

Design Research for Social Scientists: Reading Instructions for This Issue

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This issue explores an issue little known for most social scientists, design research. More specifically, it explores the more technical end of design research, research conducted in industrial design programs in leading art and design universities, technical universities, and software research programs. Unsurprisingly, most papers have a North American and Northern European origin, reflecting not just the traditional location of the design intensive industries, but also the

spatial location of design-related activities in information technology industries. Design is a growing occupation. Also, design education is growing.

To this issue, we have collected papers that, at least to us, represent some of the best pieces of ongoing work in that field. Since we are well aware of the fact that most social scientists are not familiar with design research, this introduction will situate the papers to that field, and also suggest why this field of research is interesting for a social scientist in the first place. In brief, we suggest a symptomatic way of reading the issue: We are describing research that has grown from small beginnings into something that can be called a possible new science. It is also an exploration into multidisciplinary: Its origins are multidisciplinary, its future will in most likelihood be multidisciplinary, and at present, it looks like no single discipline will dominate the field in near future. The field is not necessarily a very multicultural field, which is largely explained by the fact that design research is typically conducted in the advanced, information-technology-producing economies of the world. However, it is multinational, as this issue amply suggests. For a social scientist, design research no doubt represents a *déjà vu* experience: In browsing this issue, any psychologist, sociologist, and even economist will no doubt see just how much thinking designers borrow from these parent disciplines, even if it has to be said that these loans are often inexplicit.

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Technology Has Its Origins in Society

Perhaps an obvious but a most interesting observation, what comes to this issue is the notion that technology has a beginning. As the great Dutch historian of technology Bijker (1995) has argued, technologies are flexible for a long time before people start to see them as fixed, factual things. This view is expressed by many historians of technology, including Hughes (1983) and the philosopher and sociologist Latour (1987). This view also applies to a more ordinary level. Anyone who has been working with engineers or designers knows that they do not see technologies as ready-made things, but as proposals done by someone. Institutionalization into something self-evident and taken for granted is a fairly late stage in the lifecycle of any given technology. Even then, technologies can still be changed. For instance, although Los Angeles may be the quintessential car culture, it had one of the world's great streetcar networks early in twentieth century. Although the streetcar network has disappeared, this does not have to be so. With new technology, increasingly congested freeways, higher oil prices, and a good dose of entrepreneurial spirit, it is possible to imagine a LA on rails rather than on wheels.

The important point is that as technologies are made by people, their fate depends on many types of social organizations. For people in design and engineering, this is self-evident; looking at technology through their eyes is much like looking at life in foreign countries through anthropological eyes. What first appears chaotic and incomprehensible begins to make sense when one learns how designers relate to technology. The way in which technology develops is deeply in debt to society and its ways of thinking. Although in policy in particular, we tend to think that technology has its origins in science, this is only partially so. Just as often, its origins are in society, in the actions of entrepreneurs, politicians, and masses of people organized through the market into new opportunities. Flickr was a response to the fact that millions of people wanted to share their digital photos with their friends, acquaintances, and in some cases, with an unnamed cyberaudience.

As this issue shows, engineers and designers build on many social institutions. In their work, they skillfully combine knowledge of the social sciences, psychology, marketing and even art into science and technology. In fact, we would like to propose that

there is no technological development that is not somehow in debt to the social sciences, broadly understood. Designers and engineers do not live in a bubble outside society. Rather, they live in organizations and other environments through which they come to create visions of society, and through their work, they come to make their versions of society real for the rest of us.

When reading this collection of papers, it is good to keep in mind that a good deal of design and technology never comes to the market. It is not always even meant to come to the market. Research laboratories, research centers of major companies, and research universities offer facilities that make it possible to create and maintain liminal worlds that are in many ways much like the theoretical worlds that surround people in the social sciences. Designers' and engineers' worlds are just tangible: they consist not so much of ideas, but of machines, computer memories, electronic components, and a whole variety of models. For example, major corporations like Intel, Nokia and Philips use resources on design research because it is a cheap way to fail. Their logic works much like Karl Popper's falsificationist philosophy of science. After testing several hypothesis, the remaining one is still probably wrong, but since it has survived the test of data better than its competitors, one can build on it slightly more confidently than on those hypotheses that failed. Work published in this special issue has its origins in these liminal worlds.

A Brief History of the Social Sciences in Design

Interestingly within design practice, a space for research, including the social sciences, was created already in the first major schools of industrial design. As the founding father of Bauhaus – and through Bauhaus, modern design education – Walter Gropius, an architect by training, defined the task of design in *Principles of Bauhaus Production* [Dessau] already in 1926 as “the Bauhaus is seeking – by systematic practical and theoretical research in the formal, technical and economic fields – to derive the design of an object from its natural functions and relationship” (Gropius 1926).

The spirit of research was brought to the United States early. When László Moholy-Nagy moved to Chicago and established the New Bauhaus, linking it

to the Armour Institute of Technology, now known as the Institute of Design at Illinois Institute of Technology, he also brought the idea of linking the social sciences to design. In his book *Vision in Motion*, he writes:

... human history is much too short to compete with nature's richness in creating functional forms. Nevertheless, the ingenuity of man has brought forth excellent results in every period of his history when he understood the scientific, technological, esthetic, and other requirements. This means that the statement, "form follows function," has to be supplemented; that is, form also follows - or at least it should follow - existing scientific, technical and artistic developments, including sociology and economy (Moholy-Nagy 1947).

Similarly, in Europe, designers followed developments in the social sciences and philosophy. For example, Tomás Maldonado, who was an important figure in design education in Ulm, Germany, was quite influenced by neopositivist thinking, i.e., the Vienna Circle of Carnap, Neurath, Schlick, Morris, early Wittgenstein, and several others, in their quest of laying the foundations for a solid methodological basis for design by borrowing from the sciences. However, Ulm gradually became influenced by critical theory developed in the Frankfurt School, including Adorno, which created tensions in design education in Ulm. Design schools and institutions were not free from the radicalism of the 1960s and the 1970s, giving headway to usually Marxist philosophy among the student bodies all over the industrialized world. Even today, European design thinking borrows from philosophy, for example, the phenomenologists in Europe (e.g., Merleau-Ponty 1962) and the pragmatists in the USA (e.g., Dewey 1934), linking design to culture and society in contrast to the mainstream of American education, which has a practical orientation that links education to technology and the marketplace.

Below these broad streams of thinking are sub-currents that have become more important over the last few years, by and large accounting for the increase in design research as we see it today. More than 50 years ago, Henry Dreyfuss introduced ergonomics to designers (Dreyfuss 1955), which at that time represented a radical departure from aesthetically oriented industrial design of people like Norman Bel Geddes and Raymond Loewy. In the sixties, the idea of introducing

scientific thinking and procedures to design again was linked to changes in the wider intellectual landscape of the decade. Inspired by systems analysis and formal approaches, the so-called Design Methods Movement (primarily) in the UK in the early 1960s worked with formalizations of design methods and processes. Initially, a response to the limitations of the drawing as a way of representing and dealing with complex problems in increasingly multidisciplinary design work, scholars such as Alexander (Alexander 1964) and Jones (Jones 1970) proposed various formal approaches that were aimed to make design activity more transparent and open for collaboration. However, this particular effort was short-lived; the idea of formalization as such – analysis rather than synthesis – seemed to have taken over, and design proved to be resistant to any attempt to reduce it to such process thinking.

At the moment, design research is linked to the social sciences indirectly through information technology. When personal computers were introduced to the market in the 1980s, IT industries faced a new kind of problem. Before that time, computers were used by operators in organizational settings, including hospitals, universities, and research laboratories. When personal computers spread to households and local area networks to the workplace, industry faced the need to study new kinds of users, who were far less technologically savvy. All of a sudden, it was important to understand the user behind his personal computer, and teams and organizations at the workplace. Methods needed to understand social aspects of work came from cognitive psychology (see Norman 1988; Nielsen 1994) and sociology, especially ethnomethodology (see Suchman 1987). Today, with mobile, ubiquitous, embedded, and tangible technologies, this call for social science understanding is even more acute, and has given rise to not just new types of research, but also new kinds of occupations. The best examples of these occupations are probably usability engineering and interaction design, both still amorphous, but clearly existing job markets and identities. For example, ethnographic methods have become a legitimate and institutionalized part of a good deal of design practice. Moreover, these shifts even changed the role of designers and their relationship with the user. In the past, these relationships were generally of a rational type, i.e., in this platonic organization, the design team and manufacturers have superior knowledge at their proposal, from

which they deduce the decisions about the environment and to steer the environment through their designs, so they determine what is good for the user, or this relationship could be characterized as integrating, i.e., the designer looks after the interest of the community as well of the individual, by designing a compromise that is acceptable to the majority of users, which means a 'passive' participation by the user in the design process. Nowadays, we see the user more actively involved through participatory design, which requires direct involvement of users in analysis and design activities throughout the process.

As the collection in this issue shows, many types of designers have built on these movements. Designers and engineers borrow liberally from the social sciences and create new, often hybrid forms of knowledge production by linking their new learning to their design skills. For example, as Hummels' paper shows, there is a whole stream of research flowing from hedonic psychology. Or, as Ernevi et al's paper witnesses, some designers borrow ways of thinking from philosophy and art.

Observations From Articles

When we look at the articles in this collection, what determines what knowledge will be pursued within 'design research', is not necessarily what other research disciplines find to be scientific but what knowledge design researchers, design professionals, and perhaps especially design education find important, relevant, and even necessary for the advancement of their practices. Though this may sound like a pragmatist's approach to research – which it might, but definitely need not, be – this is just to say that while there are several established notions of what makes something scientific, ambitions to completely fit within any particular existing framework is likely to be of secondary interest here although there are strong ambitions to build on more general ideas about science and research as to foster a solid knowledge discourse. Within the fairly new field of design science, design researchers are still exploring the boundaries of what science means from a design perspective; for example, some researchers consider their products/prototypes as being a physical hypothesis and testing them as a hypothesis-generating method.

This is in itself not groundbreaking: after all, most research areas have developed as a response to certain

theoretical, methodological, and even practical concerns and few researchers refer to notions of a unified science in their daily work as we accept and live with these differences. Nevertheless, it might be that these special interests and concerns of design research sometimes make little sense to the social scientist, at least if read from a social science point of view. Typically, they find their meaning in relation to an evolving design practice. It is on basis of this practice one needs to understand how it is not only possible but sometimes plausible to, for instance, simultaneously pick up ideas, theory, methodology, etc. from such diverse areas as sociology, economics, and art.

Although design research is, and will be, governed by its own concerns, there are reasons for the social scientist to not only take a better look at what is going on, but perhaps also to engage in this development. A central reason is that although design research might be developing towards its own agenda and success criteria, there was already from the start a certain space for other kinds of research established within it, and this is a space that continuously grows. The thing with this 'space', however, is that we so far mainly have seen design research borrowing from other disciplines. We believe that this condition is likely to change as design research gains both volume and momentum. To the social scientist, this opens up for engagement in design research beyond exporting existing theory and methodology.

- One place new knowledge might be gained is to investigate how ideas, theories, methods, etc. from the social sciences turn up (and out) in this context. While design research perhaps cannot be considered to build on such research in the sense that it extends existing knowledge in ways a social scientist would do it, there are clear traces of its influence that can be examined. In some approaches, there is an influence from, for instance, actor network theory, whereas in others we may find traces of critical theory, behaviorism or cognitive psychology – just to name a few. Such influence is worthy further exploration – not to make sure that the theories are used the 'right' way, but as a kind of evaluation of what such theories bring into the world. In terms of disciplinarity, there seems to be a knowledge transfer going on that is not only a matter of knowledge moving from one discipline into

another, but perhaps more interestingly a knowledge transfer from an area primarily concerned with describing the social material world to an area engaged in creating, producing, and transforming it.

- One might also ask to what extent this transfer process could be made to work in the other direction as well, i.e., to what extent there could be a space for design research within social science. Though this might sound as a strange thing to attempt, consider, for instance, the debate on ‘authorship’, or indeed the notion of ‘experimental design’ as used to describe how empirical studies or experiments are set up. Here, we find small elements of design embedded in practices not understood as design practices. To what extent could such elements be developed as to open up for working with ‘design’ in new ways also within social science, or how could they be used to open up for new relations between social science and design research?
- Further, if we see that theories and methods from the social sciences are being picked up, transformed and used in design research, what would it mean for the social scientist to work more closely with this process from the start, e.g., by developing new theory not from the outside, but from the inside of design projects? Methods for being embedded in, and participating in, practices as part of the research process have long been important to social science, and, considering some of the research reported here, it might be that new such possibilities are being opened up now.

As with any “new” kind of research, the question of what kinds of results and knowledge it yields must be discussed and debated – but we also need examples as illustrations to be able to discuss such matters, collections of examples we at this point only are beginning to create. Thus, we would recommend the curious reader to not dwell too much on the issue of whether design research is up to the standards of social science or not, but instead think of the papers presented here as an invitation to a deeper dialogue and extended engagement.

Technology and Policy in Design

As the articles show, technology is ubiquitous in design. Most papers in this edition go far beyond the

skills of average social scientists in technical and artistic terms. Most papers aim at creating technical solutions to social problems like aging, as Zimmerman et al. show. Typically, design researchers work close to software engineering and sometimes, electronics, as Ernevi et al.’s paper shows. In many cases, what distinguishes design research from the social sciences is its close link to technology and the fact that the social sciences have a subservient role in design. Design researchers do not aim at advancing knowledge in sociology or management science, but utilize well-established theories and practices from those disciplines to advance technological development.

The issue of politics is more difficult to describe in design research today. Unlike many earlier theories – with figures like Maldonado, and the early Participatory Design movement – there is little explicit political theorizing in design today. Many researchers accept their role in economy and do not question the legitimacy of contributing to the existing economic order. However, although at the moment design research can hardly be said to be politically motivated, there are many types of political strands in design. Take the case of Ernevi et al.’s paper, which starts from an ecological problem, energy consciousness. It uses a mixture of design, artistic thinking, and knowledge of electronics to explore how people could be made more conscious of the implications of their behavior to electricity consumption.

A good deal of the politics of design today takes place at higher institutional levels. For instance, a good deal of research reported here is funded not by purely academic sources, but rather by corporations like Philips and Nokia, by governments, by institutions like European Union, or – more typically – by a combination of all these. In addition, governments are trying to incorporate design in their debate on how to shape our society. Throughout Europe, Horizon Scanning Centres are established based on the UK Foresight Programme, which aim to provide challenging visions of the future to ensure effective strategies now by providing a core of excellence in science-based future expertise and access to leaders in governments, science, and business. Designers and design researchers are explicitly invited for these multi-disciplinary initiatives.

At a more philosophical level, one could argue that design research by definition is political. The reason for such a bold statement is that its primary product, the designed artifact, is contingent (from a scientific point of view, that is). Design projects and outcomes

could always have been done differently: As we deal with the man-made, there will always be decisions regarding what to create and what not to, and there is nothing ‘given’ for us to simply observe and describe. In this sense, design is normative and, hence, political. In some cases, this is more evident in others: there are strong normative arguments in favor of a given position, e.g., in favor of a certain set of values one should be designing for. In other cases, this is less evident as such arguments are not explicit, but rather follows from taking a certain stance in relation to what to design for and how.

For example, looking at kitchen appliances throughout the last centuries reveals the relationship between products and society beautifully. A mechanical hand mixer with a porcelain bowl from the nineteenth century could express and support the nineteenth century view of the home as a place of beauty and virtue. At the beginning of the twentieth century, the focus shifted towards physical welfare and health, and the technical possibilities were used to obtain efficiency and functionality. The first electronic food mixers look like industrial machines, which were made to be only efficient and reliable (Forty 1986) because they were affordable only by the upper class, and ‘merely’ used by their servants, so appearance and comfort was not considered significant; it even confirmed the inferior position of the servants. Simultaneously Bauhaus, purism and constructivism advocated in the beginning of the twentieth century the aesthetics of the machine to improve the quality of life for all users (Heskett 1980). This principle was later used by manufacturers of, e.g., kitchen appliances, to express that the middle class could live like the upper class, with the appliances as servants. In the 1940s and 1950s the kitchen was packed with streamlined electrical appliances styled on the basis of symbols of progress, such as cars and airplanes, to support progressive living. In the late 1950s, Braun introduced the adage ‘form follows function’. They aimed for a neutral and harmonic aesthetical quality to allow users to create their own image of the product. In the 1980s the development of technology intensified and booming practices of management, economic gains, ‘time is money’ and ‘knowledge is power’, were supported by cognitive-oriented interfaces and new products such as the microwave. Simultaneously, the post-modernist movement ‘Il Nuovo Design’ criticized the social differences and concepts such as power, functionality,

and self-interest and advocated concepts such as diversity, discontinuity, ornaments, and color.

Thus, yet another way to see how this research is situated politically is to see how deeply it depends on – and relates to – the specific living conditions of the western world. Much of this research has a rather limited value to, for instance, the development countries, as it presupposes not only certain technical infrastructures, but typically also certain cultural frameworks. How to highlight and critically examine such hidden assumptions in design and technology development is probably one of the more important contributions of social science to design researchers, thereby also highlighting its political dimensions.

What Does Design Research Teach for a Social Scientist

The question this Special Issue poses for a social scientist, of course, is whether it pays off to get an idea of design, yet another field of research. We reply, “it depends”. For someone interested in the impact of technology on society, design may not be the best place to go. However, for those who want to understand the social origins of technology, as well as for those, who want to understand how technologies come to existence in the first place, design and design research open fascinating sources of information.

More than that, design research open accessible windows to technology, unlike more esoteric fields of research that are often so different from training people get in the social sciences that they may be virtually incomprehensible. Koskinen faced this dilemma in 2002, when he realized a difference in how he and a colleague from a technical university talked about the JPG image file format. In one of his studies on mobile multimedia phones, Koskinen was talking about JPG1 and JPG2, and knew that JPG3 was coming to the market at that time. The colleague, a mathematically trained engineer, was working on JPG7. Of course, this file format did not work at that time; there were no prototypes, and barely even simulations. What did exist was a series of mathematical equations that were possibly going to be used for algorithms in future versions of the file format. Very few people in the social sciences have training in mathematics advanced enough for understanding what was taking place in these equations.

In contrast, this issue shows work that is relatively easy to understand, as long as one has an idea of the research context outlined above.

Importantly, design research also provides a possibility to see how knowledge from the social sciences has found new use in technical and design universities. Engineers and designers use sociological terms in their work constantly, and make decisions that are informed by these concepts. As this issue shows, they also borrow ideas from psychology and economics. When one reads through the articles of this issue, one repeatedly faces terms like “role,” “community,” “need,” and “value” that are used in line with the social sciences, although often without references of literature. Still, designers are often surprisingly well versed in the humanities and the social sciences, as one can easily see when reading, say, Kurvinen’s article.

Conclusions

We hope the reader will have fun in reading this collection. The aim of these instructions has been simple: We have tried to give the reader a map that helps him or her to understand the papers in terms relevant to someone with a background in the social sciences. We would also like to suggest that it does not make much sense to stick to the particulars of these papers; this is not how people in design and engineering read them.

What is important is that these papers pursue arguments in their own right, although with different means than in more established fields of science. Instead of creating a mathematical model or a field study, writers in this collection have typically gone to the workshop in which they have constructed a device, an artwork, or an environment, and used that as a kind of physical hypothesis to see whether their theoretical work made any sense.

Throughout, however, there are concepts and ideas that come from the world more familiar to people in the social science field; we believe that if the reader goes through this collection of essays with an explorative mind, he will learn to appreciate design

research, which, as we said in the beginning of this introduction, may currently be evolving into a new field of research. The connections of this field to the social sciences are still unclear, but we hope that this collection will make a step towards explicating those connections.

Finally, we would like Kees Overbeeke from Technical University of Eindhoven and Thomas Binder from Royal School of Architecture in Copenhagen to permit republishing these papers. They were the driving force behind the Designing Pleasurable Products and Interfaces 2005 and the Nordes 2005 conferences from which we have selected the following nine papers.

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