Design ecosystems as the landscapes for co-creation

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ABSTRACT

This paper presents a very compact view of design, design processes and practices that forms a foundation for the concept of the design ecosystem. Design ecosystems are systems of connected and interacting designs, organized by the practices of the human participants of the ecosystem. The design ecosystem forms the context for any new designs and to creative activities, thus forming also the landscape for co-creation. Practices are also designs, and the design and adaptation of practices is the most common design activity for most people. Practices have an individual and a social dimension. New design is always based on earlier available design which forms the design toolkit. The abstract space of possible designs that can be achieved with the current resources, capabilities and constraints is the design space. Design platforms are dominant components especially in digital design ecosystems. These concepts are helpful for supporting a design-oriented analysis of diverse everyday life phenomena and provide tools for discovering opportunities for design.

KEYWORDS

Design Theory, Design Philosophy, Design Ecosystem, Design Toolkit, Design Space, Design Process, Design Platform, Evolution of Designs, Design Evolution, Emergent Design, Practices, Individual Practices, Social Practices

OVERVIEW

In this paper I introduce a set of concepts that I believe can be useful for understanding and analyzing the circumstances of co-creation and of everyday life phenomena from a design point of view.

I am proposing a set of concepts that are all linked to the phenomenon of *design*. The word ”design” is used to convey many meanings: phenomena, processes, activities and outcomes. As this can easily lead to confusion, I will make an effort to clarify how the word is used in this discussion. In

addition, I will discuss concepts such as *design ecosystem*, *design toolkit*, *design space* and *design platform*.

As a starting point, I propose that it is useful to consider the creation and emergence of *all kinds of structures and things* as *design processes*, and their outcomes as *designs*.

This gives us a common framework for seeing parallels between such different processes, and it makes it easier for us to consider the crucial roles of the ecosystem of other designs and of the different actors present in these design processes. It will also be easier for us to consider and design changes to these processes, if we have better tools for conceptualizing them in more unified ways.

Due to space constraints, I must concentrate on presenting my point, and I am not able to present the diverse other views and the intellectual history concerning these topics adequately well in this paper; I apologize for that.

WHAT IS "A DESIGN"?

The most common idea of design is probably connected to industrial production and to the creations of well-known designers. For example, we may recognize a famous design and even know the designer's name. Or, we may consider that a certain company is famous for paying special attention to the design of its products. In such a context, 1) a design is a description of a product that will be produced by a mass manufacturing process; 2) the design is created by a professional designer, who is typically educated in a design institution; 3) the design process is initiated and commissioned by the enterprise (the client) that will make and market the product; 4) the designer receives instructions from the client and a compensation for her contributions.

While there are an infinite set of variations of this pattern in various fields of design activity, these 4 main points fit well a very large class of design activities taking place in the world.

However, there are many kinds of design activities and processes that differ from this pattern, and it is a key aim of this paper to highlight their significance.

Design literature and design professionals do not have a clear consensus of what constitutes design. There is no single definition of design that the field would accept unanimously. The attempts to define design tend to either focus on the pragmatic point of view of describing what professional designers do, or to attempting to create a more abstract definition that

would embrace the much wider space where design is seen, and could be seen, to operate.

My approach belongs to this latter direction, and I admit upfront that I will take it to extremes, but for what I believe are good reasons.

The greatest difference in my position compared to most definitions of design is that I believe it is more useful to *connect the idea of what design is to the designs* that are created in various design processes, rather than to the characteristics of a creative intentional design process.

What this distinction means in practice is that *I believe it is meaningful to consider something that exists in the world and exhibits design as a design, regardless of how that design came to be*.

The other approach that focuses on design as an intentional creative activity will consider something as a design *only if it was produced by an intentional design process*, which always requires the involvements of human beings, and at least some extent of intentionality towards producing a design. This leaves out processes where humans are not the main actors and those where design-like results emerge without clear intention, as well as subjects the whole discussion to the ability to find out how the design came to be.

In this paper, I will call my approach as the *wide idea of design*, and the other one as the *narrower idea of design*.

Thus, according to both of these approaches, an industrially produced chair has a design. Instead, a spider's web has a design only according to the wide idea of design, while according to the narrower idea of design the design of the web is not intentional and thus does not count as a design.

The benefit of the wider idea to this discussion is that it enables us to discuss a much wider set of things as designs, and to consider a much wider set ot processes as design processes. This view is in my opinion a prerequisite for a realistic discussion of designs, because designs that exist in the world have their impact on it regardless of how they came to be. By separating the designs artificially into completely different categories based on whether they were intentionally designed complicates the analysis and obscures important characteristics of the systems that these interacting designs form.

While I am not the only one taking a wider stance to design, I believe that as I take it to extremes, I can not claim that anyone else agrees with my view at this point. Very wide understandings of design are exhibited for example in the following writings (Cross 2011; Dennett 1995; Krippendorff 2006; Nelson and Stolterman 2012; Papanek 1971; Steadman 2008), and

some of them offer significant support to my position. Unfortunately, a detailed analysis of the differences does not fit into this paper.

Also unfortunately, I can not yet present a clear definition of what is a design. I have many questions in my mind regarding where to draw the boundaries of that concept. However, I can provide list of examples of things that I believe do have a design:

- a chair
- a human being
- spider's web
- marriage
- parliamentary democracy
- intellectual property law
- Einstein's theory of relativity
- Japanese language
- my personal digital ecosystem
- my practice of making breakfast

Thus, for the next sections of this paper, I can summarize that according to my position, in addition to such things as artifacts, also language, music, concepts, systems, practices, organizations, regulations and human beings count in my discussion as things that exhibit designs.

A chair is not a design, but it has a design. The design consists of characteristics such as

- structure or form
- properties, functionality or behavior

THE DESIGN PROCESS

Based on the idea of design presented above, what then is a *design process*?

In my view, designs (as explained above) come to be through various kinds of design processes.

One kind of a design process is the intentional, professional, industrial design process described above. However, this kind of a process is responsible for only a minuscule minority of all designs in the universe.

Most design in the universe is *emergent* – designs have emerged through some kind of evolutionary process. Most people are familiar with the idea of Darwinian biological evolution, but evolutionary theories are also used to

explain the formation of other, non-biological, aspects of our material reality. Cosmic evolution describes the evolution of stars and planets, chemical evolution describes the evolution of various chemical substances, geological evolution describes the evolution of continents, seas and various geological strata of our planet (Chaisson 2007; Christian 2011).

The current consensus appears to be that biological evolution became possible after cosmic, chemical and geological evolution created appropriate circumstances for the emergence of life. Biological evolution has proceeded very rapidly compared to the earlier evolutionary stages and altered the design and characteristics of the earth very much. After human beings appeared, as products of biological evolution, the most powerful evolutionary process has been cultural evolution, which has had even more rapid and profound impact on the earth (Bellah 2011; Boulding 1978).

These various evolutionary processes are all design processes. My position is that these *theories of evolution are theories of the evolution of design*.

A key aspect of all evolutionary processes is that they include mechanisms for reproducing designs and thus making them persist. All designs are built on and made possible by earlier persisting designs. All designs that can be reproduced and can persist, thus create new possibilities for further design that builds on them. This makes another key aspect of all evolution, the *accumulation of design*, possible (Dennett 1995).

As mentioned above, emergence of life required certain circumstances that were created by earlier cosmic, chemical and geological evolutionary design processes. Emergence of human culture required the emergence of the design of the human species and many of its design characteristics, such as a mind that is supported by a large and flexible and versatile brain, created by biological evolution.

The emergence of human beings made, arguably for the first time, intentional, or at least large scale cumulative intentional design possible (the extent of design and its intentionality among other species in the animal kingdom can be debated (Hansell 2009); however, it is clear that no other species has similar abilities to communicate and accumulate designs, which makes the design of humans so efficient and impactful).

Thus, for those in favour of the narrower idea of design, there was no design in the known universe before the emergence of human beings.

In my view, design did take place before humans, but human beings and their ability to design intentionally has been a great leap in evolution, as intentional and culturally cumulative design has made the evolution of cultural designs radically and dramatically faster than the mechanisms of earlier evolutionary processes.

Human communication, learning, division of labour, collaboration, specialization, and the ability to design in imagination as opposed to only trial and error are examples of characteristics that make human cultural evolution of designs different from earlier evolutionary processes, and so efficient and impactful.

Cultural evolution thus differs from non-human evolutionary processes because of special cultural traits and because of purpose and intentionality. However, all cultural designs have most probably not come to be as results of very purposeful and intentional design activities. Many characteristics of human life and practices share a common ancestry with other animals, and have deep history in our evolutionary origins. Equally, even the purposeful and intentional design activities produce designs that may or may not be adopted by the society, depending on their compatibility with various other characteristics of life and existing practices and needs that are subject to various evolutionary pressures.

Thus, even the intentional design of humans still exists embedded firmly within an evolutionary framework of cultural evolution.

Based on this, what can we say of design processes? We know all kinds of things about how intentional design works. We also have studied human history, inventions and many other aspects of society and its evolution. Biologists and ecologists are exploring how the designs of organisms and their behaviors and practices have come to be. Various sciences are considering the other evolutionary processes. However, due to the scale of the variety of designs and their origins, there are only a few things that we can attribute to all design processes:

- all designs come to be and persist within an evolutionary context
- all designs build on earlier designs that make them possible – design can not make sudden leaps over required steps

What is the significance of this wider idea of design to the study of intentional human design?

When we expand the idea of what a design is and what kinds of processes create designs, we can have a more open mind to seeing designs in society and to studying their design processes without the handicap of always having to find the intentional designer. If we do not worry about the intentionality and can accept various structures and forms as designs even if they have emerged in a process we can not understand, we can take them better into account as things that have the same kinds of impacts as intentional designs do. Even if a design has emerged without us knowing its designer or the details of the process that created it, we can still aim to take advantage of it as a building block, or as a model, and for example modify

it. If we think of all such structures as designs, we may be able to better take advantage of the various parallels and analogies they and their various evolutionary paths may show.

My position is also that the wide idea of design is necessary because it lays an important foundation for our understanding of ability and need to design as a fundamental human charateristic and builds support for the idea that it is necessary to consider that human beings should have a fundamental right not only to enjoy culture but to design new culture, based on the culture that exists.

PRACTICES AS DESIGNS

The wider idea of design I promote here also considers that things such as social and individual practices are designs, regardless of whether they evolved through intentional design activities or emerged in some undocumented social or individual process.

That a practice can be thought of as a design is easy to accept in such fields as service design; it is not hard to accommodate the thought that the way how a service is delivered in the form of some practices is intentionally designed and exhibits a regular set of forms, that can easily be accounted for as a design.

While there is a lot of recent literature about practices (Reckwitz 2002; Schatzki, Knorr-Cetina, and Savigny 2001; Schatzki 1996, 2002; Shove, Pantzar, and Watson 2012), the contributions do not usually take a design point of view towards them. Notable exceptions: Korkman (2006), Shove, Watson, Hand, and Ingram (2007).

In any case, my position is that practices can and should be understood as designs, because 1) they show characteristics common to designs; 2) they have similar origins as other designs; 3) practices are the most significant arena where everyday life design by each of us takes place; and 4) it helps us to understand better how everyday life comes to be and what kind of complex co-creation activities and relationships these processes include.

Practice is a very worthwhile concept that helps us to understand better what people do and why, and why they do it in some particular way, and what are the roles of the artifacts that are employed within the practice.

Practices and artifacts have a tight relationship: artifacts have no role in life outside of practices. Every artifact comes into contact with people and used through their practices. An artifact that is not part of a practice of a person does not have any connection to the person. Practices also join artifacts to

the purposes, aims, motivations and thinking of their users (Schatzki 2002).

By considering the emergence of practices both as social and invidual phenomena as a design process with intentional and emergent features helps us to get a better picture of the evolution and emergence of practices and thus also of the way how the roles of artifacts evolve in everyday life.

Practices are both learned and imitated from others, as well as developed by individuals. Practices have an *individual* and a *social* dimension. Practices are social when they are shared with others, but when an individual participates in the shared social practice, she must by necessity perform an individual version of that practice, as no two people can possibly perform any practice exactly the same way. Thus, the development of the ability to perform and thus reproduce the practice individually is a prerequisite for the individual to be able to participate in the social practice at all. In addition to the repertoire of social practices, people also develop their own individual practices that may or may not be socially shared, or are shared to a greater or lesser extent.

Social innovation is largely about the *spreading of novel practices among some communities*. This may happen so that individuals develop various protopractices that are imitated and further developed by others, and through both intentional design and evolutionary emergence, some forms of the practice, supported by appropriate artifactual design, emerge as new social practices that count as social innovations.

Among individual practices, there are probably large numbers of practices that are in diverse forms many times reinvented by disconnected individuals and that do not persist as social practices in their communities, and may never be even seen by others.

The so called *lead users* (Eric von Hippel 2005) are people who have strong special interests to develop new practices as well as influence the development of the artifacts that can support those practices. In the same vein, *if we are able to develop our sensitivity to the evolution of individual and social practices that takes place in society, also when we can not clearly find appropriate ”lead users”, we can maybe identify promising opportunities for new artifact or service designs to better support the novel emerging forms of practices*.

DEFINING THE DESIGN ECOSYSTEM

Based on the concepts introduced above, *design ecosystem* is a new term I introduce to describe the conceptualization of a topic of interest together with the context where the topic of interest exists or happens. *A design*

ecosystem is a unique, specific and particular set of interacting and connected designs. The designs to be included in the consideration can be for example artifacts, practices, people, networks, organizations and communities. The components of the ecosystem typically have a diversity of dependencies, connections and flows between them. The most important components that organize design ecosystems are typically the practices of their human participants.

As the design ecosystem is an instrument of study, the knowledge interest of its user will need to determine how the boundaries of the study will be determined.

For example, if we want to study everyday life of an individual, the design ecosystem of everyday life is a system that consists of the various designs that the individual interacts with, with all their dependencies and connections. We can select a narrower topic, for example an individual's kitchen or cooking ecosystem, or an individual's media ecosystem, and include in this design ecosystem those components that are relevant to this topic of interest. When studying a design ecosystem with a tighter focus such as "cooking" or "media", it appears as unnecessary highlighting to keep repeating the word "design" if it becomes clear from the treatment that a kind of design ecosystem is being discussed.

The topic of interest could also be tied to some other kind of entity – we could study the design ecosystem of a group of people or an enterprise.

WHY IS THE DESIGN ECOSYSTEM A USEFUL CONCEPT?

The design ecosystem is an intellectual instrument for studying things and the activities they belong to together in a way that, through the inclusion of practices as the designs that organize the ecosystem, also opens up the reasons for their connections and dependencies as well as the motivations, purposes and intentions of the people involved.

If we consider the everyday life of an individual, it is a continuum that evolves continuously throughout the individual's lifecycle, from birth to death. When a child is born, she is born into a design ecosystem, established by her parents. Gradually she develops her own capacity to form and evolve her own design ecosystem.

The design ecosystem is in itself a complex design that evolves as a mix of intentional, externally imposed and emergent changes. Generally people strive to maintain continuity within their ecosystem, in order to be able to sustain important practices and avoid wasting work and design efforts, and to be able to direct their efforts to activities according to their own priorities. As part of such strategies, people acquire and furnish homes that

support their own lifestyles with appropriate selections of artifacts and other resources. When new practices or new artifacts enter the ecosystem, their inclusion requires changes and adaptations. As components of the ecosystem have various dependencies, it is sometimes complicated to replace existing components with new ones, as their features and interfaces to other components may not be exactly similar.

The importance of understanding such dependencies and systemic connections between components has grown dramatically because of digitalization. *Digital components have a dual nature as flexible and rigid at the same time*, due to their digital programmability. Because they can be programmed, they can in theory be designed to be *extremely flexible and infinitely customizable*. However, as their functionality depends on very strict conformance to a linguistic grammar and their programmable *flexibility depends on the ingenuity of the software designers to express the intended flexible ideas in strict conformance with the available software platform* (e.g. a specific version of a specific operating system), they are also tied very rigidly to *design rules* established by their design ecosystem.

Digital components are thus much more deeply and dependently connected to each other than non-digital ones, and their ability to deliver their expected services depend significantly on their ability to communicate and work with other components in the ecosystem.

These dependencies are also a significant source of power for those parties who are in a position to decide about the designs of those components that function as the enabling gatekeepers for other designs: the *design platforms*, e.g. operating systems (Windows, OS X, iOS, Android) and key internet services such as Google search, Google Maps, Amazon, and Facebook. Platform owners may have the power to decide alone dictatorially which features, which services, or even which partners they support and allow to contribute to the customer's design ecosystem. For more about platforms in general, see Gawer (2009).

DESIGN TOOLKIT AND DESIGN SPACE

When someone engages in design, their ability to design depends heavily on what earlier designs they have available to them as raw materials for their design. The more sophisticated, capable and useful designs they can build on, the more sophisticated their own designs can be. Such existing designs in any design situation form the *design toolkit* for further design. The concept of design toolkit is in widespread use, but here I claim that it is useful to consider that *every design situation always relies on a specific*

design toolkit, and that its characteristics can be analyzed to gain a better understanding of the design situation.

When someone engages in design, *the abstract, theoretical space of possible design outcomes that are possible to achieve, forms the design space* in that particular situation. The design space can change, extend or contract by introduction of new designs into the design toolkit, by their removal, by the introduction of constraints or freedoms, or the addition or removal of resources or capabilities (Botero, Kommonen, and Marttila 2010).

In the context of everyday life, the *central design activity of individuals is the design and adaptation of daily practices to changing circumstances, as well as the longer term design of various life projects* (Shove, Watson, Hand, and Ingram 2007). In these activities, *their design ecosystem effectively forms their design toolkit, and at the same time largely determines their design space*. Certain individual components of the design ecosystem, e.g. *the design platforms, have much significance in determining the qualities of the design toolkit and the design space*.

DESIGN ECOSYSTEMS AS LANDSCAPES FOR CO-CREATION

The discussion of design in the beginning of this paper can now be connected to the topic of co-creation. When we are discussing something like the creation of consumer products or services, it appears from the point of view of an individual as an offering to extend their design ecosystem with a new component. In order for them to include it in their ecosystem they will need to always make space for it and adapt their ecosystem to connect to the new offering. Hence the acceptance of an offering always entails also a reciprocal act of adaptation and thus, design.

If I decide to have a dinner in a new restaurant or to buy a new mobile phone app, these offerings will not become part of my life without some kind of adaptation of my practices. Hence even the smallest change requires some kind of a creation effort from my part. How much, and how convenient and how motivating this is for me, depends on the compatibility of the offering with my unique and idiosyncratic design ecosystem. If the offering is more complicated, for example something where more significant design is meaningful, the importance of compatibility and avoidance of wasting earlier design effort and redoing of work increases.

Thus, the design ecosystem of an individual forms a unique landscape where her creative actions always take place, and where the makers of the offering have to tread carefully and avoid disrupting existing designs,

couplings and practices, and instead find ways to support and strengthen the sustainable and fruitful evolution of the ecosystem and its resources.

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