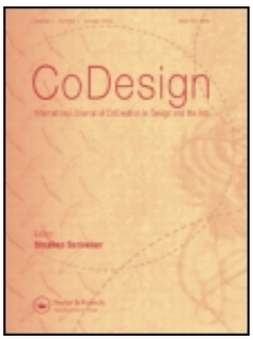

Co-Design

ISSN: 1571-0882 (Print) 1745-3755 (Online) Journal homepage: https://www.tandfonline.com/loi/ncdn20

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To cite this article: Elizabeth B.-N. Sanders & Pieter Jan Stappers (2008) Co-creation and the new landscapes of design, Co-Design, 4:1, 5-18, DOI: 10.1080/15710880701875068

To link to this article: https://doi.org/10.1080/15710880701875068

Published online: 24 Jun 2008.

CoDesign
Vol. 4, No. 1, March 2008, 5–18

Taylor & Francis
Taylor & Francis Group

Co-creation and the new landscapes of design

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(*Received 1 September 2007; final version received 9 December 2007*)

Designers have been moving increasingly closer to the future users of what they design and the next new thing in the changing landscape of design research has become co-designing with your users. But co-designing is actually not new at all, having taken distinctly different paths in the US and in Europe.

The evolution in design research from a user-centred approach to co-designing is changing the roles of the designer, the researcher and the person formerly known as the 'user'. The implications of this shift for the education of designers and researchers are enormous. The evolution in design research from a user-centred approach to co-designing is changing the landscape of design practice as well, creating new domains of collective creativity. It is hoped that this evolution will support a transformation toward more sustainable ways of living in the future.

Keywords: participatory design; design research; co-design; co-creation; collective creativity; user-centred design

1. Introduction

Over the past six decades, designers have been moving increasingly closer to the future users of what they design. Especially in areas where technologies mature, and the next new feature is no longer of value, manufacturing companies have been increasingly open to approaches that define the product based on what people need. The first advances, well consolidated now in industrial practice and education, practiced user-centred design from an 'expert perspective' in which trained researchers observe and/or interview largely passive users, whose contribution is to perform instructed tasks and/or to give their opinions about product concepts that were generated by others. The user-centred design approach (i.e. 'user as subject') has been primarily a US-driven phenomenon. Increasingly, since the 1970s, people have been given more influence and room for initiative in roles where they provide expertise and participate in the informing, ideating, and conceptualising activities in the early design phases. The participatory approach (i.e. 'user as partner') has been led by Northern Europeans. The two approaches are now beginning to influence one another. Figure 1 gives an overview of the current state of the human-centred design (research) landscape (discussed in more depth in Sanders 2006a).

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ISSN 1571-0882 print/ISSN 1745-3755 online

DOI: 10.1080/15710880701875068
http://www.informaworld.com

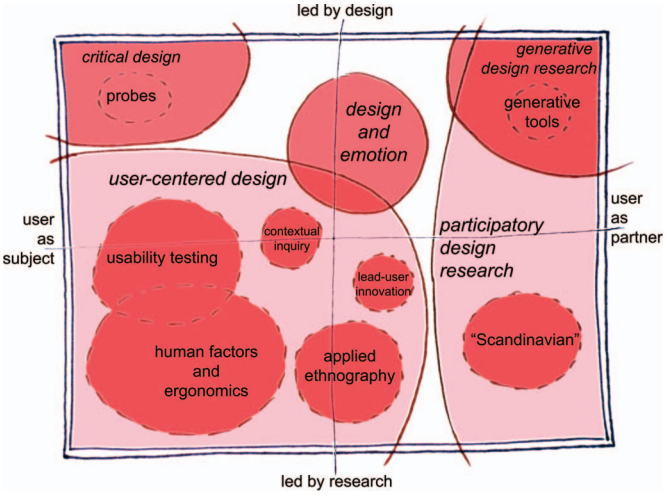

Figure 1. The current landscape of human-centered design research as practiced in the design and development of products and services.

Within this landscape, in the area of participatory design, the notions of co-creation and co-design have been growing. The terms *co-design* and *co-creation* are today often confused and/or treated synonymously with one another. Opinions about who should be involved in these collective acts of creativity, when, and in what role vary widely. Online dictionaries do not yet have entries for *co-creation*, *cocreation, codesign* or *co-design*. Wikipedia, the online encyclopaedia, has only preliminary entries on *co-creation* and *co-design*.

The authors take *co-creation* to refer to any act of collective creativity, i.e. creativity that is shared by two or more people. Co-creation is a very broad term with applications ranging from the physical to the metaphysical and from the material to the spiritual, as can be seen by the output of search engines. By *co-design* we indicate collective creativity as it is applied across the whole span of a design process, as was intended by the name of this journal. Thus, co-design is a specific instance of co-creation. Co-design refers, for some people, to the collective creativity of collaborating designers. We use co-design in a broader sense to refer to the creativity of designers and people not trained in design working together in the design development process.

Figure 2 shows a simple representation of the design process today. Of note is the large and growing emphasis on the front end. Formerly called 'pre-design', the front end describes the many activities that take place in order to inform and inspire the exploration

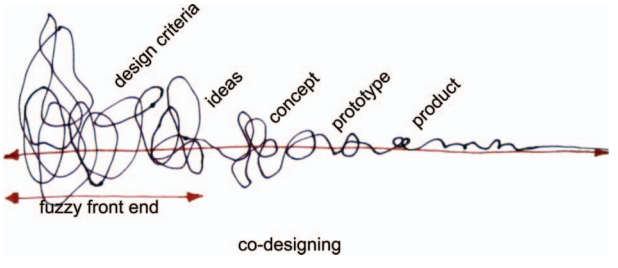

Figure 2. The front end of the design process has been growing as designers move closer to the future users of what they design.

of open-ended questions such as 'how can we improve the quality of life for people living with a chronic illness?', or 'what is the next big thing in family leisure time?' The front end is often referred to as 'fuzzy' because of the ambiguity and chaotic nature that characterise it. In the fuzzy front end, it is often not known whether the deliverable of the design process will be a product, a service, an interface, a building, etc. Considerations of many natures come together in this increasingly critical phase, e.g. understanding of users and contexts of use, exploration and selection of technological opportunities such as new materials and information technologies, etc. (Stappers 2006). The goal of the explorations in the front end is to determine what is to be designed and sometimes what should not be designed and manufactured. The fuzzy front end is followed by the traditional design process where the resulting ideas for product, service, interface, etc., are developed first into concepts, and then into prototypes that are refined on the basis of the feedback of future users.

2. A quick glance at history

It is interesting to note that even though the terms *co-creation*, *cocreation, codesign* and *co-design* have not yet made much of an impact on the online dictionaries and encyclopaedia, each of these terms retrieves hundreds of thousands of hits on the search engine www.google.com. In fact, *co-design* alone pulled up 1,700,000 hits on 2 July 2007. This attests to the interest of people around the world in these content areas. Moreover, counts on Google Scholar (11,800 for *codesign*, 538 for *co-creation*, as compared to 3,470,000 for *product design* and 17,400,000 for *design*; on 18 August 2007) indicate that the terms are also seriously discussed in academic design circles. It seems that we are talking about a very recent and relevant phenomenon. Or are we?

Actually, the practice of collective creativity in design has been around for nearly 40 years, going under the name *participatory design*. Much of the activity in participatory design (this was the terminology used until the recent obsession with what is now called co-creation/co-design) has been going on in Europe. Research projects on user participation in systems development date back to the 1970s. In Norway, Sweden and Denmark the Collective Resource Approach was established to increase the value of industrial production by engaging workers in the development of new systems for the workplace. The approach put together the expertise of the systems designers/researchers and the situated expertise of the people whose work was to be impacted by the change. The approach, thus, built on the workers' own experiences and provided them with the resources to be able to act in their current situation (Bødker 1996).

The beginnings of the participatory design movement were occurring elsewhere at the same time. There is a wonderful, but unfortunately out-of-print, book edited by Nigel Cross and made up of papers that were presented at a conference called *Design Participation*, held by the Design Research Society in Manchester, England in September of 1971. The papers came from contributors who were at the time teaching and practicing in the fields of economics, design, architecture, planning, building science, design research, and mechanical engineering.

In the Preface to *Design Participation*, Cross (1972) wrote:

> professional designers in every field have failed in their assumed responsibility to predict and to design-out the adverse effects of their projects. These harmful side effects can no longer be tolerated and regarded as inevitable if we are to survive the future ... There is certainly a need for new approaches to design if we are to arrest the escalating problems of the man-made world and citizen participation in decision making could possibly provide a necessary reorientation. Hence this conference theme of 'user participation in design'. (p. 11)

In the Closing Comments for *Design Participation*, Robert Jungk, a futurist and social inventor, advocated:

> we could talk not (only) about participation at the moment of decision but about participation at the moment of idea generation ... We can begin the preparation for this radical change. As a prognostician, I don't think this change will take place before the end of the century. We will have to suffer first from the lack of foresight of our fathers and forefathers. After that, something radically different can come, but it won't come on its own: it has to be prepared. (p. 122 in Cross 1972)

We can see now, well into the next century, that Jungk was correct in predicting that change would not come for many years. Hopefully we are well enough prepared for such change. It is interesting to note that participation in the design process, as it is practiced today, is focused more on the exploration and identification of presumably positive future opportunities than it is on the identification and amelioration of adverse consequences. However, both perspectives will need to be addressed in an integrated way if we are to face the immense challenges of living in the 21st century.

Co-design as it is practiced and discussed today takes on quite different manifestations, depending upon the expertise and mindsets of its practitioners. A few of the key proponents of co-design are briefly described below. It is of interest to note that the best known proponents of co-design originate from business or marketing and not from design practice.

C. K. Prahalad and Venkat Ramaswamy are usually given credit for bringing co-creation to the minds of those in the business community with the 2004 publication of their book, *The Future of Competition: Co-Creating Unique Value with Customers*. They propose:

> The meaning of value and the process of value creation are rapidly shifting from a product- and firm-centric view to personalized consumer experiences. Informed, networked, empowered and active consumers are increasingly co-creating value with the firm. (Prahalad and Ramaswamy 2004)

Frank Piller also writes extensively about the co-creation of value between companies and customers. Piller is considered the expert on the concept of mass customisation, having analysed hundreds of companies pioneering this approach to selling their goods (Tseng and Piller 2003). Eric von Hippel (2005) works with 'lead users' in co-creative activities. Lead users are people who have already explored innovative ways to get things done and who are willing to share their approaches with others. Patricia Seybold (2006) also works with 'lead customers', the small percentage of customers who are 'truly' creative. The von Hippel and Seybold approaches to co-creation limit participation in the design process to an elite and very carefully selected group of people. It is not yet clear whether these elite groups of people can represent and speak for the majority of people who will actually use the goods and services that are being designed and developed.

Co-creation is by now being touted at all points along the product development process, particularly in the later stages. Websites such as www.NIKEiD.com allow people to customise their own shoes, for example, by choosing colors and detailing. For many, co-creation is the latest trend in marketing and brand development. It is the latest of ways to get new products and services into an already overcrowded marketplace. For example, it is being espoused as a powerful new tool for product naming, packaging, promoting and advertising.

In our experience as researchers and practitioners we have seen that co-creation practiced at the early front end of the design development process can have an impact with positive, long-range consequences. This mirrors Jungk's observation that 'participation at the moment of idea generation' is an important place to be practicing participatory design. However, 'participation at the moment of decision' is gaining in interest as well. The application of participatory design practices (both at the moment of idea generation and continuing throughout the design process at all key moments of decision) to very large-scale problems will change design and may change the world. Participatory design has the potential, as Cross described, 'to arrest the escalating problems of the man-made world'. In fact, the co-creative paradigm is being espoused by those exploring the intersection of science and spirituality as one of the primary means for transformation of the dominant worldview that is taking place today. This transformation is from an unsustainable way of life to one 'in which both science and spirituality reconfigure our most basic understandings of human consciousness and how to live harmoniously in a healthy and sustainable ecosphere.' (Institute of Noetic Sciences 2007)

2.1. Why has it taken so long?

There are a number of reasons why it has taken so long for the principles and practices of participatory design/co-designing to make an impact on the man-made world. First, to embrace co-creativity requires that one believes that all people are creative. This is not a commonly accepted belief, particularly amongst those in the business community. In fact, the primary business-driven approaches to co-creation (i.e. von Hippel 2005 and Seybold 2006) are based on the assumption that only 'lead' people can become co-designers. Embracing participatory thinking flies in the face of the 'expert' mindset that is so prevalent in business today. The existing power structures in companies are built on hierarchy and control. Co-designing threatens the existing power structures by requiring that control be relinquished and given to potential customers, consumers or end-users. It is very difficult for those who have been successful while being in control to give it up now or to imagine a new way of doing business that can also be successful. The new generations are having an easier time in distributing and sharing the control and ownership. This change in attitude is largely possible because the internet has given a voice to people who were previously not even a part of the conversations. But it will take some time before the predominant culture accepts egalitarian idea sharing. It is also difficult for many people to believe that they are creative and to behave accordingly. Co-designing requires creative initiative on the part of the entire team: researchers, designers, clients and the people who will ultimately benefit from the co-designing experience.

Secondly, participatory thinking is antithetical to consumerism, in which personal happiness is equated with purchasing and consuming material goods. Hopefully, consumerism and the rampant consumption that goes with it has almost run its course. In many parts of the world, the needs that capitalism has worked so hard to meet have been met and so new needs are now being invented. Meanwhile, in other parts of the world, basic human needs (e.g. clean water) are not met. In our studies over the last 10 years we encounter that, increasingly, people want a balance between passive consumption and the ability to actively choose what kinds of more creative experiences to engage in and how (see Sanders 2006b). Unfortunately, it will still take years for the culture to shift away from consumerism towards the consumptive/creative balance that people seek. The renewed interest in sustainable practices is also helping to fuel that fire.

A third reason that it has taken co-creation so long to have an impact is that participatory design has been seen as academic endeavour with little or no relevance for the competitive marketplace. In many parts of industry, investment in research is looked upon as a non-obvious step, investment in user studies a big and expensive step, and user participation a radical step into the unknown. This is beginning to change now as product development becomes increasingly knowledge-intensive, and industries and universities look to each other for collaborative explorations in innovation.

Last but not least, the relationships between new technologies and future human experiences have just recently become very complex and integrated. In the past, the manufacturing industries were characterised as being either manufacturing-driven or, more lately, technology-driven. The move of companies to pay attention to 'user experience' is in part motivated by stagnation of the technology push. For example, as car manufacturers find it hard to compete on technical quality and price, they are forced to look outside the product to the user and his/her context. They are becoming aware that the car driving experience is now of primary concern.

2.2. What is going on in design practice?

Design practice has been influenced by the changing landscape of human-centred design research. The user-centred design approach, which began in the 1970s and became widespread by the 1990s, proved to be most useful in the design and development of consumer products (Sanders 1992). But it is now becoming apparent that the user-centred design approach cannot address the scale or the complexity of the challenges we face today. We are no longer simply designing products for users. We are designing for the future experiences of people, communities and cultures who now are connected and informed in ways that were unimaginable even 10 years ago.

Consequently, new disciplines of design have begun to emerge. 'Interaction design' was first introduced in the late 1980s by Bill Moggridge and Bill Verplank (Moggridge 2007). Interaction design is just now beginning to be offered as a field of study in the curricula of design programs at universities. 'Service design' started to receive attention in 2006 with the advent of the first service design conference, *Emergence* 2006, that was put on by Carnegie Mellon University's School of Design. 'Transformation design' was introduced in 2006 in a White Paper by that name published by the UK's Design Council. Each of these new disciplines incorporates several of the traditional design disciplines within it. For example, service design integrates visual communication design, information design and interaction design. Transformation design, the newest of the emergent design disciplines, is based on participatory practices in combination with user-centred methods. It 'builds on traditional design skills to address social and economic issues. It uses the design process as a means to enable a wide range of disciplines and stakeholders to collaborate' (Burns *et al.* 2006).

A snapshot in time (see Table 1) shows that we are moving from the design of categories of 'products' to designing for people's purposes. The traditional design disciplines on the left are centred around the product or a technology. Here the designer gains the skills needed to expertly conceive of and give shape to products such as brand identities, interior spaces, buildings, consumer products, etc.

The emerging design practices, on the right, centre around people's needs or societal needs, and require a different approach in that they need to take longer views and address larger scopes of inquiry. The first author, for example, is currently working on a design research project to explore the unmet needs and dreams of the growing number of people

Table 1. A snapshot in time of traditional and emerging design practices.

The traditional design disciplines focus on the **designing of** 'products' ...	... while the emerging design disciplines focus on **designing for** a purpose
visual communication design	design for experiencing
interior space design	design for emotion
product design	design for interacting
information design	design for sustainability
architecture	design for serving
planning	design for transforming

who are living with Type 2 Diabetes, in order to identify new opportunities for their future living experiences. The opportunities are open-ended and are not necessarily directed towards product or service manifestations. Another current project involves the use of co-designing tools and thinking in the cultural transformation of people who will be engaged in future healthcare experiences, both from the patient and the healthcare staff side.

Two potential projects also address larger societal needs. One project will look into participatory workplace interventions in acute care nursing with a focus on the psychological and ergonomic challenges involved with obese patients. The other one involves participatory workplace interventions aimed at the workers from family-owned farms in the US Midwest.

The emerging design practices will change what we design, how we design, and who designs. The impact upon the education of designers will be immense. The patterns of change taking place in the transition from a product perspective to the purpose perspective are described more fully in the following sections.

3. The roles in the design process are changing

The move from user-centred design to co-designing is having an impact on the roles of the players in the design process. Let's consider, for example, the roles of user, researcher and designer (see Figure 3). In a caricature of the classical user-centred design process, the user is a passive object of study, and the researcher brings knowledge from theories and develops more knowledge through observation and interviews. The designer then passively

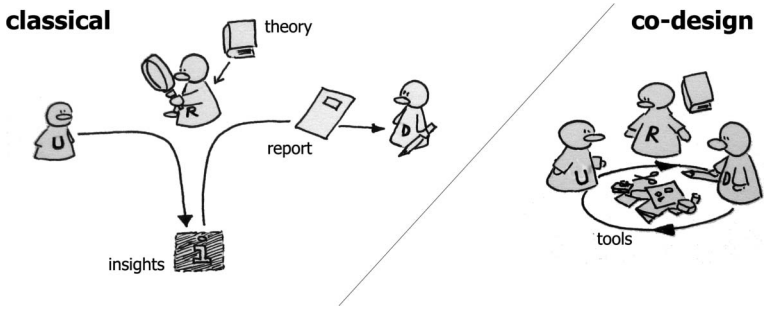

Figure 3. Classical roles of users, researchers, and designers in the design process (on the left) and how they are merging in the co-designing process (on the right).

receives this knowledge in the form of a report and adds an understanding of technology and the creative thinking needed to generate ideas, concepts, etc.

In co-design, on the other hand, the roles get mixed up: the person who will eventually be served through the design process is given the position of 'expert of his/her experience', and plays a large role in knowledge development, idea generation and concept development. In generating insights, the researcher supports the 'expert of his/her experience' by providing tools for ideation and expression. The designer and the researcher collaborate on the tools for ideation because design skills are very important in the development of the tools. The designer and researcher may, in fact, be the same person. The designer still plays a critical role in giving form to the ideas (more on the changing roles of the key players in the co-design process is discussed in Sleeswijk Visser *et al.* 2005).

3.1. The role of the user: co-designer?

Sometimes 'users' can play co-creating roles throughout the design process, i.e. become co-designers, but not always. It depends on level of expertise, passion, and creativity of the 'user'. All people are creative but not all people become designers. Four levels of creativity can be seen in people's lives: doing, adapting, making and creating (see Table 2, and Sanders 2006b) These four levels vary in terms of the amount of expertise and interest needed. Expertise, interest/passion, effort, and returns grow with each level.

Table 2. Four levels of creativity.

Level	Type	Motivated by	Purpose	Example
4	Creating	Inspiration	'express my creativity'	Dreaming up a new dish
3	Making	Asserting my ability or skill	'make with my own hands'	Cooking with a recipe
2	Adapting	Appropriation	'make things my own'	Embellishing a ready-made meal
1	Doing	Productivity	'getting something done'	Organising my herbs and spices

People live simultaneously at all levels of creativity in different parts of their daily lives. For example, they may be at the *creating* level when it comes to cooking but at the *adapting* level when it comes to the use of technology products. People with a high level of passion and knowledge in a certain domain who are invited to participate directly in the design process can certainly become co-designers. For example, this is beginning to take place today with physicians, nurses and other healthcare professionals in the design of new healthcare systems and environments. (Observations based on the first author's role on planning and architectural design teams.) Sometimes patients and family members become a part of the design team as well.

Fischer (2002) indicates a similar division of levels in viewing people both as consumers and designers, i.e. the same person is and wants to be a consumer in some situations and wants to be a designer in other situations. He proposes a continuum ranging from passive consumer, to active consumer, to end user, to user, to power user, to domain designers, all the way to meta-designer. In relation to the use of products, Fischer advocates the emergence of adaptive design, in which the user could scale his involvement with a product from passive consumption to expert adapting.

Users can become part of the design team as 'expert of their experiences' (Sleeswijk Visser *et al.* 2005), but in order for them to take on this role, they must be given appropriate tools for expressing themselves. Over the past decade, research groups within

a number of academic institutions, practitioners in design research consultancies and design research groups within industrial institutes have all explored co-designing tools and techniques and the processes by which they can be applied. The interest in tools and techniques for co-designing are growing rapidly. Figures 4–6 illustrate some of these techniques that come from the authors' most recent personal experiences.

3.2. The role of the researcher: from translator to facilitator

In the traditional design process, the researcher served as a translator between the 'users' and the designer. In co-designing, the researcher (who may be a designer) takes on the role

Figure 4. Tools and techniques support the user taking the role of an experienced expert. This photograph shows a presentation technique with a cartoonesque TV-frame that can help shy people to express their opinions more readily (see van Rijn and Stappers 2007).

Figure 5. This photograph shows nurses co-creating a concept for ideal workflow on a patient floor. Note that the toolkit components are round, helping them to think in terms of activities, not rooms. This session preceded the one shown below (Sanders 2006c).

Figure 6. This photograph shows nurses co-designing the ideal future patient room using a three-dimensional toolkit for generative prototyping (Sanders 2006c).

of a facilitator. When we acknowledge that different levels of creativity exist, it becomes evident that we need to learn how to offer relevant experiences to facilitate people's expressions of creativity at all levels. This means leading, guiding, and providing scaffolds, as well as clean slates to encourage people at all levels of creativity. It is not always the case that we want to push people beyond their level of interest, passion and creativity. Different approaches to inviting and involving future users into the design development process will be needed for the different levels of creativity. As researchers we will need to learn how to:

- **lead** people who are on the 'doing' level of creativity,
- **guide** those who are at the 'adapting' level,
- **provide scaffolds** that support and serve peoples' need for creative expression at the 'making' level, and
- **offer a clean slate** for those at the 'creating' level.

In addition to bringing people into the design process in the ways most conducive to their ability to participate, researchers will need to bring in applicable domain theories in a way that can be handled by the co-design team. The social psychologist who becomes a design researcher, for example, does not just bring interviewing skills, etc., but can also bring in background knowledge and literature on theories about social interactions, indicating patterns and factors which can guide and/or inspire the design (e.g. Postma and Stappers 2006).

3.3. The role of the professional designer

What role is there for professional designers to play if future users are co-creating tangible visions of new products and/or services? Design skills will become even more important in the future as the new landscapes of design emerge. Designers will be in demand as the usefulness of design thinking is acknowledged in mankind's drive to address the challenges of global, systemic issues.

Designers will be needed because they hold highly developed skills that are relevant at larger levels of scope and complexity. By selection and training, most designers are good at visual thinking, conducting creative processes, finding missing information, and being able to make necessary decisions in the absence of complete information. In the near future, designers will find themselves involved not only in the design of stand-alone products but in the design of environments and systems for delivering healthcare, for example. The design of a new community hospital may be completed 8–10 years before the hospital itself is opened. What will the technology be 10 years in the future? Who will be the patients? What will the needs of patients be? Who will be the healthcare workers? How will the transition into the new facility be staged? How will the healthcare workers learn to work in the new facility? As the scope and complexity of design problems increases, we will need the special skills and abilities of designers to help in the way ahead.

We will be using generative design thinking to address change in the future. The use of generative design tools lets one look forward into the possible futures of the people who will be living, working and playing there. The onus is on designers to explore the potential of generative tools and to bring the languages of co-designing into their practice. Designers will be integral to the creation and exploration of new tools and methods for generative design thinking. Designers in the future will make the tools for non-designers to use to express themselves creatively.

Third, designers will need to play a role on the co-designing teams because they provide expert knowledge that the other stakeholders do not have. Designers professionally keep track of existing, new and emerging technologies, and have an overview of production processes and business contexts. This knowledge will still be relevant throughout the design development process.

Fourth, even in the design profession there is considerable specialisation. The skills, knowledge and methods of the interior designer, the interaction designer, the graphic designer, etc., are quite different. These professions will not disappear overnight as 'users' become co-designers (Buxton 2005). Expertise within a problem area will remain important even as new design practices emerge (as indicated in Table 1).

4. What does co-creation suggest for changing design practice and education?

Bringing co-creation into design practice will cause a number of changes to occur. It will change how we design, what we design, and who designs. It will also affect the tools and methods that the new teams of co-designers will use.

The landscapes of design and design research will continue to change as design and research blur together. At the front end, design will become synonymous with design research, creating new landscapes of opportunity for designers and researchers. The fuzzy front end will become populated with hybrid design researchers and research designers. Already research is becoming more prominent in the curricula of the quickly growing university-based design programs, and links between, e.g., the social sciences and design are getting stronger. For example, several schools are including participatory design techniques, ethnography and psychology into the curriculum of industrial design engineers (e.g. for the Delft programme, see Stappers *et al*. 2007a, Stappers, Hekkert and Keyson 2007b). In practice we now see industrial designers with many years of experience in product development who are moving into new roles as design researchers.

The design/research blur will be disruptive at first, with arguments going back and forth about who is best suited to do what, which tools and methods belong to whom and how to analyse the data. This is where we are now. As the disruption gains momentum,

however, new disciplines will spin out and people will begin to explore the new design spaces on the emerging landscape. From the blur will come new types of designers and researchers with specialties based more on the purpose of designing as opposed to the products of designing (see Table 1). Or perhaps the spinout from the blur will result in professionals who have special expertise in certain stages of the process, such as in the fuzzy front end.

Co-designing teams will be far more diverse than they are today. Future co-designing will be a close collaboration between all the stakeholders in the design development process together with a variety of professionals having hybrid design/research skills. These team players will vary across many types of culture simultaneously: disciplinary culture, company culture, ethnic culture, worldview, mindset, etc. For example, one of the major challenges in the planning and architectural practices today is the communication gap between the design team, the various levels of 'user groups' and the wide array of specialised consultants to the process. In the future, the new co-design languages that support and facilitate the many varieties of cross-cultural communication will become highly valued.

What is being designed will change. Larger views across space and time will be needed. New tools and methods for design research will be needed to address increasing scope, scale and complexity. The domains of architecture and planning are the last of the traditional design disciplines to become interested in exploring the new design spaces that focus on designing for a purpose. Design for sustainability has been the first of the new design spaces to impact architecture and planning, followed by design for experiencing. The exploration of new design spaces within architecture is happening now primarily in the design of healthcare environments (based on observations from the first author's recent experiences in practice). This is a domain of vast complexity where the introduction of co-designing is being warmly welcomed by many of the healthcare professionals. The opportunity to bring the practice of co-design tools and methods to the design of educational environments and to the corporate workplace is now beginning as well.

4.1. New domains of collective creativity

We will see the emergence of new domains of collective creativity that will require new tools and methods for researching and designing. We will need to provide alternative learning experiences and curricula for those who are designing and building scaffolds to support the collective creativity of others. New curricula will be needed for helping people learn how best to function in the generative front end of the product development process. Many questions arise from this challenge. Answers to these questions will require the collective attention of many explorers.

- Is it best for students to learn the traditional design process first and then move to co-designing? Or is it better to start with co-designing? For many people, the mindset for co-designing, i.e. the belief that all people are creative, is difficult to embrace. If we start the education of designers with co-designing, the mindset is less likely to be a problem to overcome.
- When should education about co-creation and co-designing begin? If started in the elementary level, how much more rapidly will the world take shape?
- Who are the new hybrid researcher-designers? Can we learn how to identify people with the most promise? What abilities, skills, mindsets and worldviews will they need?

- What about the learning process for social scientists? Is the learning process for co-designing easier for social scientists (*vs.* engineers) to learn? What implications does this have for the future?
- What will be the impact of enabling and supporting multiple simultaneous levels of collective creativity? How will that influence design cultures? What influence will that have on the world cultures?
- With everyday people given access to the design process in co-creation, how much will design thinking diffuse into everybody's curriculum for living, learning and working?

In the future, we will be designing in virtual and hybrid domains. We are heading into a world where experience often trumps reality. We can see this now in the rapid proliferation of virtual experiential realms on the internet. The human-centred design research landscape will become a virtual realm, growing and changing in response to the zeitgeist. It will eventually become evident that the design research community does not need to worry about ownership of spaces on the design research landscape since we will be creating new ones. The new landscapes of design and research will be infinite in space and time and continually changing.

Acknowledgements

The authors would like to thank the CoDesign reviewers, Froukje Sleeswijk Visser, Lindsay Kenzig, Stephanie Patton and Dennis Brandon for feedback on earlier drafts.

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