

Enabling Creativity. Imagination in Design Processes

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Abstract. The paper is a theoretical contribution to design epistemology. It proposes a framework for describing and analyzing the workings of imagination in creative design processes. The approach of the paper is to look for structural features of the imagination as they develop in the dynamic interaction between consciousness and the exterior aspects of the material world. The hypothesis is that with their design designers can create a specific connection of abstract conception and concrete views. The design process can be considered as a process of the Kantian schematization that further can be described in design specific terms of the dichotomies of known vs. unknown, focussing vs. defocussing, and whole vs. detail. Thus, the approach is phenomenological in its grasp on the experiential operations of the design process.

Keywords: Imagination, creativity, design epistemology, design methods, schematization

1 Introduction: Accessing Imagination

Going into the issue of imagination in design and its role as a formative power of creativity means entering a complex but interesting discussion of the nature of creativity in design in the interface of human consciousness and the material culture of design objects.

One reason for this complexity is the elusive character of the concept of imagination. On the one hand, imagination is a capacity that is always present, an integral part of consciousness that nobody can do without. By imagination I mean the capacity or the faculty of consciousness to envision things that are not present in the physical world that surround us. We might even say that it is the capacity of imagination to negate the given and material that essentially enables abstract thinking and our ability to categorize the material (Sartre 1940). In everyday language, we might say that someone lacks imagination, but on a structural level, we all have the power of imagination, which is, furthermore, active all the time. On the other hand, imagination is an enclosed part of our consciousnesses, and it remains a challenge how to access it or at least gain insight to it. In an important

article, which has nevertheless gained relatively little traction in design theory, Terry Liddament argues that not only can we not know what is going on in the inner space of consciousness with regard to imaging and picturing in connection with design; the very notion of a particular essence of creative imagination is problematic (Liddament 2000). In the article, "The myths of imagery", Liddament criticizes the metaphysical assumption that in producing pictures, for example, we render explicit something that already exists inside us as a sort of essence. Similarly, he criticizes empirical approaches, for example in cognitive science, in similar pursuit of a particular mental substance. Following his argument, 'imaging' and 'imagery' is "not something intangible which takes place in a mysterious 'medium'," i.e. the mind; instead "*imaging is a doing*" that "alludes to the thinkable, and this means: to the do-able" (604). In her rethinking of the role of visuality in design, Kathryn Moore argues for the importance of being critical to the implicit metaphysic that lurks in theories of creativity. She is especially critical of specific kinds of visual or sensory modes of thinking that are supposed to find their roots in elements of consciousness that precede perception and language (Moore 2010). She states, then, that there "is no need to look for anything hidden beyond or beneath what is already there in front of our eyes," (12) and in an attempt to "demystify the art of design" she advocates a non-circumventable and opaque role of the visual in design.

I, too, think it is necessary to be critical of any metaphysical assumptions in the concepts we employ when speaking about design, imagination, and creativity. Still, it may prove productive for a discourse on creativity to address some features of the *modus operandi* of imagination in design. Thus, this paper will propose a theoretical model that (i) takes its starting point in the interaction between inside (our consciousness) and outside (the exterior aspects of the material world), e.g. the material world of objects, and (ii) uses tools informed by design methods to specify this model. Thus, I see the paper as a contribution to

design epistemology, that is, specific ways for designers to approach the process of designing, i.e. “designerly ways of knowing” (Cross 2007). We cannot look into the minds of the designers, but indirectly we can detect what is going on by investigating ways of approaching their work. In this way, I aim to investigate the structural “codes” in the act of translation that takes place in design between an intention or a wish to meet a need and the resulting physical artefacts (cf. *ibid.*: 25). Thus, in analyzing these codes, I will enter into a discussion of some of the factors that enable creativity in design. The methodological premise of the paper and its theoretical approach are that creativity in design can be indirectly enhanced by a better understanding of some of the mechanisms and processes in cognition that underlie design creativity, that practice can “perhaps take advantage of an improved understanding of its underlying principles” (Gedenryd 1998: 3).

2 Theoretical Approach

My focus here is on the role of imagination for the conceptual framework in design.

First, I will address imagination as a structure that comes to itself in the *dynamic interaction* between inside and outside. In the same way that cognition in design should not be regarded (only) as thinking but rather as an activity of inquiry and action that is flexible due to its specific function (Gedenryd 1998), I will operate with a concept of imagination that exceeds the closure of the mind.

Second, I will use the structure of this dynamic interaction to examine the junction of internal, abstract conceptualization and outward, concrete materialization. My focus will be on this linking of concepts and concrete matter as it is expressed in design objects. Thus, the focus here is not on the design process itself, e.g. the process of drawing, although that has been a topic for design research in the discussion of the designer’s reflective dialogue with her or his sketches (Schön 1983). Similarly, my focus is not on the mental activity in an investigation of imagery processing in the form of image generation and transformation (Kavakli & Gero 2001), i.e. how imagery can be examined as an equivalent of perception, and how imagined objects can be interpreted like physical objects (362). True, a high “performance in cognitive activity may be dependent on the richness of representational structures and pattern goodness” (364); however, my aim is to look beyond the concrete tools that all designer use and examine the *structural* relationship between the

activity of imagination and the becoming of concrete design solutions.

In order to address the interface between inside and outside, between mental settings and physical manifestations in design, I will propose the theoretical concept of *schematization*, a concept that captures the cognitive, imaginative framing of reality. The concept is not unknown in design discourse; for example, in a context of actual design practice the term *schemata* has been used to describe dominant ways of addressing problem solving in the “development of a growing pool of precedent” (Lawson 2004: 456). Further, the notion of image schemata from contemporary cognitive science (cf. Hampe & Grady 2005) and its focus on conceptual frameworks has found its way into design research and design discourse as an attention directed at users’ responses to technological artefacts which require a reorganization of given knowledge structures to generate a new construction of meaning in a process of embodied interaction (Markussen 2010).

My approach will be to focus on the process of *linking concepts and materiality* as this process can be detected in design objects and traced back to a question of the designer’s mental setting in relation to the design process. In two steps I will argue for Immanuel Kant’s role as an important philosophical source, in part because he connects imagination to epistemology and aesthetics and offers a foundation for the process of linking concepts and materiality through the concept of schematization, and in part because he points to the dynamic nature of this process.

1. In his seminal epistemology in *Kritik der reinen Vernunft* (1781/87), Kant describes the basis for a release of the productive powers of imagination that had hitherto, in English Empiricism, been too tightly connected to the sensual. The basic – and revolutionary – premise in Kant’s epistemology is his shift away from a belief in gaining access to things ‘as they are’ to focusing on human cognition as the entrance to knowledge, “*our way of perceiving and recognizing objects*” (Kant 1990: B25). Kant operates with *flexibility* in cognition and relates this to imagination. For him, experience takes place at the intersection of sensual appearances and, on the one hand, inescapable structures such as time and space and, on the other hand, the conceptual constructions of cognition. The crux of the matter is that he proposes the *scheme* as a matrix for the apperceptive and synthesizing linking of concepts and sensual, sensory and perceptually given appearances and thus for the human production of meaning (B177). Thus, the scheme conditions our ability to construct meaning through synthesis. The key point is that the scheme is itself a product of imagination (B179); i.e., it is not

given once and for all but is a structure of the human mind that is open to alteration and new configurations. This kind of reflection reveals the conditions of knowing and construing meaning and leaves it open to analysis: We see that meaning is not actually given but created in a complex interaction of constructive factors.

2. In his work on aesthetic experience, *Kritik der Urtheilskraft* (1790), Kant uses the flexibility of schematization in relation to ‘judgements of taste’ (Kant 1995). The judgement of taste operates without concepts, but through the imagination it may *schematize openly without given concepts*. It operates in a search for concepts that fit the appearances that seek to be comprehended through the judgement of taste. The point is that aesthetically, imagination can perform the operation of linking sensual matter with conceptual meaning in an open, non-teleological construction of the concepts involved.

My hypothesis, then, is that with their design designers can create a specific connection of abstract conception and concrete views, and that in this respect the design process can be considered as a process of schematization. In fact, all processes of making meaning can be seen as acts of connecting concepts and sensual impressions and/or material, and what makes designers’ work special in this context is their ability to transform this process of synthesizing into concrete or tangible design solutions. Thus, designers are making meaning on a concrete level. The process of connecting abstract conception and concrete views produces new meaning through the designers’ intentions concerning the interaction of the design and its surroundings, including its cultural and societal contexts, and its way of organizing meaning in a way that ultimately lets the design affect perception and understanding (on a small scale). Herein lies the way in which schematization can be activated as a dynamic and flexible operation that transgresses the individual and subject-bound perspective otherwise implied in traditional thinking of imagination and creativity; just as art has the capacity, in phenomenological reflections of experience, to cause a “coherent deformation imposed on the visible” that provides us with “emblems whose meaning we will never stop to disentangle”. Thus, art is less a source of concrete, specific ideas than a source of overall “*matrices of ideas*” (Merleau-Ponty 1960: 96-7), and the insight into the structuring of experience through actual artefacts can be turned towards the creative process where it can be made an asset of aesthetic production. Thus, in focussing on the general structures and patterns of ideas (and not on idiosyncratic-personal ideas of creation) and using the concept of schematization we may be able to achieve valuable insights into the connection of designers’ mental

settings in relation to the outcome of the design process: the design objects.

3 A Structural Model of Imagination in Design

The formulation of “matrices of ideas” is significant, as the focus of an investigation of the formative powers of schematization in design must be aimed at a meta-conceptual level that analyzes the structures of concepts and ideas. What, then, is of interest in this part of the analysis is not the actual and specific concepts that designers use in the design process, normally as part of the design brief and design requirements (e.g. concepts of efficiency, functionality, user-friendliness). Instead, the analysis will be focussed on the construction of meaning in the interaction between inside and outside in the flexible structures of schematization in imagination. This particular focus is chosen in order to examine some of the general factors in the transformation of an internal mental setting into an outward physical manifestation. My proposal involves the identification of three general meta-conceptual concepts or *settings* that are effective in the designer’s process of turning inner imaginings into products. These settings can be defined within a span of dichotomies:

- 1) Presupposed knowledge: Known vs. Unknown
- 2) Imaginative starting point: Whole vs. Detail
- 3) Degree of focus: Focussing vs. Defocussing

In combination, these settings define the structure of the prism of schematization in imagination that I will propose as a model for design creativity.

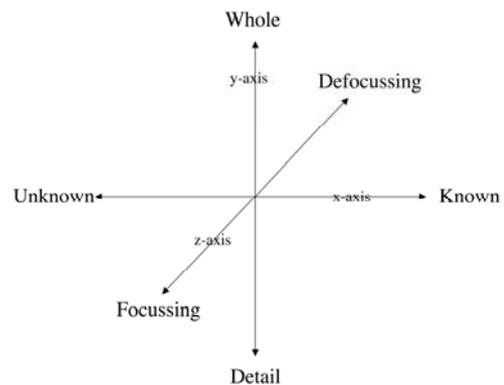


Fig. 1. A Prism of Schematization in Imagination

In the following, I will describe each of the three meta-concepts in relation to aspects of design method theory. In closing, I will address the discussion of how to work with and apply the model as an asset for enabling design creativity.

3.1 Amount of presupposed knowledge

The amount of knowledge that designers start out with in a design process is crucial but inherently difficult to determine. The question of the relationship between known and unknown is particularly relevant for design development and design epistemology, as the anticipation and prediction involved in grasping at something not-yet-existing and presumably preferable are specific characteristics of design (cf. Simon 1996; Zamenopoulos & Alexiou 2007; Galle 2008) where the method of development is not given in advance but evolves during the process. Thus, design processes can be conceptualized as grasping at something that is not-yet-known, which means that design processes often function as an exploration of the unknown. With regard to design methods, there has been some debate about the necessary amount of knowledge: How much knowledge is needed in a phase of analysis in order for a phase of synthesis to extrapolate, generate and stipulate new design solutions (cf. Lawson 2005)? Instead of trying to define the optimal type and amount of knowledge, we may be better off simply viewing design problems as inherently “wicked” and ill-defined, since it is the nature of the problem to evolve as the design process unfolds (see e.g. Rittel & Webber 1973). In principle, we cannot know in advance what knowledge will be relevant for developing a design solution whose existence is emergent.

From the perspective of imagination, however, the question is not so much how to gain information from the outer world (data about users, tests, market research, etc.) but rather what kind of knowledge is present in the designer’s consciousness, and how it is employed and transformed here. This pushes the relationship of known vs. unknown in another direction. Seen in relation to consciousness, the structure of known vs. unknown can be regarded as a mental setting in relation to the design problem and thus as a method of filtering experience and meaning. Awareness of this structure of knowledge can be an asset in the design process; if one is aware of its tacit workings in consciousness, it may shed light on the inner dynamics of the design process and its material envisioning of something new that not only was not there before but was also not-previously-knowable. In management theory, C. Otto Scharmer speaks about seeking ‘self-transcending knowledge’ that is

organized around ‘emerging opportunities’ (Scharmer 2001) and about developing a culture of management based on the perspective of an open and emergent future, where a connection to the roots of human existence in a phase of “presencing” enables a “letting come” of the future and its not-yet-to-be-known paradigm of knowledge (Scharmer 2007).

My proposal is to focus at the inner interface of known vs. unknown within consciousness and, as a structure of schematization, to localize it as a mental setting that is relevant for the production of meaning. As a meeting of concepts and sensual appearances in the structure of schematization, the interface between known vs. unknown filters the construction of experience and meaning. Thus, in combination with insights into design as an exploratory, emergent activity that uses the non-logical logic of abduction (in the Peircean sense) in generating a design proposal which may seem as the result of a creative leap that may be hard to explain (Cross 2007), the interface of known vs. unknown not only designates an important feature of design work but can also be actively used by designers: It may explain why the design process cannot take its starting point exclusively in the acquisition of knowledge as part of a more or less structured process plan but must also involve an integration of unknown, emergent and becoming layers of meaning. Thus, a mental setting that embraces the openness of the interface between known and unknown may make it possible to let the inner space of imaginings develop into something new in the design process.

3.2 Imaginative starting point

The mental setting concerning the starting point for the design process in either an overall (typically ideational) conception of the design as a whole or a more experimental exploration of details plays an important role for the way in which concepts and materiality meet and produce meaning through schematization. With regard to the ongoing development of concepts in design, these two positions describe the extremes of a span between a top-down and a bottom-up process. If the starting point is the conception of the whole, key concepts are often clearly stated, or – considering the imaginative framework of developing design between known and unknown – as clearly stated as possible, typically in the form of stated success criteria or requirements in the design brief. This is often the approach in goal-oriented, industrial or engineering design, where the client’s expectations are a crucial element in the design process. The strategy of beginning from an exploration of a detail is often at the heart of experimental design

where new forms, new combinations of materials, and new design principles can be openly tested without regard for a set of requirements in a design brief.

This duality of different starting points is usually not, however, so rigid in real life; concrete design situations are often defined and situated in between. The point is, further, that whole and detail are ontologically linked. This is evident, as every detail is structurally and hermeneutically bound to a totality or a whole that can perhaps hardly be fully stated. Thus, details can only be developed and understood as fragments in the light of a totality that is perhaps only on the verge of becoming through fragmented details (cf. Blanchot 1969). Vice versa, a whole would be empty but for the richness of details. The distinction is which perspective the designer *mentally* chooses as his or her starting point.

Furthermore, the span between whole and detail is related to a span between abstract and concrete. On the one hand, abstract reasoning is part of all design processes when the overall requirements of the design are stated, i.e. in the ‘meta-design’ or the design of the design. On the other hand, designing is also always an operation of making the abstract concrete, i.e. designing (more or less) material matter in a way that inextricably contains and condenses specific immaterial knowledge (Brix 2008). With reference to the artistic object, the relationship between abstract and concrete, or general and particular, has been widely debated within traditional aesthetic theory. On the one hand, in 1802/03 the philosopher Schelling, who was the first to connect aesthetic theory solely with art, had an optimistic focus on the general as he claimed that the special feature of artistic creation is that it is able to connect “the absolute” with “the specific” and let the “divineness of the general” be created through “the particular” (Schelling 1991: 177). On the other hand, later aesthetic theory has illustrated the dangers of letting the general perspective take over, as it contains an element of power because it subsumes and thus levels the particular (Adorno 1970). Thus, later aesthetic theory has emphasized the importance of maintaining the perspective of the singular in the aesthetic experience of the work (Bubner 1989). The general, however, always plays a role in artistic creations; it must not be allowed to take over but should nevertheless be acknowledged for its constitutive and formative role in aesthetics. Thus, aesthetic experience can be seen as a process that (i) starts in a sensual experience which at the same time (ii) leads to the “search for the totality in the detail” (Bubner 1989: 65). A noteworthy point in this kind of theory is that the general and the abstract play a constitutive role for aesthetic objects, as their wider implication of meaning lies exactly in the abstract-conceptual (and not necessarily ‘divine’) constructions

of the aesthetic work, while the specificity of the aesthetic creation lies in the extension and implication of the *singularity* of the aesthetic creation: The concentration of meaning is constructed from the bottom-up with a base in sensual matter.

3.3 Degree of focus

An important aspect of the dynamics in the design process is the span between problem statement and the generation of solutions. In most cases it is impossible to state and define the full scope of the problem directly or to take it as ‘given’ in a way that leads to an ideal solution in a generic and linear way. Instead, theories of design methods view the relationship between problem and solution as an ongoing process of “negotiation” in the “tension between a problem view and a solution view of the situation” (Lawson 2005: 271), in a structure of a “co-evolution of solution *and* problem spaces” (Cross 2007: 102), where the problem remains continuously open to investigation, as “creative design is not a matter of first fixing the problem (through objective analysis or the imposition of a frame) and then searching for a satisfactory solution concept” (Dorst 2006: 10). When the span of problem and solution is open to investigation and continuous reformulations, the process of *framing* the problem, i.e. the context for approaching and *naming* the problem and its components (cf. Schön 1983: 40), takes on importance along with the actual generation of solutions, since it is often through the strategy of proposing ‘satisfactory’ solutions that the requirements of ‘ill-defined problems’ can be met, as these can rarely be converted into ‘well-defined problems’ in an analytical phase (Cross 2007: 103).

Seen in the context of imagination, the relationship between problem statement and solution generation defines the path from inner imagining as an adaptation of the problem statement to outward manifestation in a design solution. Thus, the attention shifts from framing as a discursive activity of naming to *focussing* as in the process of schematizing a way of structuring the transfer of meaning between inner imaginings and outer physical manifestations. Like framing, the process of focussing is open to ongoing reformulation, and due to its functional position in the interface between inner consciousness and outer world, it lies in the span between clear and rational discourse and the inaccessible mental space.

As a filtering of inner meaning that is transformed into form, the activity of focussing is closely connected to the methodological complex of *idea generation* described within the field of design method theories. Here, idea generation can be seen in the dual

perspective of keeping an open mind to new and unforeseen turns in the development process and leaving the field of opportunity open “for as long as possible” while on the other hand acknowledging the power of the initial proposal in guiding the design process: “[T]he very first conceptualizations and representations of problem and solution are [...] critical to the procedures that will follow” (Cross 2007: 54, 34). The emphasis is often on many focal points rather than one single one, as they become part of the dynamics of the design process. Thus, in the book *How Designers Think*, which deals with design cognition and “design thinking as a skill”, Bryan Lawson speaks of design as a “multi-dimensional process” and points to designers’ “ability to think along parallel lines, deliberately maintain a sense of ambiguity and uncertainty and not to get too concerned to get a single answer too quickly” (Lawson 2005: 15, 289, 298). Lawson points out that in working with multiple frames the designer can achieve a position of meta-framing and meta-perspectivism by reflecting on the fact that although adopting a certain perspective is a constitutive condition, awareness of this fact can in fact alter the frame: “The skill to create and manipulate frames is a central one in determining how the process will unfold” (292).

An integral factor in the generation of multiple and parallel ideas and solution proposals is the relational proportion of focussing and defocussing in each proposal. Or, to be precise, the multiple ideas and the kind and degree of focussing in each proposal interact in a structural network of constructing new meaning that is crucial for the design situation: While the presence of multiple ideas enables a dynamic design process (more approaches are being tested, although the openness eventually has to come a halt and be converted into a narrowing decision that comes to form the basis of the final design), the kind of focussing in each proposal points directly to the structure of schematization and its process of meaning construction in the intersection of sensual materiality and conceptual construction. Thus, the discussion of the structure of focussing and defocussing explains how meaning is not just given as something to be found in the design process but is developed as a result of the designer’s mental setting with regard to meaning, and underlines that this meaning contains definite as well as more elusive elements. In a philosophical context of epistemology, the determinate and the indeterminate can be said to be eternally intertwined in the sense that the indeterminate can be regarded as the conceptual background of the determinate; within conceptual knowledge there will always exist a constitutive difference “between what from the given perspective is determinate and what is indeterminate” (Seel 2006: 188). On the one hand, all

ways of addressing meaning in the world are seen from a specific perspective and bound to seeing *aspects*; on the other hand we cannot presume that any specific, given concepts circumscribe the process of determining, since indeterminism is always lurking in the background.

A sharp and conceptually determined focus will often be associated with a goal-oriented process that is close to the given requirements as stated by the client (as well as the conceptual limitations and constraints imposed by the client). Through a complementary strategy of defocussing, the goal loses prominence, while the broader background with more or less directly related ideas and concepts becomes more important. This widens the conceptual scope. Thus, Kavakli and Gero speak of “defocussed attention” or “remote association” as a method of “divergent thinking which refers to the general process of thinking of unusual associations”; thus it may be “important to deliberately defocus one’s attention when attempting to discover creative solutions to a problem” (Kavakli and Gero 2001: 358-9). Absolute focussing and defocussing cannot, however, be attained simultaneously. Instead, focussing and defocussing can be present in various degrees at the same time, or a design process may involve variations in focussing strategies.

4 Prisms of Imagination

After having proposed the dichotomies of known vs. unknown, whole vs. detail, and focussing vs. defocussing as parts of an overall conceptual framework, the next step is to discuss the character and the application of the model. One approach might be to discuss the eight corners of the model, i.e. to list the combinations of the three dichotomies (2^3) and examine whether they indicate and identify possible mental settings in the design process and approaches towards solving design tasks as inner imaginings are turned into products. A span could be defined that ranges from the open design processes in the combination unknown/defocus with regard to both whole and details in the design to the more fixed position that combines known and focussed. This approach would, however, extrapolate positions from the extremes that would exclude the opposite ends of the spectrum. That is not an accurate reflection, as briefly discussed above; an approach toward a design task may very well simultaneously apply strategies of focussing and defocussing or a mixture of known and unknown. Thus, the dichotomies should not be seen as mutually exclusive extremes but as dimensions that co-exist in the design process.

The big question, then, is how to combine the three dichotomies in design practice. The general and ‘easy’ but nevertheless valid answer would be that they all help to inform a design-relevant and design-specific discourse about the formative powers behind creative processes in design. In this way, the proposed theoretical framework can enhance our knowledge about design processes that normally have the character of tacit knowledge. This type of clarifying, discursive theory is, in my opinion, methodologically necessary for design practice (cf. Author 2010) and is not contrary to but rather a supplement to the role of intuition, for example, in design. Since all designers who look at the world through the “design they are working on” are in fact looking through a particular “set of lenses, and cannot help but do so” (Harfield 2007: 171), there may be an advantage in becoming aware of the workings of these lenses with regard to perceiving and understanding the world and configuring experience. When we discover how we see and work and become aware that we always see and configure work through one set of lenses or another, we acquire reflective knowledge and get past being entangled in experience. The same can be said about imagination: A greater awareness of the mechanisms of imagination helps us understand how imagination contributes to our ways of constructing meaning and lets us create and use design as a medium for this process. Naturally, the implementation of this kind of discourse within design practice will require efforts within education and communication if it is to succeed; this issue may be addressed in the context of upgrading academic knowledge in design practice (cf. Engholm 2008).

In addition to this kind of methodological reflection that considers the general benefits of conceptualizing means and procedures of practice and tacit knowledge, the three dichotomies can be used to offer theoretically informed insights into the underlying structures and structural codes in the design process. This structural analysis should not, however, be understood in the sense of Christopher Alexander’s early approach in *Notes on the Synthesis of Form* (1964), which investigates structural patterns of design problems in order to find a “underlying structural correspondence” with the “process of designing a physical form which answers that problem” (Alexander 1964: 132). Instead, the proposed prism of imagination can be used to challenge designers on their own conception of imagination and creativity, and the overall framework of schematization can be employed in analyzing actual design solutions and as a starting point for questioning designers about their mental setting in the design process. Thus, the combination of the three dichotomies – known vs. unknown, whole vs. detail, and focussing vs.

defocussing – should not be seen as a rigid taxonomy of possible mental settings in design but rather as a flexible framework with many entry points that is capable of raising many types of questions, and which can be specified to match the work process of individual designers. Thus, the prism of imagination has a general descriptive potential in the analysis of design solutions and working practice as well as a specific descriptive potential in informing designers about their mental settings.

In conclusion, I will briefly mention the application of aspects of the model on two types of working strategies of selected design agencies that have provided input to the conceptual framework of the model during my research process.

a) The Danish industrial design agency 3PART design works especially with the dichotomy of *focussing vs. defocussing* as a means of challenging the borderline between *known and unknown* in their search for new groundbreaking design solutions. For example, 3PART deliberately strives to generate and shift perspectives within the idea generation process and is aware of the productive power of operating with different levels of framing at the same time. They operate within a continuous oscillation between defining a specific frame for the design work (i.e. sticking to the client’s brief) and applying an ‘unframing’ that “drives the process forward” (cf. Simon Skafdrup, industrial designer and CEO, 3PART). This unframing consists in asking new and unexpected questions; this is often welcomed by the client, who wants the designers to create solutions that exceed the brief. 3PART employs the dialectics of focussing and defocussing as a device for shifting perspective during the design process and as a strategy for interpreting different aspects and sequences of the design situation. Thus for example, the 3PART designers use metaphors to highlight certain aspects of the design. When designating a wheelchair for teenagers as a “Transformer wheelchair”, they use a method of metaphorical defocussing to draw attention to the design features that would make the chair desirable for its users: that it should be flexible and adapt to many kinds of use and situations: “We often add little twists and turns to the way we see and address the design problem, and this heightens the qualitative standards of the design” (Simon Skafdrup).

b) The German design agency FUCHS+FUNKE often takes its starting point in the dichotomy of *known vs. unknown* and employs means of inward meditation in an attempt to state the design process as a search for the unknown. Thus, in an interview about imagination, Wilm Fuchs, one of the two associates of FUCHS+FUNKE, talks about the process of seeking to enable imagination in order to transform and implement (“umsetzen”) it as design (“Entwurf”). In

this creative zone, he points to an “ability of *sensitizing* [sensibilisieren] oneself” by focussing on the mental images in the founding stages of the design process. Further, he speaks of both negative and positive aspects of imagination as a borderline of possibilities and non-possibilities of design; the positive side of imagination can activate “passive knowledge” and evoke cross-links (“*Querverbindungen*”) in a borderland of known and unknown, thus enabling something hitherto not possible. This is reflected, for example, in *Papton* (from 2004 and onward), an origami chair that is still on its way to finding its form. In this case, the mental setting is one of openness towards the relationship between known and unknown: By taking into account that the solution of the problem (how to make the ultimate origami chair out of a standard sheet of paperboard) is developed in a process of infinite approximation (the folding can always be varied slightly), the design process takes on the character of a negotiation of the known and given in the material matter of the chair and the unknown in the conceptual construction of its form.

Direct means of nurturing creativity in design are difficult to find; an analysis of the structural factors of imagination can, hopefully, contribute to an increased understanding of creativity in design. Furthermore, enhancing our understanding of the workings of the formative factors of creativity in design is also an attempt at enabling creativity to unfold.

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