foundation. Downloadand use of the PDF version of the toolkit is free. There also is a hardcopy version available which retails at £33.50 on Amazon.co.uk. URL: http://diytoolkit.org	Toolkit	2014	3	2	1	2	2	3	3
Design Thinking for Educators	Design Thinking for Educators is a website containing a toolkit of design thinking tools specifically targeted at education professionals in the context of K-12 education. The toolkit can be downloaded as PDF document. It is comprised of an introductory section and then provides tools along the five phases, as well as a workbook with empty worksheets. The toolkit is also available in Portuguese. The toolkit was produced by IDEO in collaboration with Riverdale Country School. The use of the toolkit is free in exchange for one's contact details. URL: https://designthinkingforeducators.com	Toolkit	2012	2	3	2	3	1	3	3
Design Kit Travel Pack	The Design Kit Travel Pack is a deck of 52 cards containing design thinking exercises. It builds on the DesignKit.org platform and targets 'anyone' who is interested in learning about and applying 'human-centred design'. The Design Kit Travel Pack was created by IDEO.org and funded through a Kickstarter campaign. People who pledged $35 or more will receive a Design Kit Travel Pack. URL: https://www.kickstarter.com/projects/758112599/design-kit-travel-...	Card Deck	2018	0	3	1	3	2	3	2
Innovating for People: Human-Centered Design Planning Cards	This is a deck of 37 cards for business professionals to use. This deck was created by LUMA Institute, a US-based consultancy, drawing on its customised programmes teaching human-centred design to businesses. The cardsdeck retails for $20.95 on Amazon.com. URL: https://www.amazon.com/Innovating-People-Human-Centered-Design-Planning/dp/0984575003/ref=pd_bxgy_14_img_2?_encoding=UTF8&pd_rd_i=0984575003&pd_rd_r=4VFV5R8AYM8D1SH8EPPQ&pd_rd_w=DHzaB&pd_rd_wg=54qDI&psc=1&refRID=4VFV5R8AYM8D1SH8EPPQ	Card Deck	2012	3	1	1	3	1	2	1
OpenIDEO	OpenIDEO is consultancy US-based consultancy IDEO's open innovation platform. It targets anyone interested in using design thinking to address social issues. People can sign up and participate in 'challenges' (e.g. create new products or services, usually social impact-oriented) set by external organisations (e.g. NIKE or UNFP). The use of OpenIDEO is free, sponsors pay to set 'challenges', users can win money in 'challenges'. URL: www.openideo.com	Platform	2010	3	2	0	2	3	3	3
Design Thinkers Academy Network	The Design Thinkers Academy Network is a platform run by the Amsterdam-based DesignThinkers Academy, a business. It seeks to facilitate conversation between 'creative' people. Use of the platform is free. URL: http://www.designthinkingnetwork.com	Platform	2009	3	1	3	1	3	3	3
Design Thinking in Schools	Design Thinking in Schools is a directory of schools and programs that use design thinking in the curriculum for K12 students, as well as design thinking resources. The directory is global and it targets parents. Any user can add content to the directory, subject to review by the editors. It was set up by the K12 Lab Network at Stanford's d.school together with consultancy IDEO. Use of the directory is free. URL: https://www.designthinkingforschools.com/	Directory	2013	2	2	0	2	3	1	1
OECD-OPSI Curated Innovation Toolkits	This is a directory of 118 design thinking and innovation resources, framed as overview of approaches, methods and tools for innovative government. It targets public servants. It was put together by the OECD Observatory of Public Sector Innovation (OPSI). The use of the directory is free whilst the use of the individual resources may not be. URL: https://airtable.com/shr5JNDnNVvqeHvAy/tbl1WUoqEo9tdJeow	Directory	2018	3	2	3	2	2	3	2
Google Ventures: The Design Sprint	The Google Ventures Design Sprint is a five-day process for 'answering critical business questions' based on use of the approach at Google Ventures. A schedule, Youtube videos and checklists are available for free on the website, the book 'Sprint: How to Solve Big Problems and Test New Ideas in Just Five Days' retails at ca. $15 on Amazon.com. URL: http://www.gv.com/sprint/	Jam/Sprint	2016	3	3	3	1	1	2	2
Design Jam	Design Jam is a one-day event that invites designers, developers and entrepreneurs to come together to 'solve a problem' and 'build a prototype'. The events are hosted in Munich and London. Anyone can join for free, events are usually sponsored by organisations who also provide the space (cost: €3,000-4,000). URL: http://designj.am	Jam/Sprint	2012	3	3	2	0	3	3	2
Enterprise Design Thinking	Global technology firm IBM has built up a capability in design thinking which it calls a 'proven way of coming to better solutions in less time' for 'the speed and scale of the modern enterprise'. It offers a toolkit and training in design thinking for staff and integrates the approach on client projects. Learners can acquire badges at different levels of expertise. Requires login (for holders of a license only). URL: https://www.ibm.com/design/thinking/	Training/Informal Learning	2018	1	2	3	3	1	3	2
Fundamentals of Innovation Through Human-Centred Design	This 2 day workshop centres on US consultancy LUMA's 'System of Innovation' and is comprised of both lectures and activities. It targets anyone who wants to 'accelerate innovation in their organisation'. Workshops are held in the UK, the US and Australia. The workshops are offered by LUMA Institute. They cost $1,900 per person (standard rate). URL: https://www.luma-institute.com/products-and-services/workshops/fundamentals-innovation-human-centered-design/	Training/Informal Learning	2010	3	2	3	3	1	3	2
Creative Confidence	The book 'Creative Confidence' was written by IDEO and Stanford d.school co-founder David Kelley and his brother Tom Kelley, IDEO partner. It centres on the notion that 'creative capacity' is key to 'innovation'. The book was published by Crown Publishing Group. The hardcopy retails at ca. $20 on Amazon.com. URL: https://www.creativeconfidence.com/	Book/Publication	2013	3	0	3	3	3	3	1
Design Thinking: Integrating Innovation, Customer Experience, and Brand Value	This book was edited by Thomas Lockwood (former head of Design Management Institute) and positions design thinking as strategy for improving customer experiences. The book has 23 chapter written by different authors, a mix of academics, design professionals and business people. It was published by Allworth Press. The soft copy retails at ca. $18 on Amazon.com. URL: https://www.amazon.com/Design-Thinking-Integrating-Innovation-Experience/dp/1581156685	Book/Publication	2009	3	3	0	3	2	3	1
Introduction to Human-Centred Design	This MOOC is set for 4 hours work time/week over the course of 9 weeks. It is run by IDEO designers and is hosted on the NovoEd platform. People are encouraged to take the course as a team. It is produced by IDEO.org and + Acumen and funded by American Express. Participation is free. URL: https://www.plusacumen.org/courses/introduction-human-centered-design	MOOC	2018	3	3	3	3	3	3	2
Udacity - 'Become a Design Sprint Expert'	This MOOC is set for 10 hours work time/week over the course of 4 weeks. It is run by instructors from AJ&Smart and an instructor from Udacity. It focuses on the 'design sprint', sections are 'the concept', 'the storyboard', 'the prototype' and 'user testing'. Basic computer skills are required. This MOOC is offered by Udacity. The course costs €200/person. URL: https://www.udacity.com/course/design-sprint-foundations--ud809	MOOC	2018	3	3	3	0	1	2	1
Evaluating the Impact of Design Thinking in Action	This webinar features research by Jeanne Liedtka (Darden School of Business, University of Virginia) on how organisations use design thinking in practice. The webinar looks to identify the most effective elements within design thinking, assess the value of design thinking for innovation and evaluates the overall impact of design thinking in practice. The webinar is featured on Mural.co. Free. URL: https://blog.mural.co/designthinking-ex	Webinar	2018	3	1	2	3	1	3	0
Stanford Webinar - Design Thinking = Method, Not Magic	This webinar describes design thinking as strategic process, including obstacles and limits on an individual and organisational level. It is delivered by Bill Burnett at Stanford University and hosted by Stanford. Free. URL: https://www.youtube.com/watch?v=e4c42CBNvJA	Webinar	2016	3	3	3	2	0	2	0
Understanding How Design Thinking, Lean and Agile Work Together	This blog post combines the ideas of design thinking, lean and agile. It was written by Jonny Schneider, consultant at Thoughtworks. Free. URL: https://www.thoughtworks.com/insights/blog/understanding-how-design-thinking-lean-and-agile-work-together#.WrId_LtbSUm&_twitter%20	Blog Post	2018	2	2	1	0	1	3	0
Why We All Need Design Thinking	This blog post describes how design thinking has evolved into a strategic element within the business context. It was written by Nicholas Fenlaw, User Experience Manager at Orion Health. Free. URL: https://thevaldog.com/blog/design-thinking	Blog Post	2017	3	2	0	1	2	3	1

Fig. 1 Typology of selected design thinking Internet learning resources

3.4 Discussion

As a graphical device, this typology offers a visual pattern showing through colour intensity the higher scores for the rationales and principles we gave to the online resources. For example the intensity of dark purple shows the omnipresence of the problem-solving principle across all the formats and therefore shows that problem-solving is a strong link between the different resources. What this typology also shows strongly is that human centred and participatory design are not always aligned (i.e. resources which score highly in the former do not necessarily score highly in the latter). If we put this against the backdrop of design research at large, then we can see how this pattern maps onto two distinct lineages in design research: (a) ethnography in design and design anthropology and (b) participatory design.

What is not visible in this typology is that a homogenous set-up and a similarity of purpose within existing Internet-based resources on design thinking mask the heterogeneous fields and settings these resources get deployed in. A breadth of fields and settings, ranging from product innovation, to school education and international development, lies behind just three types of rationale and four types of principle. We note from this how design thinking resources in our sample downplay the specificities of individual contexts. Instead, design thinking tends to be framed as universal approach for all sorts of problems, whether that is sanitation issues in informal settlements in the Global South or the launch of a new product by a global corporation. Here, accounts of design thinking are normative, evangelical even. This raises the issue that there is little reflection here on what design thinking is or could be and that critical analysis is impeded.

Further, the resources we examined make design thinking look tidy, agreeable and easy to achieve, rather than messy, political or complex to negotiate. This is particularly reflected within the *rationales* and *principles* underpinning the design thinking resources we discussed. In particular, claims to being 'human-centred' fail to acknowledge the requirement to examine the structures and processes through which 'needs' come into being or persist. Along these lines, the visual language of these resources emphasizes participation in the doing of design thinking in workshops, presenting a particular kind of design labour. Furthermore, it is striking how much the depicted design actors in these resources resemble one another: young people, often white, male and well-dressed, inhabiting 'abled' bodies. The diversity and social contexts with which design thinking resources set out to engage is not reflected in their representations of these using design thinking resources.

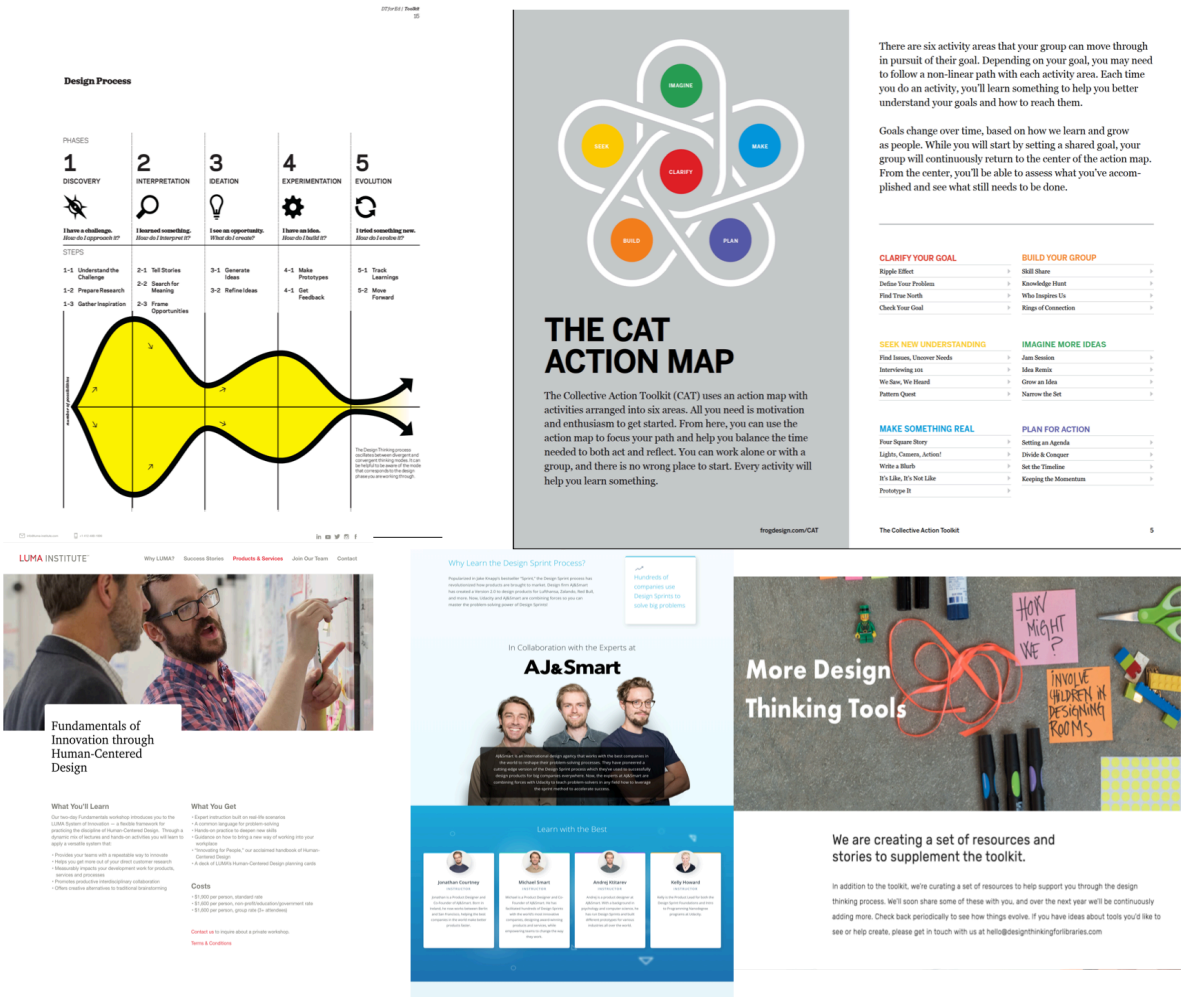


Fig. 2 Screenshots of selected design thinking resources[22]

[22] Clockwise, from the top left: 'Design Thinking for Educators' (IDEO); 'The Collective Action Toolkit' (Frog Design); 'Design Thinking for Libraries' (Global Libraries program at the Bill & Melinda Gates Foundation, IDEO, Chicago Public Library, Aarhus Public Library); 'Become a Design Sprint Expert' (Udacity Nanodegree Programme); 'Fundamentals of Innovation through Human-Centred Design' (LUMA Institute).

This homogeneity of the current design thinking landscape is underscored by a very limited engagement with academic research. Many resources list partners involved in producing or developing them, which may include universities. While many of the resources aim to effect changes to systems based on surfacing such needs, they ignore other accounts of these worlds rooted in, for example, studies of education or public administration which offer analysis of the very systems the 'tools' are trying to change. Producers of resources refer to their own projects, or to other projects within a relatively narrow range of organizations, locations, or settings. Scholarly expertise rarely makes it into the claims made for these resources. For example, in relation to the principle that design thinking is 'human-centred', we noted how many tools emphasise the need to understand people's experiences often citing 'ethnography' for inspiration or legitimacy, but without reference to the critical, theoretical and methodological discussions associated with social research. Here, 'ethnography' is used to generate insight into people's lives to that products can be designed that can be sold more easily. Put crudely, design thinking appropriates ethnography as a tool to turn the social complexity of people's lives into oversimplified customer profiles (see Gunn et al 2013). Similarly presentation of design thinking as experimental, often through prototyping, is disconnected from management and social science research on these topics (e.g. Thomke 2003; Marres et al 2018).

Furthermore, instead of inquiring critically into the conditions shaping projects in which design thinking is mobilised in practice, or examining the consequences of being located or enabled in particular ways within different contexts, design thinking resources produce narratives that serve their own perpetuation. This mechanism appears to be tied into relations of power. We found that a small number of organizations came up repeatedly, either as producers/funders of such resources, or cited by or linked to by others. International design consultancy IDEO dominates here. But other organizations came up several times such as consultancies who, by definition, have to market themselves in order to stay in businesses. Others were prominent charities or foundations such as Nesta (UK) or the Rockefeller Foundation (US).

4 Implications for Research, Higher Education and Design Practice

The fact the existing landscape of Internet-based design thinking resources is normative rather than critical or reflexive marks the limits of deploying Abrahamson's (1996) management fashion approach to analyse the proliferation of design thinking resources: the resources we assessed reveal design thinking as an organisational capacity for action that is disconnected from organisational practices, structures, cultures. Therefore, looking at design thinking purely as management fashion runs the risk of perpetuating the narrow focus on organizational capability and therefore being unable to examine the actual set-up design thinking resources. It may also and limit criticality. In particular, it does not enable examining the different kinds of social complexities and possible inequalities which may drive and result from the proliferation of design thinking within and beyond the business world[23]. The origins of design thinking lie within product and industrial design and with

[23] Here, the term inequalities is used broadly: to describe the framing of those 'impacted' by design thinking in certain areas which can include the development sector; to refer to the way in which communities are framed as those 'being helped by' design thinking; to describe the perpetuation of

providing expertise through consultancy as a business model; as a result, claims made for design thinking are entangled with neo-liberal modes of anticipation in which futures are visualized and materialized by hiding some operational, political and ethical considerations (Julier 2017).

Yet the Internet-based resources in our sample presented design thinking as decontextualized, unproblematically adaptable and universally applicable: the rationales and principles that crystallised in the analysis and link up the different resources show this strongly: none of them focus deeply on individual contexts but rather on universal approaches. Furthermore, the typology highlights that some of them are dominant across a number of resources and intensely link them, for example 'problem-solving'. Future research into design thinking as management fashion, therefore, must build on an updated account of the management fashion approach that privileges a *critical* engagement with the contexts and conditions under which certain ways of doing things become a management fashion, including through linkages with organization design and change.

As we reflect on our research, we note the challenges we faced in maintaining our own critical stances as we reviewed and patterned the online resources. To address this, in what follows we identify important epistemological and conceptual limitations in our approach. We then combine these limitations with the findings from this exploratory study and propose directions for future research (including new questions for critical theorizations of design thinking) as well as new directions for design higher education and practice.

4.1 New directions for research

Towards a critical discourse. We described our intention to produce a 'map' (as opposed to listing or ranking) in the context of this book. In our study, we were unable to avoid search-engine bias within the algorithms in our usage of services such as Google, Amazon, Alexa.com, SimilarSites and Twitter. Based on the outcomes of our study – where one organisation appeared several times in the online resources we found – we suggest that these algorithmic circuits replicate networks of power, particularly in relation to both market and discourse domination[24]. This leads to new questions around the genealogies of and relations between design thinking and the managing and organising of resources in the context of neoliberal capitalism. As a management fashion that became visible over the past 15 years, design thinking's purposes, effects and legitimacy are still in question even as it continues to develop. Based on that, possible future questions must include: How do particular actors constitute, organize and benefit from design thinking resources? Who and what are included and excluded from dominant accounts of design thinking? What are the consequences of these inclusions and exclusions and how do they play out, online and offline? What are the wider social, economic and cultural contexts of the proliferation of design thinking and how can we theorise this in dialogue with the social sciences and studies of management?

Western-centric tastes within design; to describe the unequal distribution of the severe economic and ecological consequences of the production of products, services and solutions; and to describe the elite position from which the story of design thinking is told and enacted.

[24] IDEO is a case that underlines this point very well: throughout our online search, we continually (re-)encountered IDEO design thinking resources, or design thinking resources that IDEO had, at the very least co-authored or sponsored. It is fair to state that IDEO is dominating the design thinking discourse outside of higher education and that this dominance is reinforced digitally.

Design thinking as controversy. Our mapping revealed two important tensions in the claims made for Internet-based design thinking resources. First, there are persistent questions about the legitimacy of design thinking within the practitioner discourse, even as it spreads. Second, we identified a disconnect between the apparent homogeneity of design thinking resources and the claims made for its universal applicability to any context and the fields and sites in which it is being developed, adapted and used. Therefore, we suggest that future critical research into design thinking would benefit from a framing of design thinking as *controversy* rooted in social studies of science and technology (STS) (see Venturini et al, 2014). This produces a focus on the social *processes* through which knowledge, practices, narratives and actors around design thinking are entangled with one another and the claims (e.g., the rationales or principles we identified) attached to them that come into view. Shifting to a framing of design thinking as a controversy enables accounting for both the substantive issues at stake *within* the controversy (such as 'innovation', 'growth', 'change' or 'participation'), as well as the formative role that mediating technologies (such as the Internet) play in configuring the controversy (see Marres and Moats, 2015). Here, new critical studies could use digital methods to map and visualise claims, actors, links, densities and clusters related to design thinking within the Internet. Here, using tools developed by STS researchers could be of use, e.g. the 'Issue Crawler', which follows links between resources, or 'Googlescraper', which allows researchers to understand the presence and ranking of sources within Google[25]. This would be in tune with developments within STS that argue for inventive approaches to the doing, representing and intervening into social life (Marres et al, 2018). Interesting questions in the context of such new research can include: How do different actors assemble design thinking online? Who makes what kinds of claims about the 'truth' about design thinking? How do they travel within the Internet and where do they cluster? How does design thinking co-emerge with other management fashions such as agile software development, lean start-up or open innovation?

Design thinking as a learning experience and professional practice. Our scope only allowed us to explore the *claims* articulated within the resources. Future research might assess how the proliferation of design thinking resources is happening through the eyes of their users, and what unfolds through the use of these resources in the context of organizational culture and change (e.g. Elsbach and Stigliani 2018). This would imply a deeper engagement with the key actors shaping the conditions in which such resources are promoted, produced, consumed and used and management researchers. Here, it would be interesting to compare the claims made within the tools to the lived experiences of people using design thinking resources in diverse settings. It would also point to an examination of the approaches of teaching and learning that underpin design thinking resources, and the extent to which these relate to organisational competences, individual cognition and learning styles (e.g., Beckman and Barry 2007). Our study has not contextualized design thinking with the different concepts and theories about professional expertise and teaching and learning more generally. For example, there are different understandings of learning at stake in the design thinking toolkits, courses and resources we found. Osberg (2018) notes a long-standing distinction in educational practice between approaches that are 'world-centred', holding education responsible for working towards a desirable future, and those that are 'person-centred', which emphasises the responsibility to cultivate human beings so they can achieve their potential. With its orientation to opening up individual and

[25] See Rodgers (2013) and Marres (2017) for discussions of the potential and limitations of using digital research methods.

organisational creativity, and ambition to effect changes in the world, such underlying bases of these resources merit further study. Based on this, future questions for new research should include: How do design thinking resources construct different kinds of 'design thinkers'? To what extent do 'tools' such as PDF documents downloaded from a web resource reconfigure organisational practices and individual expertise? Who are the diverse users of design thinking resources? How are they using and experiencing design thinking resources?

4.2 New directions for design higher education and practice

Internet-based design thinking resources claim to enable individuals, teams and organizations to achieve participatory, problem-based learning about an issue or domain that results in solutions. Available online, usually with no charge, possibly accompanied by practitioner reflection and dialogue, these resources co-exist alongside formal academic structures, processes, rewards or oversight. If a design consultancy can set up a design thinking course or even graduate programme, with or without university accreditation, what is the role or responsibility of a university for a learner seeking to develop skills in design? How does academic expertise in design thinking intersect with other disciplines? We would suggest that design educators might take on the role of helping learners — who might include professionals or other academic researchers — navigate the design thinking landscape and try out, review and assess some of these resources in dialogue with other learners, or produce their own. There is an opportunity here for mutually beneficial dialogues between practitioners, researchers and educators, for example connecting with developments in design education articulating a vision for using design to enable transitions to sustainable ways of living (see Irwin 2015). In other words, higher education institutions can and must play an important role in providing *critical* reflection and oversight, rather than just up-skilling. As was argued in relation to management fashion (Abrahamson 1996), such an external perspective can be both conceptual and also methodological.

There are implications, too, for the producers and users of such design thinking resources. Our research raises questions about the contexts of use, purposes, claims and kinds of knowledge embedded in them. Practitioners are also generators of critique and as such offer valuable windows into social life (Marres, 2017). But we see a need here for producers and users of these resources to examine what extent they should or can incorporate further criticality, both conceptually and methodologically, into them. In the discussion on decolonizing design (Schultz et al, 2018), Danah Abdulla scoffs at the idea of 'The Decolonizing Design Toolkit' (which may well exist already but did not appear in our searches)[26]. How can practitioners and educators extend or deepen the ways they can engage to co-produce insights and opportunities for social learning?

5 Conclusion

[26] See the Liberatory Design Toolkit which aims to develop equity-centred designers, adapted from the Stanford d-school design thinking process which introduces questions of power into the design methods. https://dschool.stanford.edu/resources/liberatory-design-cards. (Accessed 25 October 2018).

Despite the growth of design thinking online resources and toolkits outside of or on the edges of higher education, there is neither systemic evidence nor deeper analysis of this development. This chapter has set out to fill this gap by mapping the proliferation of Internet-based design thinking resources through an exploratory study. It has also aimed to provide an empirical and conceptual basis for new and more critical research into design thinking resources. As a point of departure, the chapter described design thinking as management fashion (Abrahamson, 1996), allowing for a view on *what kinds of claims* the proliferation of design thinking is based on. This served as a cue for a framework that was based on both conceptual criticality, i.e., contextualising this study with existing critical design research, and on methodological criticality, that is reflexivity through description. The analysis of the dataset of over 80 design thinking resources identified links between the resources via three rationales (innovation, experimentation and capacity-building) for the particular enactment of design thinking within any given resource as well as four principles that the design thinking resources describe themselves as being grounded in (design thinking as human-centred, creative, problem-solving and participatory). Showcasing two cases per format, the rationales and principles were scaled in a table to assess the strength of the links between the resources. Leading on from that, the discussion highlighted the homogeneity of Internet-based design thinking resources, despite the diversity of sites they claim to be relevant to. This normative framing prompted a critical reflection of the management fashion approach which needs to be deepened and extended in order to allow for a problematization of how design thinking is entangled with wider socio-economic contexts, such as neoliberal capitalism (see Julier, 2017). To conclude, this chapter has suggested three directions for more critical research into design thinking as well as considered the implications for design education and practice.

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- Design a Better Business: New Tools, Skills, and Mindset for Strategy and Innovation Cards. https://www.wiley.com/en-us/Design+a+Better+Business%3A+New+Tools%2C+Skills%2C+and+Mindset+for+Strategy+and+Innovation-p-9781119272113
- Design Kit. http://www.designkit.org
- OPSI. Observatory of Public Sector Innovation. Toolkit Navigator. https://www.oecd-opsi.org/projects/innovation-toolkits/
- The Design Thinking for Educators Toolkit. https://designthinkingforeducators.com/toolkit/
- Design Thinkers Academy. http://www.designthinkersacademy.com
- Development Impact and You (DIY). http://diytoolkit.org
- Stanford University. Stanford Design Thinking Bootcamp Bootleg. https://dschool.stanford.edu/resources/the-bootcamp-bootleg
- Frog Design. Frog Collective Action Toolkit. https://www.frogdesign.com/wp-content/uploads/2016/03/CAT_2.0_English.pdf
- Design Thinking for Libraries. http://designthinkingforlibraries.com
- The Field Guide to Human-Centered Design. http://www.designkit.org/resources/1
- Kickstarter. Design Kit Travel Pack. https://www.kickstarter.com/projects/58112589o/design-kit-travel-pack
- Innovating for People: Human-Centered Design Planning Cards. https://www.amazon.com/Innovating-People-Human-Centered-Design-Planning/dp/098575091X
- ZIG ZAG Creativity Cards. http://www.unc.edu/home/rksawyer/zzdeck/
- OpenIDEO. https://www.openideo.com
- Design Thinkers Academy Network. http://www.designthinkingnetwork.com
- Design Thinking in Schools. https://www.designthinkinginschools.com
- Creative Confidence. https://www.creativeconfidence.com
- +Acumen/IDEO MOOC. Introduction to Human-Centred Design. https://www.plusacumen.org/courses/introduction-human-centered-design
- Stanford Webinar. Design Thinking = Method, Not Magic. https://www.youtube.com/watch?v=vSuK2C89yjA
- Understanding how Design Thinking, Lean and Agile Work Together. https://www.mindtheproduct.com/2017/09/understanding-design-thinking-lean-agile-work-together/
- Jam Berlin. http://www.jamberlin.org
- Google Ventures Design Sprint. http://www.gv.com/sprint/

Online Tools for Controversy Mapping (**as in section 4.1 listed in order of mention**), **all accessed 16 April 2018**)

- GovCom. Issue Crawler: http://www.govcom.org/Issuecrawler_instructions.htm
- Digital Methods Wiki. GoogleScraper. https://wiki.digitalmethods.net/Dmi/ToolGoogleScraper