Information, Inspiration and Co-creation

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Abstract

We are experiencing today the co-evolution of two distinct approaches to human-centered design research in practice: research that informs the design development process and research that inspires the design development process. Research that informs the design development process has been evolving for many years and is by now well established. Thus, this paper will describe the patterns leading to the emergence of research that inspires the design development process. It will also describe the design spaces (i.e., consuming, experiencing, adapting and co-creating) that are emerging at the intersection of the co-evolution.

Keywords

Co-creation, collective creativity, design research, experience, experiential research, generative research, inspiration, prototype

The landscape of human-centered research in design practice today

The landscape of design research in practice has changed dramatically over the last twenty years. It has grown from a handful of individuals to hundreds of independent practitioners, many small research companies and internal design research groups within a number of large organizations.

Companies are now experimenting with and seeking new tools and methods for human-centered design research, particularly for the early front end of the design development process, often referred to as the "fuzzy front end". This pattern of experimentation and exploration is seen most often in the large technology-driven companies such as Microsoft (Sanders, 2004), Motorola, Intel, Samsung, and others whose survival depends on innovation.

Professional organizations that focus on the front end of the design development process have been growing dramatically. Some of these organizations include the Product Development and Management Association (www.pdma.org), Computer Professionals for Social Responsibility (www.cpsr.net) that sponsors the Participatory Design Conference, and The Institute for International Research (www.iirusa.com) that sponsors conferences and seminars, many of them about the fuzzy front end of the design development process.

Quantitative research for the product and service development process has reached commodity status. There is not much innovation or excitement there. The excitement now is around qualitative research for the front end. The methods and tools of the applied social sciences (e.g., psychology, anthropology, sociology, etc.) are in demand. For

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example, applied ethnography was the hot new research method a few years ago. But today, ethnographic research is no longer a new thing. Many traditional market research firms now offer ethnographic research services. Very few, however, have people trained in ethnographic methods actually conducting the research. In fact, taking entire product development teams out to consumers' homes and workplaces in order to do "ethnographic research" is now commonplace at companies such as Procter & Gamble.

Why are these changes so apparent now? Perhaps we have reached the limits of technology-driven innovation. After the US market crash at the turn of the century, the focus on new product and service development turned away from innovation for the sake of innovation, and moved toward innovation more relevant to people's lives. A key question of businesses in the 2000's is "what should we make/offer?" They are beginning to realize that research at the fuzzy front end can help to provide answers, insights and opportunities.

Four patterns have been converging over the last twenty years, shaping the landscape of human-centered design research in practice:
~ the locus of design research in the design development process has changed,
~ the way we talk about the people we serve through design has changed,
~ the forms of prototyping in the design development process have changed, and
~ everyday people want to balance consumption and creativity.

The convergence of these patterns is pointing toward new design spaces that will co- exist with the design spaces we know of today.

Where is design research in the design development process?

Design research has been moving progressively closer to the front end of the design development process.

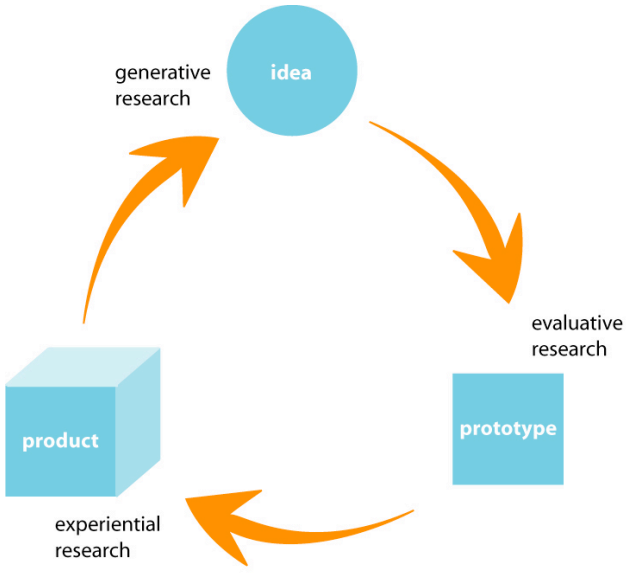

Figure 1: A view of the design and research development process

Figure 1 shows a simplified view of the design development process that can be used to talk about the development of all types of "products" (e.g., hardware, software, systems, and spaces). We can also consider services to be a form of "product". Products start as ideas that are then transformed into one or more prototypes, which eventually become products. The research that informs each of these stages differs in intent and in form. Research done to assess prototypes is called evaluative research. Research that is done to explore what happens to products when they are used by people in the real world is called experiential research because it is focused on exploring experience. And finally, research that is conducted in order to generate ideas or to uncover new product opportunities at the fuzzy front end is called generative research.

Figure 2: The evolution of research in the design development process

Figure 2 shows the order in which the various design research domains have influenced the design development process. Design research began in an experiential mode. It was not uncommon many years ago for designers to immerse themselves in the use context of the product domain they were exploring. They might, for example, observe people using the product or they might use the product themselves. However, researchers were not generally a part of this early experiential effort.

Evaluative research came along in the 1980's as many new products with information-driven interfaces proved to be beyond the limits of human cognitive abilities. Today, the largest number of researchers contributing to the design development process practice as evaluative researchers, many of them in interactive design domains.

Generative research is the last of the design research domains to emerge. It is in the generative phase that the clash between research for information vs. research for inspiration is being felt, as will be described later. There is a growing awareness that different types of research and different types of research expertise are needed at the various points along the design development process. It has become apparent that the skills needed at the generative end are not always possessed by practitioners who have traditional research backgrounds.

Talking about the people we serve through design

How we think about and refer to the people we serve through design has undergone significant change.

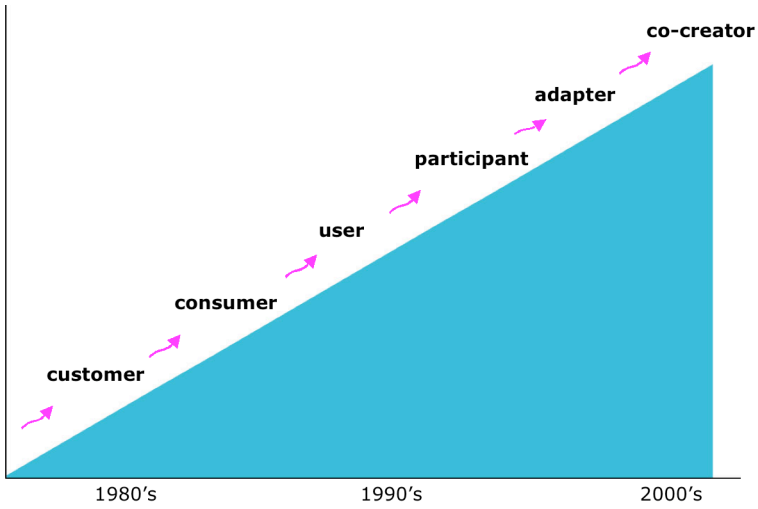

Figure 3: Changes in the way we think about people

Figure 3 shows the language we have been using to talk about (and consequently to think about) the people we are serving. During the 1970's and 1980's we called them "customers" and "consumers". This timing coincides with the heyday of the market-driven era. A user-centered phase began in the late 1980's and is today continuing to drive designing. In this phase we are more likely to refer to the people as "users" or "end-users".

A newer approach is emerging in which we invite the people we serve through design to participate with us in the actual designing. We are now beginning to think of people as participants in the design process, as adapters of the designed artifact or even as co-creators, i.e., equal in stature and possessing of unique and relevant expertise. At the top of the "hill", designers become interpreters of people's needs and dreams and not just the creators of artifacts.

Where is prototyping in the design development process?

Prototyping in the design process has changed radically as well. Prototyping, like research, has been moving to the fuzzy front end.

Figure 4: The evolution of prototyping in the design development process

Twenty years ago, prototyping was focused on the making of artifacts that looked like the real thing. The more realistic, the better. Consequently, prototypes were made near the end of the process and few were made because the time and cost of doing so were high. An evolution of prototyping has been taking place since then and we know now that the earlier and rougher the prototype, the more the design team can learn through its creation. And because rough prototypes are less costly, an iterative range of prototypes can be made.

The evolution in prototyping can be observed in product design, in interface design and in software design. For example, "paper screens" are now preferred to appearance mockups in the early phases of the interface design process. The unfinished nature of paper prototypes invites better feedback and participation in the design process by the design team members, as well as by end-users.

New technology is also leading to innovative visualization tools for the design process. For example, VR is being used to create virtual prototypes in which designers and others can immerse themselves. Once again, the trend toward earlier and rougher prototypes can be seen in the virtual domain. Researchers are finding that low-tech tools such as video can be used to create very rough and immersive 3-D like environments that are very useful early in the design process (Keller and Stappers, 2001; Frost and Warren, 2000).

The next step in the evolution of prototyping will be the embodiment of ideas and dreams by the people we serve through design.

Everyday people want to balance consumption and creativity

Because human-centered design research has been invited to play in the fuzzy front end, we are getting a glimpse of what everyday people aspire to do, to be and to have in the future. The notion that everyday people want to balance consumption and creativity is an insight derived from my 25 years of experience as a design research practitioner. It is based on a fundamental change in people's dreams for the future that first emerged only five years ago. It has become increasingly evident that everyday people are no longer satisfied with simply being "consumers." They want to be "creators" as well. This unmet need for creativity is being expressed through the use of generative toolkits (Sanders and William, 2001), whether we are conducting research about people's home experiences, their learning experiences, or their work experiences. People's examples of what constitutes creative behavior are, however, surprisingly varied, as can be seen in the following section.

The interest in more creative ways of living can be seen also in the new books dedicated to the topic. Two good examples include Ray and Anderson's *The Cultural Creatives: How 50 Million People are Changing the World,* and Florida's *The Rise of the Creative Class.* New forms of creativity in art and design are emerging as well. *Postproduction* (Bourriaud, 2002) refers to the increasing number of recent artworks that have been created based primarily on pre-existing works of art. Artists today are interpreting, reproducing, and re-using the art originally created by others. Similarly, "adhocism" is the idea that describes the trend in industrial design whereby old products are salvaged and recombined to create new ones.

An immense opportunity emerges when the patterns described above are combined:

- consumers are wanting to become co-creators
- prototypes are moving to the fuzzy front end
- visualization tools are getting faster, rougher, cheaper and more immersive

Putting the new visualization tools in the hands of all the people (not only designers, but also the everyday people we have been calling "end-users") who have a stake in co-creation will reshape the front end of the design process. You can think of the new visualization tools as prototypes for dreaming.

Levels of everyday creativity

In practice, I have uncovered four levels of creativity that everyday people seek. The four levels progress from doing to adapting to making and finally to creating. The chart below shows the primary differentiating characteristics of each level.

Level of creativity	Motivations	Requirements
Doing	To get something done / to be productive	Minimal interest Minimal domain experience
Adapting	To make something my own	Some interest Some domain expertise
Making	To make something with my own hands	Genuine interest Domain experience
Creating	To express my creativity	Passion Domain expertise

Figure 5: The four levels of everyday creativity

The most basic level of creativity is **doing.** The motivation behind doing is to accomplish something through productive activity. For example, people have told us that they feel creative when they are productively engaged in everyday activities such as exercising or organizing their closets. Doing requires a minimal amount of interest. The skill requirements are low as well. Many of the goods and services offered to "consumers" today can be said to satisfy the doing level of creativity. They come to the consumer readymade. For example, in the food preparation domain, a doing activity would be to buy or select a prepackaged microwave entrée and prepare it for a meal.

The next level of creativity, **adapting**, is more advanced. The motivation behind adapting is to make something one's own by changing it in some way. People might do this to personalize an object so that it better fits their personality. Or they might adapt a product so that it better fits their functional needs. We can see adaptive creativity emerging whenever products, services, or environments don't exactly fit people's needs. Adapting requires more interest and a higher skill level than doing. It takes some confidence to go "outside of the box." In the food preparation domain, an adapting activity might be to add an extra ingredient to a cake mix to make it special.

The third level of creativity is **making**. The motivation behind making is to use one's hands and mind to make or build something that did not exist before. There is usually some kind of guidance involved, *e.g.,* a pattern, a recipe, or notes that describe what types of materials to use and how to put them together. Making requires a genuine interest in the domain as well as experience. People are likely to spend a lot of their time, energy, and money on their favorite making activities. Many hobbies fit in this level of creativity. In the food preparation domain, an example might be to create an entrée using a recipe.

The most advanced level of creativity is **creating**. The motivation behind creating is to express oneself or to innovate. Truly creative efforts are fueled by passion and guided by a high level of experience. Creating differs from making in that creating relies on the use of raw materials and the absence of a predetermined pattern. In the food preparation domain, for example, making is cooking with a recipe, whereas creating is making up the recipe as you go.

The path from doing to adapting to making and finally to creating develops in the individual over time and through experience. All people are capable of reaching the highest level of creativity, but they need the passion and the experience to do so. Consequently, people differ in the level of creativity they attain in different domains. In fact, they may find themselves at all four levels of creativity simultaneously in different domains. They may attain the higher levels of creativity only in their hobbies or other domains for which they have high interest and/or passion.

The emergence of new design spaces

Several new design spaces are emerging from the shifting terrain of the design research landscape. We are currently in, and have been for many years, a design space focused on consumptive activities such as shopping and buying which leads to owning and using. This **Design for Consuming Space** will always exist, but will be joined by newer design spaces along a continuum of creativity as shown in Figure 6.

Design spaces	Everyday activities
Design for consuming	Shopping, buying, owning, and using
Design for experiencing	Doing and using
Design for adapting	Adapting, modifying, or filling in
Co-creating	Making and creating

Figure 6: New design spaces are emerging

In the future, all four of these design spaces are likely to simultaneously exist. Certain industries may become fixated at points along this continuum. Many manufacturing companies are positioned in the Design for Consuming Space, with a focus on producing products that people will choose to buy. In fact, this emphasis on consumptive activities has resulted in products such as multifunctional technology devices (*e.g.,* a cell phone/PDA/video camera) that have so many features and functions that they are difficult to use. In the Design for Consuming Space, it is important for your products to have more bells and whistles than your competitors' products, whether people will use these features or not. In the **Design for Consuming Space**, product and service design is market-driven as opposed to human-centered.

A **Design for Experiencing Space** is emerging now and is most evident in the domain of interactive media. The objective in this design space is to look at the entire experience domain into which the product or service fit. New design tools such as scenarios and personas are being used to inspire the design process. In some cases, (e.g., Grudin and Pruitt, 2002), the scenarios and personas are based on an informational research approach, but more often that not, they are simply used as points of inspiration for members of the design and development teams.

At the edge of practice are the newer **Design for Adapting Spaces** where people "fill in" the designed artifact to meet their own needs and dreams. Adaptive design spaces are being discussed mainly in research-based universities, large software companies, and on design-oriented Weblogs. Design for Adapting has been referred to as "loose fit" design (Rapoport, 1990), "underdesign" (Moran, 2002), "meta-design" (Fischer, 2003), and more recently as "design for hackability" (Galloway, Brucker-Cohen, Gaye, Goodman and Hill, 2004). The idea is that people can and will fill in the artifact to address their needs and fulfill their dreams. In fact, the less you give them, the more they fill in (McCloud, 1999).

How do you design for people to "fill in"? This does not mean simply leaving a product unfinished and then putting it out as a Beta test version so that lead users can find and report the bugs. It means learning how to build scaffolds to support and afford creative behavior by everyday people (Sanders, 2002).

Beyond the current edge of practice are the **Co-creating Spaces** where designers and everyday people work collaboratively throughout the design development process. New tools and methods for both research and design are required for co-creation. New roles and skills for designers and researchers will be needed as well. Co-creating spaces will become especially important in highly complex domains and for domains that fuel people's passions.

The co-evolution of approaches: Information and inspiration

The new tools and methods of human-centered design research are converging on the fuzzy front end of the design development process. But there is some disagreement as to how best to uncover people's unmet needs and whether or not it is even possible to have access to people's dreams. Human-centered design research done by researchers has tended to focus on the informational approach. Human-centered design research done by designers has tended to focus on the inspirational approach. Figure 7 shows the clash between information and inspiration at the fuzzy front end.

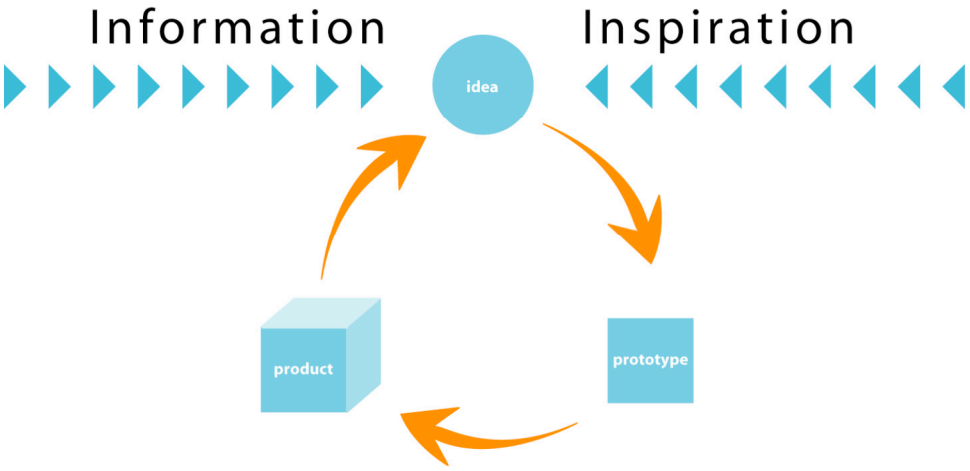

Figure 7: Information and inspiration at the fuzzy front end

Research that informs the design development process:

- tends to be conducted by people who are trained in research and/or the applied social sciences,
- has borrowed heavily from the scientific model of research with its adherence to the tenets of good research: reliability, validity and rigor,
- is built upon the results of investigation, analysis and planning, and
- relies primarily on extrapolation from past events as a way to move into the future.

On the other hand, research that inspires the design development process:

- tends to be explored and applied by designers,
- is discovering its own tenets of good research such as relevance, generativity and evocativeness,
- is built through experimentation, ambiguity and surprise, and
- draws primarily from the future and the unknown, using imagination as the basis for expression.

With regard to research for inspiration, one might ask whether this is research or design? There is certainly a blur of the two perspectives on the inspirational side. (See also Hanington 2003).

Research that informs the design development process has shown itself to be effective in the Design for Consuming Space with its emphasis on the "product". The Design for Consuming Space is reaching its useful limits, as can be seen in the rampant consumerism that has resulted from the reliance on extrapolative thinking.

Research that inspires the design development process has been useful in the newer Design for Experiencing Space. This type of research helps designers to develop empathy for the people they serve through design by revealing their emotions. Research that

inspires the design development process shows us that experience can be more meaningful than product.

It is useful to distinguish between the two design research perspectives since each offers different and relevant deliverables. But it is not useful to argue which approach is better.

	Information	Inspiration
Design for consuming	X	
Design for experiencing		X
Design for adapting	X	X
Co-creation	X	X

Figure 8: Information and inspiration in the design spaces

Figure 8 shows that both perspectives, information and inspiration, are needed in the emerging design spaces for adapting and co-creating. Both design research perspectives will be essential for meeting the opportunities and challenges the future holds. We need to understand the full range of experiences people have in order to meet their needs today and their dreams for the future. The distinction between research and design blurs in the emerging design spaces. The tools and methods must be capable both of informing and inspiring.

Design research practitioners from the US seem to be focused primarily on research for information. Much of that research has grown out of more traditional methods of market research and human factors, as well as the more recent applications of ethnography. Design research practitioners in Europe tend to be more focused on research for inspiration. Some of the leading work along this perspective is being done at the Royal College of the Arts (RCA) in the UK, Delft University of Technology in the Netherlands (TU Delft), and University of Art and Design Helsinki (UIAH) in Finland.

Cultural probes were first introduced by Gaver, Dunne, and Pacenti, from RCA. Cultural probes are designed to provoke inspirational responses from end-users in order to provide inspiration for the members of the design team. The probes include well-designed artifacts featuring "evocative images" and "oblique wording" so that the end-users immerse themselves in interpreting the probes and filling them out. The probes are typically sent to the end-users or left behind following a face-to-face visit. The end-users can then take the time to complete the probes on their own before sending them back to the design research team. Probes are usually well-designed in order to look like a gift. Gaver et al. are adamant that the use of the probes be restricted to "Inspiration, not information".

Tuuli Mattelmaki and Katja Battarbee from UIAH are exploring the creation and use of "empathy probes" which are similar to, yet evolved from, cultural probes. Empathy probes are used for gaining contextual understanding as well as empathic information about the user. Thus, empathy probes provide both information and inspiration for designers (Mattelmaki, personal communication, 2004).

Pieter Stappers and his colleagues at TU Delft have been exploring many varieties of "sketchy tools" and "inspiration interfaces" for designers (e.g., Keller and Stappers, 2001). One such tool in the video collage which consists of a combination of image sequences, video, sounds, music, etc. shown on a curved projection area. Details of the environment are omitted, while the relevant action in the video is highlighted. The goal of the video collage is to evoke for the designer, a sense of "presence" in an inspiring design environment.

Co-creation through understanding experience

How do we involve everyday people in the adaptation and co-creation of their future worlds? We must first understand their experiences (Sanders, 2001).

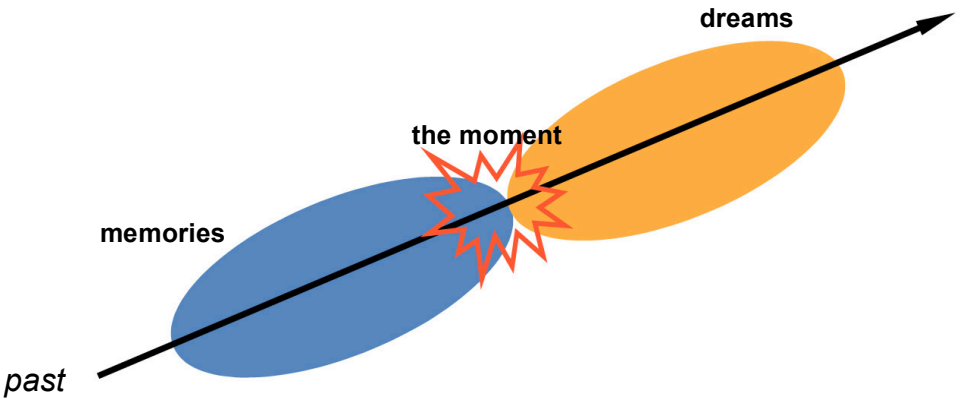

Figure 9: The experience domain

Figure 9 shows the components of the experience domain. Experience is a subjective event, felt only by the person who has the experience. Experiences that have already been lived and felt are called memories. Experiences not yet lived or felt, but imagined are called dreams. Experiencing is the point where memory and imagination meet.

In order to understand experience, we must explore the full set of experiences (i.e., memories, the current moment and dreams) that people have. Doing so requires that we explore not only what people *say* and what people *do*, but also what people *make*. Each route to experience reveals a different story or picture. Listening to what people say tells us what they are able to express in words (i.e., explicit knowledge). But it only gives us what they want us to hear. Watching what people do and seeing what they use provides us with observed experience. But knowing what people say/think, do and use is not enough.

There are new tools for human-centered design research that focus on what people *make*, i.e., what they create from toolkits we provide for them to use in expressing their thoughts, feelings, dreams and new ideas. *Make* methods enable creative expression by giving people ambiguous visual stimuli to work with. Being ambiguous, these stimuli can be interpreted in different ways, and can activate different memories and feelings in people. The visual nature liberates people's creativity from the boundaries of what they can state in words. Together, the ambiguity and the visual nature of these tools allow people room

for creativity, both in expressing their current experiences and feelings and in generating new ideas.

When all three perspectives (*what people do*, *what they say*, and *what they make*) are explored simultaneously, we are able to understand the experience domains of the people we are serving through design.

It is the *what people make* tools that are providing the vista to the new design spaces of adaptation and co-creation. To make the tools, we draw from an infinite set of visual and verbal components. The simplicity and ambiguity of the components is crucial. We put the design language components together into toolkits that people can use to express their memories, dreams, ideas, fears, needs, etc.

It has become increasingly clear that when we put all the *make* tools together, we can see a participatory design language that encourages everyday people to explore and express their thoughts and feelings about their experiences (past, present and future). This language gives them the opportunity to construct very early and rough prototypes of their dreams. We have seen in practice that people already know how to express themselves with the *make* tools. They enjoy the creative process. In addition, use of the *make* tools results in physical artifacts, such as collages, maps and Velcro models (Sanders and William, 2000) that are inspirational and informational not only to designers, but also to others involved in the design development process.

Where do we go from here?

The identification of divergent design research perspectives and the emergence of new design spaces raises many questions and challenges:

- How can we best balance the need for and use of information and inspiration?
- What are the additional tools and methods of the new design spaces?
- How will we educate and prepare young designers for the future?
- As design and research continue to blur at the fuzzy front end, will we need to rethink the design curriculum?
- Should we reorganize the design curriculum around human experience categories rather than around the materiality of the artifact?

The identification of divergent design research perspectives and the emergence of new design spaces also begins to reveal a terrain where our understanding of creativity, innovation and designing will be challenged by the new forms of collective creativity that appear.

- Will design and development teams accept that everyday people are creative?
- What will collective creativity look like?
- What tools and methods best afford collective creativity?

> *"People need not only to obtain things, they need above all the freedom to make things among which they can live, to give shape to them according to their own tastes, and to put them to use in caring for and about others."*
>
> (Ivan Illich, Tools for Conviviality, 1973)

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