
What is the Object of Design?

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Abstract

In this paper we reflect upon design at a conceptual level, discussing how creativity can be coupled with participation and experience, dialoguing with philosophers and social theorists, and looking for the experiential grounds of our understanding of the very nature of design. Three words: 'drawing', 'thing' and 'together', are at the center of our discourse. We propose a view of design as accessing, aligning, and navigating among the "constituents" of the object of design. People interact with the object of design through its constituents. The object of design is to draw things together.

Keywords

Interaction design; drawing; thing; object; together; design theory; design process; design practice;

ACM Classification Keywords

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Introduction

"Now here is the challenge: In its long history, design practice has done a marvellous job of inventing the practical skills for drawing objects, from architectural drawing, mechanic blueprints, scale models, prototyping etc. But what has always been missing from those marvellous drawings (designs in the literal sense) are an impression of the controversies and the many contradicting stake holders that are born within with these. In other words, you in design as well

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as we in science and technology studies may insist that objects are always assemblies, "gatherings" in Heidegger's meaning of the word, or things and Dinge, and yet, four hundred years after the invention of perspective drawing, three hundred years after projective geometry, fifty years after the development of CAD computer screens, we are still utterly unable to draw together, to simulate, to materialize, to approximate, to fully model to scale, what a thing in all of its complexity, is." Bruno Latour [16]

In this paper we try to draw things together, but is it a CHI paper? Yes and no. We have built computational artifacts. We did ethnographic work as we were designing. We are considering experience as well as "implications for design". But not in the way so eloquently criticized by Dourish [7]. The "implications for design" we reflect upon are neither specific reflections on the artifacts designed nor the ethnographies carried out, but on design thinking, design practice and the very object of design. So in this paper we do not present a study of the usage of a system by its users, neither in quantitative nor in qualitative terms, neither we discuss the experience of its users, on specific terrains like emotions, cognition, learning, intuitiveness, etc. We are reflective designers and we think that a careful evaluation of the user experience with innovative systems is of great importance for design itself, but, while observing and analyzing it, our attention is mostly dedicated to understanding its complexity, rather than to evaluating it with respect to some well defined qualities. We think that these studies are frequently risking assuming an oversimplified viewpoint, since, generally, they take for granted that concepts like emotion, cognition, learning,

intuitiveness are well defined and can be measured in 'objective' terms.

We can say that at the heart of design is the need to *mobilize cooperation and imagination*. The design process needs to be kept open to requirements that by necessity are evolving, as well as to be able to arrive at novel, and sometimes unexpected, solutions. Openness implies that decisions about possible design trajectories are not made too quickly, and requires that the various stakeholders involved present their work in a form that is open to the possibility of change. It puts emphasis on the dynamics of opening and expanding, fixing and constraining, and again reopening. Therefore, in this paper we will discuss design at a rather conceptual level, discussing how creativity can be coupled with participation and experience, dialoguing with philosophers and social theorists, looking for the experiential grounds of our understanding of the very nature of design, questioning user participation during the design process. We opened this introduction with a quotation of a design challenge to "draw things together" put forward by philosopher and Science and Technology Studies (STS) scholar Bruno Latour. We have collaboratively for a decade reflected upon responses to such a challenge. First as participants in ATELIER, a European research project focusing on designing and understanding digital tools and mixed media support for collaborative design environments [8][2][12]. Then as the collective writer of a book entitled *Design Things* [1]. So the three words: 'drawing', 'thing' and 'together', will be at the center of our discourse. They, we think, shed light on the subtle contradictions emerging in design practice: on the one hand, the opposition between the individual act of drawing and the social dimension of



The *tangible archive*, a tangible exhibit connecting to digital resources, providing interactive and mixed-media boundary devices.



The *mixed objects table*, a variety of technologies such as RFID tags, optical markers and projections allow mixing physical models and digital media.

design (together); on the other hand, the irreducibility of the outcome of design to the intentions of its designer (the design thing is, in fact, a 'thing!'). As a background, however, for the argument of drawing things together we first introduce our experiential background – the things we built, how they relate to human computer interaction, and the philosophical crossroads where we ground our understanding of creative design practice.

Design practice and the object of design

As a group of researchers we had come together in the ATELIER projects (Architecture and Technology for Inspirational Learning, 2001-2004), to explore and envision design practices and think about the studio of the future merging ubicomp technologies taking inspiration from the traditions of studio work among architectural and interaction design students. We are all rooted in the turn towards design within HCI that gave us interaction design in the early 1990'ties. This turn was equally propelled by two different, yet interrelated, currents of thought, which questioned the conventional human factors perspective on human-computer interaction. On the one hand the Scandinavian tradition of systems design had successfully shown that prototyping with users and designing through the interface were powerful alternatives to a rigid practice of lab experiments and usability testing of user interfaces. The other influential current that created a push towards design was the studies of use practices conducted by anthropologists and sociologists. Here we gained insights into how use is fundamentally situated in socio-material contexts, and how use evolves over time in ways that can hardly be foreseen. A turn towards design and away from requirement engineering

seemed also here a logical reaction, but the studies of users and their communities of practice also indicated that this design attitude has to include sensitivity towards use practices as evolving and changing.

The ATELIER project gave us an opportunity to work with new studio environments that brought ubiquitous computing to design students who themselves worked with interaction and architectural design. Exploring the concept of design as bricolage we built what we called *the tangible archive* and *the mixed objects table* where digital and non-digital artifacts could be brought together to form hybrid design artifacts. We created the *texture painter* as a physical-digital brush to enable design students to "paint" various computer-generated visual overlays as textures on physical 3D models in real-time (see side bars on following pages). Using a brush, which is tracked, this application allows "painting" on objects such as models or parts of the physical space, applying textures, images, or video, scaling and rotating them. We developed applications such as the *eDiary*, a mobile application that supports students who visit a remote site to collect material for a design project. With these and other similar artifacts we attempted to furnish the design studio in such a way that the students were equipped to design the human computer interaction of the future. Observing how students tried out these devices and applications, though interesting in itself, was rather useful for us as it raised fundamental questions about what a design is and how it comes about. Much of the discussion on design within interaction design and HCI has been about process, but less has been said about the object of design. As we enter the design studio and attempt to provide new tools and new formats for shaping this object of design the question of what is actually

ATELIER Project examples



The *texture painter* allows painting physical models with digital textures



Participants paint collaboratively a physical model and stage it utilizing a spatial multi-projector set up.



Figure 1. Left: The first performance of designed artifacts of ATELIER as a wall exhibit in conjunction with UbiComp 2002. Center: A second version of designed artifacts exhibited as a modular and configurable furniture in Ivrea 2003. Right: The final display of ATELIER artifacts as a spatial installation in the top floor of the Academy of Fine Arts in Vienna in conjunction with CHI 2004.

produced and how it is experienced becomes urgent. What is an object of design? How are things drawn together?

Experiencing the object of design

Our approach to studying design is guided by an interest in design as involvement in practical action in the world, in “design practice” (in contrast to, e.g., “cognition”) and is grounded in theories of situated activity. Instead of focusing on the individual designer, we focus on the collective dimension, paying attention to the material aspects of design practice in its ability to engage all our senses, to designers’ interactions with the physical environment, and to the collective emergence of creativity in design. Donald Schön, through his books on the reflective practitioner [21][22], has probably offered the most influential account of design practice. His seminal descriptions of how designers learn and conduct professional artistry

through processes of reflection-in-action. In theory, knowing and doing are inseparable, and he delineates how these are carried out in on-the-spot experiments where the materials of the situation (models, sketches, drawings) at hand “talk back,” often in surprising ways, and where the naming and framing of the specific problematic or puzzling design situation are important activities. Of special relevance to our context of creative design practice are his studies of the architectural studio as an educational model for this kind of reflection-in-action, and the observation of such a reflective practicum as characterized by learning-by-doing, coaching rather than teaching, and a dialogue of reciprocal reflection-in-action between teacher and student. This perspective on design is heavily influenced by the pragmatist philosophy of John Dewey, a general epistemology of creative and investigative processes, where experience, seen as growing out of encounters with real-life situations, is taken to be



The same physical model painted digitally and staged in different contexts.

fundamental to understanding. In his theory of inquiry, as expressed in his main work on research philosophy *Logic: The Theory of Inquiry* [4] and in his specific work on aesthetics, *Art as Experience* [5], creative processes include everyday practical reflections as well as artistic production and scientific research. According to Dewey, all creative activities show a pattern of controlled inquiry: framing situations, searching, experimenting, and experiencing, where both the development of hypothesis and the judgment of experienced aesthetic qualities are important aspects within this process. Aesthetics becomes a matter of recognizing aesthetic experiences in everyday life situations. Experiences occur all the time in the creative and investigative process, but when reinforced by emotion and reflection, they can grow into aesthetic experiences. Aesthetic experiences, as opposed to ordinary experiences, are characterized by being unified and growing toward a state of fulfillment. Aesthetic experiences are not, however, instances of sheer pleasurable perception; rather, they develop in the creative process over time and are both intellectual and emotional. A fundamental aspect of a pragmatism of design (and art) is the inseparability of doing and experiencing.

Jean Lave puts forward a similar view, arguing that whereas “traditional cognitive theory is ‘distanced from experience’ and divides the learning mind from the world, theories of situated activity do not separate action, thought, feeling, and value and their collective, cultural-historical forms of located, interested, conflictual, meaningful activity” ([17]:5). Practice in this perspective is situated doing: and people’s undergoing experiences and expressing themselves as they engage in practical action, often together with others. An important characteristic of such situated

doing, and of the knowing that is constructed and transformed in activity, is that it is open ended. Lave considers doing and knowing as “inventive” in the sense of that they are “open-ended processes of improvisation with the social, material, and experiential resources at hand” ([17]:13). This perspective resonates with the phenomenological tradition, which focuses on the phenomenon of human perception as construed in Merleau-Ponty’s reading, as active, embodied, and always generative of meaning [18]. This reasoning also forms the background of the concept of embodied interaction, which has been introduced by Paul Dourish [6]. The notion of embodied interaction addresses how a situation must be considered as a whole. Meaning is created in the use of shared objects, and social interaction is related to how we engage in spaces and with artifacts. In this interplay the body plays a central role; in many ways, the body can be seen as the necessary medium for “having a world.” This notion has stimulated research on the relationship between the use of things and the role of our haptic and kinesthetic senses. Drawing on the phenomenology of Merleau-Ponty [18], Larssen, Robertson, and Edwards [14] explore how technologies might feel to use and provide a framework for conceptualizing body-thing relations: when we interact with artifacts, “sensing and motor skills are in constant dialogue, performing in concert” ([14]:272). “Attending to the thing” and acting on and through it is basic to design practice.

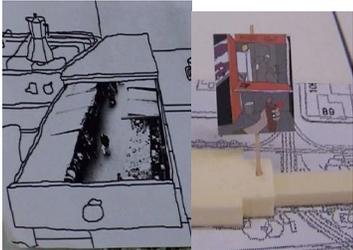
The ethnographic orientation in our own research has enabled us to build insights into the situated, embodied, and collective nature of design work. However, the kind of multimodal analysis required to arrive at a deeper understanding of how bodies come

into dialogue with the people and things around them is still in its infancy. Our perspective on design practice is guided by this attention to the body, artifacts, spatial relations, and their interplay as an aesthetic experience and a source of creativity. This brings us back to the core of this paper and challenge of how to think about drawing things together. Lets start with the thing.

Things? Socio-material things and objects of concern

The etymology of the English word “thing” reveals a journey from meaning an assembly, which was decided on beforehand to take place at a certain time and at a certain place to deal with certain “matters of concern” to the community, to meaning an object, “an entity of matter.” So, the term thing goes back originally to the governing assemblies in ancient Nordic and Germanic societies. These pre-Christian things were assemblies, rituals, and places where disputes were solved and political decisions made. It is a prerequisite for understanding this journey that if we live in total agreement, we do not need to gather to solve disputes, since there are none. Instead, the need for a common place, where conflicts can be negotiated, is motivated by a diversity of perspectives, concerns, and interests. This shift in meaning of the word thing is also of interest when reflecting on the practice of design. We suggest that we revisit and partly reverse the etymological history of things. A major challenge for design today has to do with what is being designed— not just a thing (an object, an “entity of matter”) but also a thing (a socio-material assembly that deals with matters of concern). How can we as professional designers work, live, and act in a public that permits a heterogeneity of perspectives and actors to engage in alignments of their conflicting objects of design? How

can we gather and collaborate around design things? So what we argue for is a “deconstruction” of the object of design. This deconstruction begins, following Heidegger, with the things themselves, or more specifically in our case with socio-material design things. Design is the progressive transformation of its object (the web of heterogeneous things created and/or imported in the design process bringing forth the qualities and features of the thing to be created) until the moment in which the design thing itself is delivered. Designers are therefore working both envisioning in their object what their design thing should be and playing with the socio-material things constituting it. The things constituting the object of design have therefore a double nature: on the one hand, they are objectified so that they play a role in the characterization of the thing to be created; on the other, they are experienced as socio-material things per se by the people (designers and/or stakeholders) gathered in the design thing. The nature of thing of the constituents of its object is the propellant of the dynamic nature of design. From this viewpoint, when Bruno Latour calls for “thing philosophy” and “object-oriented politics” [15], he challenges designers to make public the design object. We propose a view of design as accessing, aligning, and navigating among the “constituents” of the object of design. People interact with the object of design through its constituents, be those constituents things, artifacts, or “representations”. In the tradition of Participatory Design we see heterogeneity and conflict as characteristic of the constituents of design, as these reflect the perspectives of different stakeholders - professionals with their different traditions and skills, future users and contexts of use. In experiencing things, objects, and devices people are primarily



The card left tells the story of how convenient it may be to live on top of a street market: „... you are in the midst of cooking and realize that you forgot something ... then you just rush downstairs to get it“.



Materiality and metaphors as narrative techniques for constituents of the design of a building that flows out of a crack in the mountain.

involved not with different types of materials, but in different kinds of interaction. We think of a design thing being made 'public' when it is handed over to users, as it then becomes a matter of concern to them with its new possibilities of interaction. Hence, thinking about design practice we ask: how can we as designers work, live and act in a public of design that permits the heterogeneity of perspectives and actors to engage in alignments of their conflicting objects of design?

Drawing: Designerly practices

This framing of design competence, ethnographic studies of design practices, and experiments in the ATELIER project led us to think of designerly drawing skills as:

- Systematically cultivating the “art of seeing” and narrating: working with metaphors, analogies, and themes that help express, contrast, and intensify the design concept so as to create a common understanding, to evoke imaginations rather than prescribe, invite others into a dialogue, and the like.
- Engaging with a plethora of materials—inspirational resources as well as material conceptualizations of the design concept (text, diagrams, comics, video, sketches, rough “sketch” models, virtual 3D models, CAD drawings), with the diversity of design artifacts increasing the designer’s possibilities of evaluating the design, as each representation helps make particular aspects of a design visible.
- Engaging in a movement of closing and opening, in a rhythm that is characterized by formulating “themes,” searching for “facts,” and experimenting with different solutions.

- Being able to work in a “meandering” way, with “floating concepts,” while maintaining things at different stages of incompleteness.

Our ethnographic work made us think about the qualities of a design environment that supports these designerly skills. Our vision is a studio where design participants through projects configure and reconfigure the space exhibiting narrative artifacts that are in continuous evolution. Narrativity is inscribed in artifacts using a variety of strategies ranging from choices of materials to metaphorical references (see also side bar this page). Organizing multiple travels through the material is a collective activity that culminates in design performances after which constituents leave the space for new ones as in a metamorphosis. In the book *Design Things* [1] we especially elaborate upon “drawing” strategies of metamorphosing, place making and performing.

- How do designers mobilize, manage, and transform artifacts and their interpretations? Our approach explores how the web of “constituents” is woven around a drifting object of design as the designer engages in its transformations. Design work is looked on as an act of “metamorphosing,” where design concepts are envisioned and realized through objectifying and manipulating a variety of representations. Design skill then is not just a question of applying mechanical force to exterior objects, it also includes care, judgment and dexterity in a fine-tuning of movements that can reach a rhythmic fluency, which is the trademark of a skilled practitioner.
- We propose particular notions of place and landscape to explain how the design environment is performed in

Designerly performances



Above two events during a project at different times: the importance not of an ostensible product or specification (a model) but rather of accomplishing events. In each event, we observe a change in what the design object is and a change in the art and relevance of the techniques used to converse with design material.



A presentation as a dialogue of contrasting narratives between two groups of students embodied as two sets of projectors, exemplifying the performance of a fictional space.

the work of designers and how a situational ground is enacted and transformed as design artifacts emerge. We suggest the concept of an “emerging landscape” as an experienced landscape in which the designer journeys and dwells.

- How do designers express and experience design objects? Our suggestion here is to describe and explain the evolution of the design through the designer’s performance of it (sidebar). This includes considering narrative temporalities, fictional spaces, and creative constraints as basic features of *performing design*, and looking at characteristics of staging design events. We suggest an interventionist, participative and experiential understanding of design as purposeful staging and accomplishing of events.

Can these designerly skills also be set in motion to draw things together, not just to “draw” pretty things?

Together: Participatory drawing

The ATELIER project, as mentioned, inspired us to look for ways to combine design as designerly “drawing” practices with a participative approach to design, reaching out to and engaging stakeholders, eliciting their cooperation and creative contribution. Since design ends with the delivery of one of the constituents of its object, its embodiment, then it is this; the very thing of design itself. The relationship between designers and stakeholders becomes crucial when this design thing takes form. The project is the kind of socio-material design thing that is the common form for aligning resources (people and technology) in all larger design endeavors. Projects are things that have objectives, time lines, deliverables, etc. In practice, resources to align in a design project may for example

include: project brief; prototypes; sketches; ethnographies and other field material; buildings; devices; project reports; ‘users’; engineers; architects; designers; researchers; other stakeholders; etc. Rather than thinking of a project as a design thing in terms of phases of analysis, design, construction and implementation, a participatory approach to this collective of humans and non-humans might rather look for the performative ‘staging’ of it. Inspired by Pedersen [19], we could then ask: How to construct the initial object of design for the project? That is, how to align the participants around a shared, though problematic, object of concern? As work proceeds, how can the involved practices be made reportable (fieldwork, ethnographies, direct participation, etc)? How can the object of design be made manipulatable. That is how are ‘constituents’ of this object expressed in forms that can be experienced (sketches, models, prototypes, games, etc)? How is the object of design made into a public thing and open to controversies among participants in the project as well as outside (workshops, exhibitions, public debate, etc)?

Projects are however, as Klaus Krippendorff [13] has pointed out, only part of, or a specific form of, alignments in the life cycle of a device, and every object of design eventually has to become part of already existing ecologies of devices (in peoples already ongoing life-worlds), be they digital like computer applications and databases or physical like buildings, furniture, doors, books, tools, vehicles, etc. Hence, the beginning and end of a designed device is open, and hardly ever constrained to the limits of the project. This points at the importance of understanding how design in a project is related to users/stakeholder appreciation and appropriation, be it as adoption or redesign, and

how users make it part of their life-worlds and evolving ecologies of devices. Design might be thought of as constrained to a specific project with given objects of design, resources, timelines and specified outcomes, but since the final embodiment of the object of design is a thing, this thing opens up for unforeseen appropriation in use in already existing, evolving ecologies of devices. Hence, also use must be redefined as Redström [20] has argued. Strategies and tactics of design for use must also be open for appropriation or appreciation in use, after a project is finished, and consider this appropriation as a potential, specific kind of design. Krippendorff's notion also implies that in design for use we also should focus on the 'before' the project, the 'procurement' process of aligning actants in a design project and how objects of concern becomes a specific object of design. This may involve making explicit the often hidden performative 'protocols of design' initially setting the stage for design things and establishing the object of design [19]. To draw things together is the object of design. Recently researchers have proposed that HCI lacks research and theorizing about interaction design practice advocating more in-depth studies of interaction design practice and to engage in theory-building [9][10]. Such attempts are useful and help understanding the role of design in research [23]. Our reflection on design practice beside serving these aims also recognize that design in research or professional practice is a changing thing and for this reason is useful to continuously reflect on it and also sense or influence its becoming.

Controversial Things

In our approach to drawing things together the philosophical pragmatism of John Dewey and the 'thing politics' of Bruno Latour has been corner stones for

reflecting upon design as participation in collectives of humans and non-humans. Dewey's position on controversial things and the public makes the project of drawing things together even more challenging. He argued [4] that in fact the public is characterized by heterogeneity and conflict. It may be challenging enough to design for, by and together with collectives of humans and non humans where common social objectives are already established, institutionalized or at least within reasonable reach, where socio-material things are supported by relatively stable infrastructures. But the really demanding challenge is to design where no such thing seems to be within immediate reach, where no social community exists. In short, where a political community, a public characterized by heterogeneity and difference with no shared object of design, is in need of a platform or infrastructure. Not necessary to solve conflict, but to constructively deal with disagreements – public controversies where heterogeneous design things can unfold and actors engage in alignments of their conflicting objects of design. Participation in the making of such things, and the relation between professional design and design activism, stands out as the ultimate challenge when we gather and collaborate in and around design things. This we believe is a major challenge also to design thinking in general as well as to more specific participative and user-centered approaches to drawing things together.

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