

# **Beyond design thinking: Design-as-practice and designs-in-practice**

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## **Abstract**

Recent publications by scholars, practitioners and government bodies claim that design, or rather design thinking, has the power to stimulate or drive innovation and transform organizations and even societies. But the term “design thinking” is confused and the literature on which it is based is contradictory. This paper contributes to understanding design activity and its effects by reviewing literature and identifying problems with the concept drawing on theories of practice in sociology, science and technology studies and organization studies. It proposes an alternative way of conceiving of design activity, without privileging the work done by designers, by attending to the practices of others involved in constituting design outcomes. Introducing a pair of concepts – design-as-practice and designs-in-practice – to replace design thinking solves a number of problems facing researchers in design and management. The paper’s contribution is to make an explicit link between design and social science in order to advance understanding about designers’ work and value creation.

## **Key words**

Design thinking, design theory, design practice, design, practice, design-as-practice, designs-in-practice

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## Introduction

Study the TV listings, the bestseller lists of booksellers, or the magazine racks at your local newsagents, and you would be forgiven for thinking that self-conscious design has become a widely distributed set of practices. We are invited to (re)design our homes, our identities, our furnishings, our personal communications as well as our gardens and cities. Design seems to have moved from being a specialized competence of professions rooted in industrialized economies, to become something we can all practice as part of our consumption activities. To paraphrase artist Joseph Beuys talking about art, everyone is a designer.

At the same time, design disciplines have been trying to describe the specific things that design professionals do and how they are distinctive. Attentiveness to design methods in the 1960s and 1970s gave way to claims about a generalized “design thinking” in the 1980s and 1990s. More recently, management scholars and educators have turned their attention to design, in an attempt to refresh their own disciplines concerned with matters such as organization design (eg Romme 2003; Weick 2003; Boland and Collopy 2004; Mohrman 2007), strategy (eg Dunne and Martin 2006; Liedtka 2000; Brown 2008) and research design (van Aken 2005; Huff et al 2006; Jelinek et al 2008). Managers and others should start thinking like designers (Dunne and Martin 2006) or adopt a “design attitude” (Boland and Collopy 2004); organizations should organize themselves like design teams (Dunne and Martin 2006). Some governments are also concerned with promoting design and design thinking. In the UK, a government-funded national body, the Design Council, argues that design thinking plays a key role in innovation (Design Council 2009). In these accounts, design, or rather design thinking, has the power to stimulate or drive innovation and transform organizations and even societies. In popular culture, everyone might be a designer but in management, it seems, everyone should be a design thinker.

But the term design thinking is confusing. Contributors to practitioner, consultancy and magazine blogs (eg Nussbaum 2009; Collopy 2009; Currie 2009; Brown 2009a) argue over what exactly it means and whether other terms, such as creativity, invention and innovation, are more helpful. They ask whether design thinking differs significantly from other kinds of (professionalized) approaches to work and value creation such as systems thinking (Senge 1994). Their discussions reflect a lack of coherence in academic literatures in design research and in management and organization studies about the ways that designers do (and think about) things, how distinctive they are, and what it might mean for organizations, value creation and knowledge production. At a time when the design thinking concept, however confused, is gaining currency beyond the design professions, it is useful to revisit the origins of design thinking. The paper’s contribution is to articulate the main problems with the term and suggest a new way of conceiving of design activity that links both what designers do, with what stakeholders such as end-users and others do, rooted in theories of practice.

The plan of the paper is as follows. First we review the background to design research and the development of the concept design thinking, drawing on key contributions that moved understanding of design from being knowledge about objects and how to make them, towards knowledge about what people do with objects. Then we identify problems with the concept drawing on sociology, science and technology studies and organization studies. We then propose an alternative way of conceiving of design activity, without privileging the work done by designers, by attending to the practices of others involved in constituting design outcomes. We urge an approach to design that attends to the roles that artifacts play in design practices. Introducing a pair of concepts – design-as-practice and designs-in-practice – to replace design thinking solves a number of problems facing researchers in design and management. The paper’s contribution to research is to jettison a concept that is no longer helpful to accounts of design, and to make an explicit link between design and social science in order to advance understanding about designers’ work and value creation.

## **Design and its objects**

Much of design theory and practice has struggled with objects. As privileged makers of objects, modern designers are understood to have a special relation to knowing about the effects they might have and how they come to be. Knowing how objects work, what they do, and how to make them, product and industrial designers are lay theorists whose ideas about human behaviour are inscribed in their sketches, models, plans and specifications and in the final design of an object.

Physical objects are central to design, even though design theorists have been trying to shift designers away from them for some time. Alexander (1964) argued that design was about giving form, organization and order to physical things. For Alexander, “The ultimate object of design is form” (1971: 15) where form means a physical arrangement. Visit a design studio or institution where designers are educated, and the possibly quite disorderly arrangement of objects on work surfaces, walls and floors serves to remind visitors how professional design is still taken up with doing things with and to objects.

Designers do not black-box the objects they arrange around themselves, study and try to change (Latour 1987). As Cross (2006: 9) puts it, “Objects are a form of knowledge about how to satisfy certain requirements, about how to perform certain tasks.” As people who fiddle and tinker, who practice bricolage, they want to get inside and understand how objects are constituted and how they work. As Molotch (2003) suggests, “stuff” comes partly from designers doing things with other stuff. In the designer’s world, objects and technologies are necessarily contingent; they don’t have to be that way. Someone has designed them a particular way, for some reason. It may not be a good reason, but for designers, objects offer information about the purposes of their designers, manufacturers and users. “Designers are immersed in this material culture, and draw upon it as their primary source of their thinking. Designers have the ability both to ‘read’ and ‘write’ in this culture; they understand what messages objects communicate, and they can create new objects which embody new messages.” (Cross 2006: 9)

Different design professions have found distinct ways to attend to objects and are expected to create different kinds of objects. For designers educated in the arts tradition, paying attention to the visual appearance of objects is a key part of their practice (Julier 2006). Visual style matters, whatever that means for a particular set of circumstances at a particular time and place (eg Forty 1986: Sparke 2004). While other kinds of designer may be less attentive to visual effects or less skilled in creating them, the visibility of artifacts matters. For designers educated in the engineering tradition, the artifacts they create such as drawings and prototypes also play an important role in team collaboration, problem definition and solving, as Henderson (1999) shows. Objects are central to the work of professional designers, but theories of design have moved away from objects.

## **From design to design thinking**

Writing contemporaneously with Alexander, Simon (1969) was also trying to understand and describe design. Having already made contributions to economics (for which he won a Nobel prize), Herbert turned his attention to the organization – or in his terminology – “design” of human action in the realm of the artificial. In his *The Sciences of the Artificial* (1969) Simon distinguishes design as the knowledge that is in the domain of the professions such as engineering, management or medicine, all of which he sees as concerned with “what ought to be” in contrast to the sciences which are concerned with “what is”. For Simon, design is a core human activity: “Everyone designs who devises courses of action aimed at changing existing situations into preferred ones” (Simon 1996: 111). In Simon’s account of design, objects do not feature. The action he is talking about is a rational set of procedures in response to a defined problem.

Simon's account of design may seem anathema to practitioners and theorists in non-engineering traditions which emphasize stakeholder involvement in defining and solving problems (eg Rittel and Webber 1973) or studying to the aesthetic dimensions of design and changes in taste (eg Forty 1986; Sparke 2004). But his privileging of the formal work of the designer offered a scaffold on which subsequent scholars have drawn.

A stream of research that developed from the 1960s focussed on what designers do and how they think. Sometimes called the "Design Methods" movement (Buchanan 1992; Jones 1992), these researchers sought to understand the processes and methods by which (successful) designers went about design activity especially in circumstances in which design problems were increasingly complex. Schön's (1983) description of individual, professional practices, focuses on the work by practitioners during their "reflection-in-action" as they move to reframe problems, based on judgement. Work by Rowe (1987), Cross (2006) and Lawson (1980/2006), for example, described research attempts to describe the thought processes of designers in action: their designerly way of knowing (Cross 2006) or design thinking (Rowe 1987).

Emerging from this design studies tradition, Buchanan's (1992) paper "Wicked Problems in Design Thinking" shifted design theory away from its legacy in craft and industrial production towards a more generalized "design thinking" that could be applied to nearly anything, whether a tangible object or intangible system. Drawing on Pragmatist philosopher Dewey, Buchanan saw design as a liberal art, uniquely well-placed to serve the needs of a technological culture in which many kinds of thing are designed, and human problems are complex. For Buchanan, design problems are indeterminate or wicked problems (Rittel 1972; Rittel and Webber 1973) to which the designer brings a unique way of looking at problems and finding solutions.

Buchanan's contribution was to shift the concept of design thinking away from a cognitive style toward an intellectual approach to problem framing and problem solving that acknowledged the social aspects of design work. More recently, theories of design have moved even further away from individual cognition towards an understanding of design that sees it as a distributed social accomplishment, acknowledging work in anthropology and sociology such as by Suchman (1987) and Hutchins (1995). Suchman (1987)'s description of situated action showed in detail how people actually went about purposeful activity. In contrast to Simon, Suchman found that in practice, "Every course of action depends in essential ways upon its material and social circumstances." (Suchman 1987: 50). Margolin (1995) proposed that designers and scholars of design shift attention from products to what he called the "product milieu" and pay more attention to the relations between design and social action. Within participatory design and the studies of computer-based systems, there has been a close attention to users' situated practices drawing on traditions within ethnography (eg Kensing & Blomberg, 1998; Squires & Byrne, 2002). For Julier (2006), designers and design can be seen as a culture, and using the tools of social and cultural analysis enables scholars to account for not just what designers do, how their work is organized, but the effects it has. Julier also emphasized the neglect of theories of consumption in design theory, proposing instead a more mobile design culture as a field of study that is at the intersection of value, circulation and practice. Combining consumption theory with studies of science and technology, Shove et al. (2007) argued that innovation in products often requires innovation in practices, calling for a "Practice Oriented Product Design".

### **Design thinking moves beyond professional design**

While the scholarly debate has shifted, the term design thinking remains current, especially among practitioners, at a time when management scholars and educators have begun to explore design as an intellectual and practical resource for other disciplines.

Boland & Collopy (2004) draw on their experience of working with architect Frank Gehry during the design of a new building for their business school. Drawing on Simon (1969), they distinguish between what they call a “design attitude” and a “decision attitude”, finding the latter the basis of management practice and education in which the challenge facing managers is choosing between alternative options. They believe that “the design attitude toward problem solving, in contrast, assumes that it is difficult to design a good alternative, but once you have developed a truly great one, the decision about which alternative to select becomes trivial” (Boland and Collopy 2004: 4). For Boland and Collopy, the decision attitude and analytical techniques used by managers are useful for situations in which problems are stable, whereas a design attitude is necessary when feasible alternatives are not known. Both are necessary: managers are designers as well as decision-makers.

Martin (Dunne & Martin, 2006) also argues that design thinking offers something of value to managers, which can complement established analytical techniques. Martin sees design thinking as combining inductive and deductive as well as abductive reasoning and argues that managers are ill-served by contemporary management education which neglects the latter (Dunne & Martin, 2006). Drawing attention to the different ways that managers and designers judge reliability and validity, Martin (2005) points to some of the fundamental challenges facing those who would import designerly approaches to management.

Hatchuel (2001) has also explored the contribution that design can make to management and organization theory, arguing that design is essential to innovation and value creation. While acknowledging the importance of Simon’s work on design within his programme of understanding “bounded rationality”, Hatchuel argues that for Simon, design is a type of problem-solving activity. Instead, for Hatchuel, problem-solving is a moment in a design process (Hatchuel 2001: 263). He shows that design – in the sense of creating new objects – requires expanding initial concepts, collective action and the creation of learning devices. Hatchuel’s definition of design involves the exploration of non-countable sets which are infinitely expandable. This expandability of concepts underpins Hatchuel’s formal theory of design (Hatchuel and Weil 2009) making it irreconcilable with earlier attempts rooted in bounded rationality (eg Simon 1969; Alexander 1964). In Hatchuel and Weil’s (2009) C-K theory (concept-knowledge theory), an important element of design activity is what you cannot (yet) know.

In different ways, Martin, and Boland and Collopy have synthesized design literature, and attempted to account for the distinctive practices of professional designers and describe why these are of value to management. In contrast Hatchuel has moved beyond Simon and away from a focus on pragmatist approach to understanding design to generate a formal theory that offers an account of design which is nonetheless intuitively recognizable in accounts of practice. However there is not, as yet, any unified theory of design to serve as the basis for claims about designers’ work and the effects it has. The next sections go on to summarize the characteristics associated with design thinking, and where some of the problems with the concept lie.

### **Contradictions in design thinking and designers’ activities**

As the above discussion has shown, there is no single authoritative definition or description of design or design thinking. The list of characteristics summarized in Table 1 below, drawing on several contributions by researchers and practitioners, illustrates quite how diverse and at times contradictory ideas about the nature of design activity or design thinking are. As has been emphasized, theories and concepts about designers’ practices lie several fields and are not necessarily consistent with one another. Research about design has seen understandings of design shift away from objects towards the social, but it is not clear where this idea of the

social is located. The aim of producing the table is not to synthesize existing work, but rather to highlight key themes and contradictions that appear across literatures.

**Table 1 Research on design and design thinking**

	<b>Characteristic</b>	<b>Reference</b>
<b>Goal of design</b>	To achieve fit between a form and its context	Alexander 1971
	Problem solving	Simon 1969
	The generation of new concepts and new knowledge; expandable rationality	Hatchuel and Weil 2009, Hatchuel 2001
	The resolution of paradoxes between discourses in a design situation	Dorst 2006
<b>Modes of reasoning and thinking in design</b>	Abductive	Cross 2006
	Inductive, deductive and abductive	Dunne and Martin 2006
	Balancing divergent and convergent thinking	Lawson 2006
	Designing new possibilities rather than selecting between alternatives	Boland and Collopy 2004
<b>The nature of design problems</b>	Determinate; ill-structured problems can be solved similarly to well-structured problems	Simon 1969; Simon 1973
	Indeterminate; design problems are wicked problems	Buchanan 1992
	Paradoxes between discourses; design problems are not knowable and evolve during the process	Dorst 2006
	A design attitude sees problems as opportunities for the invention of new alternatives	Boland and Collopy 2004
	Design and creativity are special cases of problem solving	Simon 1969 (Hatchuel 2001)
	Problem solving is a subset of innovative design	Hatchuel 2001
<b>The nature of design processes and activity</b>	Dynamic mapping between functions and design parameters	Braha and Reich 2003
	Selecting and identifying constraints and applying guidelines	Lawson 2006
	Exploratory and emergent	Cross 2006
	Functional decomposition	Alexander 1971, Hubka 1982
	Reflection-in-action; making 'moves' to reframe problems	Schön 1983
	Design processes do not end	Lawson 2006
	Working at high levels of abstraction as well as detailed level	
	Co-evolution of problem and solution	Dorst and Cross 2001
	Solution fixated	Cross 2006; Rowe 1987
	Experimentalism	Brown 2008
<b>Designers' approach to knowledge production</b>	Comfortable with ambiguity and uncertainty	Cross 2006, Michlewski 2008
	Integrating across knowledge domains	Hargadon and Sutton
	Consolidating multidimensional meanings	Michlewski 2008
	Empathy with users and stakeholders	Brown 2008; Dunne and Martin 2006; Michlewski 2008
	Design requires expanding concepts that are	Hatchuel and Weil

	partly unknown	2009
	Design requires designing learning devices	Hatchuel 2001
<b>Emblematic practices</b>	Sketching and drawing	Cross 2006; Lawson 2006
	Prototyping objects, experience prototyping	Kelley 2001, Fulton and Suri 2000
	Brainstorming	Sutton and Hargadon 1996, Kelley 2001
	Tearing up a drawing of a possible solution	Boland and Collopy 2004
<b>Approach to organizing work</b>	Collaboration	Brown 2008, Dunne and Martin 2006
	Co-design with users	Bate and Robert 2007
	Project-based working	Dunne and Martin 2006
	Small group working	Kelley 2001

### Design practices in design thinking

We now move to problematizing the concept of design thinking. The discussion below is suggestive rather than conclusive but it raises questions for those relying on this term to make claims about the distinctive practices of design professions, and about how design is understood, more generally. In particular it addresses the question identified above about where the social is located in design. To aid with this analysis, we draw on work in sociology, anthropology, and science and technology studies which attend to the situated, embodied practices of those doing (professional) work. Increasingly visible in organization and management studies, these resources offer a rich set of ways to understand the work of designers and the effects their work has.

Accounts of design thinking often hinge on descriptions of the ways designers *do* things. For example, Boland & Collopy (2004) describe their experience of working with architect Frank Gehry during the design of a new building for their business school. In a striking story, they relate how, having spent two days with them revising the arrangement of space, the project architect Matt Fineout tears up the plans they have just agreed on and suggests they start again, now they know they can solve the problem (Cameron, 2003, p. 92; Boland & Collopy, 2004, p. 5). Even in this short description Boland and Collopy draw our attention to practice. While they identify a design “attitude”, it is also possible to notice the embodied, shared experience of working around a table on sheets of onionskin, making marks, and iteratively framing and solving problems using the routines of architects. Reading this account, one can feel Boland and Collopy’s visceral response to seeing the architect tear up the work they have just achieved together and the solution to the problem they had agreed on. This emblematic story may indeed serve to communicate the attitude of a professional architectural designer, but it can also be read as an account of design practice in which designers are willing to generate new alternatives, even when an apparently viable one has been found.

Theories of practice (eg Reckwitz 2002; Schatzki et al 2001; Bourdieu 1990; Giddens 1984) draw on the attention paid in anthropology and sociology to what people do in their embodied, often mundane, situated interactions with other people and with things. The philosophical underpinning for these theories includes late Wittgenstein (cf Reckwitz 2002; Schatzki et al 2001), who urged that scholars look not for meaning but for use. Practice theory shifts the unit of analysis away from a micro level (individuals) or a macro one (organizations or groups and their norms) to an indeterminate level at a nexus of minds, bodies, objects, discourses, knowledge, structures/processes and agency, that together constitute practices

(Reckwitz, 2002). Examples of this perspective within organization studies include studying technology use (eg Orlikowski, 2000; Barley and Kunda 2001;); strategizing (eg Whittington, 1996; Whittington, 2006); knowledge in organizations (eg Brown and Duguid, 2001; Whyte et al. 2008); accounting (Hopwood & Miller 2004); and service innovation (Dougherty 2004).

The variety of approaches within this theoretical orientation mean that practice perspectives are not necessarily coherent with one another (Reckwitz 2002). Practices involve bodies, minds, things, knowledge, discourse, structure/process and agency and, importantly, cannot be considered by taking one of these elements in isolation. This paper follows Reckwitz in his definition of an ideal-type of practice theory in which practice is understood as “a routinized type of behaviour which consists of several elements, interconnected to one another: forms of bodily activities, forms of mental activities, ‘things’ and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge” (Reckwitz 2002, p. 249). For the purposes of this discussion of design thinking, three aspects of practice theory are emphasized.

The first is to highlight the way that situated and distributed practices constitute technologies and structures (eg Suchman 1987; Hutchins 1995; Barley and Kunda 2001). In her study of Lotus Notes, for example, Orlikowski (2000) showed how technologies are constituted in different ways by users’ practices. She found that as they interact with a technology in their ongoing practices, people enact structures which shape the emergent and situated use of that technology. She found that “technology-in-practice” can vary considerably in the ways structures are routinely encoded. “When people use a technology, they draw on the properties comprising the technological artifact, those provided by its constituent materiality, those inscribed by the designers, and those added on through previous interactions” (Orlikowski 2000, p. 410). The contribution of this study was to show that structures are not located in organizations, or in technology, but are enacted by users in practice. The implications for understanding design is that it transcends the boundaries of the individual and his or her cognitive style and offers a way to see design activity as distributed across a number of different people and the artefacts they interact with.

The second aspect of practice theory on which we will draw is the attention paid to the role of objects in constituting practices, echoing work by many scholars should not ignore the material in studies of technology and organisation (Latour and Woolgar, 1986; Latour 2005; Orlikowski and Scott 2008). As Reckwitz describes: “For practice theory, objects are necessary components of many practices – just as indispensable as bodily and mental activities. Carrying out a practice very often means using particular things in a certain way” (Reckwitz 2002, p. 252). Paying attention to objects, be they objects in the natural world, instruments, or objects produced within a knowledge practice is for Knorr Cetina (2001) a way of making a distinction between a definition of practice as rule-based routines or embodied skills, and a notion of practice that is “more dynamic, creative and constructive” (Knorr Cetina 2001, p. 187).

The third aspect of practice theory that will be emphasized here, is knowledge. This, of course, has been studied in many different ways. The particular contribution of the practice perspective is to avoid the alternatives presented in other theories that focus exclusively on what goes on in people’s minds, or at the level of social norms, or what goes on in language, for example. In theories of practice, knowledge is a social accomplishment situated in the ongoing routines of bodily and mental activities. As Schatzki (2001) explains:

“The prioritization of practices over mind brings with it a transformed conception of knowledge. As indicated, knowledge (and truth) are no longer automatically self-transparent possessions of minds. Rather, knowledge and truth, including scientific versions, are mediated both by interactions between people and by arrangements in the world. Often, consequently, knowledge is no longer even the property of



individuals, but instead a feature of groups, together with their material setups” (Schatzki 2001, p. 12).

In their discussion of knowledge in organizations, Brown and Duguid (2001) remind us that Polyani’s (1966) terms “tacit” and “explicit”, and Ryle’s (1949) “know how” and “know that” are dimensions, not types, of knowledge. “They are interdependent and cannot be reduced to one another. ... In both of these well known arguments, then, knowledge is two-dimensional and practice underpins its successful circulation.” (Brown & Duguid 2001, p. 204)

Drawing on these resources, we believe that the practice-theoretical approach has something important to offer theories of design and designers’ work, which, as shown above, are typically accounts of practices rather than “thinking”. Drawing on this approach problematizes design thinking in at least four ways.

First, the emphasis on designers in design thinking overly privileges the roles that design professionals play in constituting the meaning and effect of design outcomes. Several strands of design practice and theory have invested resources in articulating the importance of putting end-users and stakeholders at the heart of design (cf Rittel and Webber 1973; Norman 1988; Squires and Byrne 2002; Krippendorff 2006). In contemporary experience-based design practice (Bate and Robert 2007; Buxton 2008), designers study and learn from the experiences and practices of end-users and stakeholders as they begin to articulate design problems and start trying to solve them. In the field of participatory design, the designer’s role is sometimes concerned with enabling conversations with stakeholders so that they can undertake design themselves (eg Kensing and Blomberg 1998; Sanders 2006). Calls for a user-centred design or human-centred (Krippendorff 2006) design still foreground the designer as the architect of the design process, if they no longer create all the detail of design outcomes. But if we take seriously the contributions of anthropology and sociology to understanding what people do, especially once the formal design process is over and people are engaging with products and services *in situ*, then it becomes important to acknowledge the part that end-users and other stakeholders play in constituting the meaning and effects of design through practice (Shove et al 2007). Considered this way, end-users and other stakeholders are co-designers as they engage with objects in their practices.

Second, descriptions of design thinking that focus on individual designers and cognition fail to account for the situated nature of knowledge production and the institutions that serve to validate it. By looking at practices, rather than individuals or norms, scholars interested in design benefit from analysis that considers how knowledge that is required to practice becomes formalized, routinised or mundane; and how institutions take shape and authorize some kinds of knowledge, and not others, and some kinds of discourses, and not others (eg Foucault 1976). One way to understand the long-standing distinction between engineering-based design and design in the arts tradition (cf Dorst and Dijkhuis 1995) comes from considering how early engineering scholars went about formalizing and institutionalizing engineering design knowledge (Henderson 1999; cf Abbott 1988), in contrast to graphic, product or interaction design for example, which has much weaker institutions. Accounts of design thinking that are rooted on an individual or group level neglect to account for how designers’ knowledge becomes routinized, formalized and authorized.

Third, the practice-theoretical orientation avoids difficulties associated with the word “thinking”. While proponents of design thinking are generally not Cartesians privileging mind over body (Ryle 1949), the practice approach serves to emphasize the embodied nature of professional design work: how designers and stakeholders involved in design processes move, what they think, what they do and how it feels. In practice theory, routinized bodily performances and sets of mental activities are necessary components of practices (Reckwitz 2002). For a group of professions and disciplines that foregrounds stakeholder experiences, it

makes sense to attend also to the experiences of designers whose practices and knowledge is intimately tied to what they do with their bodies as well as their minds.

Fourth, accounts of design activity typically involve descriptions of the artifacts that designers make, the sketches, models, photographs, videos, plans, specifications and other objects that designers make, acquire and use in different ways during design. “Drawing” is in the Latin root of the English word “design” (Borja de Mozota 2003). It is hard to think about design professionals without thinking about the emblematic artifacts with which they are associated, whether they are drawings, models or prototypes. For example, it is difficult to imagine a product designer or architect without their drawings, whether created by pencil and paper or software tools. The concept “design thinking” with its suggestion of cognitive styles neglects to account for the artifacts without which design practice cannot proceed and which constitute design. Ethnographic descriptions of engineering designers (Henderson 1999; Whyte et al 2008) and architects (Yaneva 2005), for example, have shown how designers of different kinds are entangled with objects, whether they have acquired them in the course of their work, created them themselves, or involved stakeholders in generating them. In the practice-theoretical approach, artifacts are necessary constituents of practices which are “carried” by individuals (Reckwitz 2002).

### **Design-as-practice and designs-in-practice**

Having identified problems with the concept design thinking, the paper now turns to offer an alternative way of conceiving of design activity. The concepts we introduce solve these problems (although they may well introduce new ones). We believe the attempt to try to find a new way of thinking about design thinking is pressing, especially at a time when scholars and professionals from other disciplines are attempting to draw on resources in design theory and practice.

We propose a pair of concepts as an analytical tool, which draw on the literatures in sociology, science and technology studies as well as design studies. Using terminology from design, readers are invited to see this pair of concepts as a sketch. As such, the ideas that follow are understood as tentative, and suggestive, but nonetheless may offer ways to reframe the problem as Schön (1983) describes.

The first idea is perhaps an obvious move, to conceive of “design-as-practice”. If descriptions of design thinking rely on accounts of what designers do, what goes on (as far as we know) in their minds, in their shared, embodied and situated routines, and cannot be completed without involving the artefacts they use, make and work with, how does it make sense not to use the resources offered by practice theory? Design-as-practice mobilizes a way of thinking about the work of designing that acknowledges that design practices are habitual, possibly rule-governed, often shared, routinized, conscious or unconscious, and that they are embodied and situated. Design-as-practice cannot conceive of designing (the verb) without the artefacts that are created and used by the bodies and minds of people doing design. This way of thinking of design sees it as a situated and distributed accomplishment in which a number of things, people, and their doings and sayings, are implicated. As with strategy-as-practice in organization studies (Whittington 1996), conceiving of design-as-practice offers rich resources for understanding what goes on during design activities and relating them to organizational outcomes. It moves the unit of analysis and thus the research agenda away from oppositions between individual skill or knowing (eg Cross 2006), or organizational competence (eg Kelley 2001) to an arena which acknowledges the practices and discourses which span both. Design-as-practice avoids the problem in accounts of design that see it as a rational problem-solving activity (eg Simon 1969) or something concerned with expandable rationality (Hatchuel 2001). It acknowledges the work done by professional designers in their practices, but also opens up design to others, such as managers and employees in

organizations during design processes, and also customers, end-users and other stakeholders who through their practices also take part in design.

The second idea is of “designs-in-practice”. Like Orlikowski’s (2000) technologies-in-practice, this term acknowledges the emergent nature of design outcomes as they are enacted in practice. Taking the plural noun form of “design” which can mean the outputs created during a process of designing, such as blueprints, models, specifications and what is finally assembled in products and services, the term designs-in-practice draws attention to the impossibility of there being a singular design. But it not sufficient to study what the designers and others involved in the designing process think and say and do. Drawing on consumption theory (eg Ingram et al 2007) and ideas of user-led innovation (eg von Hippel 2001), the concept of designs-in-practice foregrounds the incomplete nature of the process and outcomes of designing (Garud et al 2008). When the designers have finished their work, and the engineers and manufacturers have finished theirs, and the marketers and retailers have finished theirs, and the customer or end user has taken engaged with a product or service artefact, the work of design is still not over. Through their engagement with a product or service over time and space, the user or stakeholder continues to be involved in constituting what the design is. Designs (the noun) are constituted through the practices of both professional designers, customers and identifiable, known end-users, but also by many others.

As a pair, design-as-practice and designs-in-practice serve to ground the practices of designers, their knowledge, ways of knowing, ways of doing, and shared routines, within the bodies they use to do their work, their minds, and the institutional arrangements in which they practice, and connect them with the objects that are implicated in it, and, crucially, to the practices of stakeholders and others co-producing outcomes of design in the world, which are outcomes that must remain incomplete. As an alternative to design thinking, the pairing of design-as-practice and designs-in-practice moves the unit of analysis away from the individual designer or user, or the organization or group and its norms, to a wider frame which refocuses the research agenda. The possible implications of this are now discussed.

## **Discussion**

Earlier, the origins of the term design thinking were discussed, in particular Simon’s (1969) work with the attendant critiques by Rittel (1972), Schön (1983), Suchman (1987), Hatchuel (2001) and others. For many scholars, especially those working drawing on anthropology and sociology, the deterministic nature of Simon’s argument is unappealing and unpersuasive since it fails to acknowledge the contingencies of the social. However *The Sciences of the Artificial* (Simon, 1969) marked out an important intellectual agenda that acknowledges the importance of the activity of designing, which is finding increasing favour within fields such as management studies.

It may be of value to go beyond the incommensurability of these two positions. Practice theory offers a way to do this. Simon’s rational vision of design as the science of the artificial conflicts with social theories that serve to situate his ideas within the messy realities which most of us are familiar with as organizations and projects and in the ways that people engage with objects in their day-to-day lives. Practice theories offer an alternative by switching the unit of analysis from a choice between individual actors or society and its norms, to a messy, contingent, iterative combination of minds, things, bodies, structures, processes and agencies, and the configuring and reconfiguring of and between them. Attending to practice offers ways to understanding the design activity not just as the work of design professionals but also of the managers, employees, paying customers, end-users and other stakeholders whose practices constitute design and its objects in different ways.

## **Implications for practice and research**

We now move to considering briefly what the implications of this approach might be for practice and research in design and management. For design research and practice, the practice-theoretical approach discussed above means that designers no longer have to make arguments about why stakeholders or end-users should be at the centre of design. In this approach, they already are. Similarly to how Vargo and Lusch's (2004: 2008) focus on service-dominant logic removes the need for introducing a customer-focus in marketing management by reconceiving of marketing as inherently relational, in the practice approach, design cannot be understood without people and their practices. Further, stakeholders are co-designers and designers are another kind of stakeholder.

For management practice and research, the practice-orientation helps scholars and managers intrigued by design thinking open up the roles that various stakeholders play in constituting value creation through design activity. The legacy of industrial, product and graphic design which results in some people understanding design as styling or giving form to things, which has more recently shifted to a non-object-based design thinking, can be confusing. The practice-theoretical approach, however, shifts attention to the practices involved during the design process, instead of focussing on the cognitive styles of individuals or teams of designers or other professionals or employees. Further, by foregrounding the work done by what customers, end-users and other stakeholders in constituting design outcomes, once a product or service is in the marketplace or in society, this approach forces the realization that design is never complete.

## **Conclusion**

This paper began with the claim that design, although it appears dominant in popular culture, is not well understood and that the term design thinking is confusing. We proceeded to a review of key contributions in literatures on design which identified a shift away from a focus on giving form to objects, to purposeful action to solve problems, to paying attention to the ways that design professionals go about their work and then understanding the social in design activity. The paper then reviewed the main developments in management and organisation studies using design, proposing that managing is designing as well as decision-making. Having summarised the literature about design and design thinking, the paper then identified a number of problems with the dominant view of design thinking, rooted in theories of the social that see the locus of the social not at the level of individuals and their minds, or in organisations and groups and their norms, but rather at a nexus of minds, bodies, things, institutions, knowledge and processes, structure and agency. The paper's contribution has been to identify the main problems associated with the design thinking concept and propose a new pair of concepts to describe and analyse design activity that acknowledge the work done by stakeholders and others in constituting design in practice. As with other theories that attend to the production of the social as situated accomplishments in which the connections between things can be traced, the practice perspective is necessarily empirical. In order to see the connections between design-as-practice and designs-in-practice, researchers must go and look for them. This paper is therefore offered a sketch, which may contribute to the design of such a research programme.

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