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Words, Images, and Rhetoric

Communication and Production of Knowledge by Design

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Abstract. Words, images, and models are used in order to grasp the often chaotic world. Here the verbal is regarded as the most appropriate way to communicate and also produce scientific knowledge, and the role of the visual, tactile and images in science is often neglected. Rhetoric is of great importance within architectural practice, for presenting good arguments for proposals, both verbally and visually, but it is also an important part in the processes of designing and communicating. There is inherently rhetorical dimensions in all design thinking, but the rhetoric based on the good argumentation is central to all knowledge as well. The paper deals with the questions of the role of images, models, physical making and rhetoric within scientific thinking, production of knowledge and exploration of design solutions as well as in communication of knowledge and findings.

Keywords. Design; Rhetoric; Visual thinking; Architecture; Knowledge.

Introduction

We use words, images, and models of different kinds in order to grasp and gain knowledge about the often chaotic world around us. Humanity has developed different strategies to understand the world, which have turned into disciplines like science, art, philosophy etc. In contemporary discussions on the relations between research, design, science and art one can be surprised of how deep the chasms has become between these different fields of knowledge and strategies to confront chaos.

This paper will deal with the questions of the role of images, models, physical making and rhetoric within scientific thinking, production of knowledge and exploration of design solutions as well as in communication of ideas, knowledge and findings. Rhetoric is not only a technique of persuasion, it can also be an important instrument that gives knowledge about prevailing relations, norms, values, and truths in certain situations. The paper intends – by discussing the role of the visual and images in scientific thinking, the role of rhetoric within design, and some connections between rhetoric and knowledge – to show the importance of images and design thinking on different levels for the production and communication of knowledge.

Words and Images in Scientific thinking

The verbal is regarded as the most appropriate and legitimate way to communicate and also produce scientific knowledge. The role of the visual,

tactile and images in science is often neglected. The way disciplines like design and architecture really develop knowledge by means of visual thinking and representation are being discussed, and also the possibilities for communicating research findings in visual ways. (Cf. Rust & Wilson 2001) Knowledge in design essentially rest on non-verbal thought, where concrete and iconic modes of cognition are more relevant than formal and symbolic modes relevant in the sciences. Design often use 'object languages' for nonverbal thinking and communication, including concrete objects, images and cognitive mapping. (Cross 2007)

Martin Kemp has in several books studied visual imagery in science, and has showed that visualization and modes of representation have played a central role in Western science from the Renaissance onwards. The history of science is full of thinking through visual insights, the building of visual models, and modes of visual communication of incredible richness. There is also a constant interplay between words and images, and Kemp states that "there are no pictures within science, or within art for that matter, that operate outside an implicit or explicit dialogue with words, any more than there are theories about how things work that can ultimately resist our apparently irresistible desire to picture phenomena". (Kemp 2000, p.178) Kemp argues that there are some constant currents in our human quest for visual understanding, and that we all have a propensity to articulate acts of seeing through what he calls 'structural intuitions'.

With the term 'structural intuitions' Kemp tries to capture a way of thinking in which painters, sculptors, architects, engineers, designers and scientists often share a deep involvement with the alluring structures in the configurations and processes of nature – both complex and simple – and when looking at nature we use mechanisms of intuitive extraction of the underlying patterns, drawing out certain aspects of geometrical order from the objects of inquiry. (Kemp 2004, p.37) Kemp underlines these structural intuitions as of particular applicability when dealing with engineering solutions in architecture, where an instinctive sense of what might be stable and strong is obviously central to the processes of architectural design, especially at the conceptual stage of projects that push at the boundaries of existing solutions.

We constantly structure reality in relation to perceptual experience, pre-established criteria, acts of interpretation and conceptualisation, and deeper structures operating at a pre- or subverbal level. This is also the case in scientific work, and according to Kemp under all kinds of science lie deep structures of intuition which often operate according to what can be described as aesthetic criteria. This involves the 'look' of visual demonstrations, as well as the more approved verbal modes, and the recent developments in computer graphics have served to unleash the aesthetic instincts of researchers and research teams. (Kemp 2000, pp.2-3)

Any visual product possesses the quality we call 'style', and it is of course not only in art, architecture and design that the works exhibit 'styles'. There are always choices of design, of how to represent and present – choices greatly extended by computer graphics – even if the chosen style is automatic and unconscious. Every age of science and technology has its own rhetorics for communication both internal within the disciplines and with the external world. Here the visual plays a key role, both concerning its importance for observation and representation, and because it is an effective way of communication with non-specialist audiences. (Kemp 2006, p.3) Style is one of the ways through which we can gain access to issues about makers, materials, power relations, dissemination and reception. "The visual demonstrations in science – alongside the verbal formulations, the mathematical expression, the table, and the graph – has its own job to do in building the edifice of scientific understanding." (Kemp 2000, p.5)

Images, visual representations and visual thinking have the potential for opening up new vistas, lines of thought and compositions. For instance was Richard Feynman within the arduous field of quantum mechanics, through his famous diagrams able to combine complex and demanding equations in one picture. Here the diagrams efficiently explained and predicted in ways that were at once intuitive and analytical, they both preceded and even directed calculation. (Kemp 2006, pp.311-312) The visual model has a specific position, and the tree-dimensional model has proven a vital tool in the development of different disciplines, e.g. in the 'engineering' of new substances. These three-dimensional models often have 'styles' characteristic of their period – a certain 'look' or visual 'feel' of the object – including the choice of materials, constructional techniques, colours, textures, scales, and the vocabulary of the shapes. The choices, in science no less than design, involve hugely complex permutations of utility, technology, and aesthetics. One can see obvious connections between scientific models and the systems of representation or characteristic design parameters of the specific age – from how molecules were modeled in the nineteenth century, with their polished balls, firm rods, and turned mahogany stands, to the way recent computer images mirror the high-tech rhetoric of electronic graphics. Kemp finds a parallel between the way molecules and architecture were envisioned and visualized at a certain time: "The haemoglobin model has its own 1960s look – assertive and futuristic, like a visionary model for a concrete block of layered residences. As in any work of architecture, more is involved than mere structure." (Kemp 2000, p.121)

The visual and images seem to play more important roles in science than often is acknowledged. Ylva Dahlman has studied how work with images can support the training and understanding of natural science. The aim of her doctoral thesis was to reveal and understand the hidden structures and cognitive processes that develop knowledge through work with images. Dahlman argues that learning something new implies a movement between different domains

of experience, where the process at certain times needs to return to the verbal domain for reflection. (Dahlman 2004, p.204) An interplay between the visual and the verbal – words and images – is important in knowledge production and understanding. Conscious work with images implies that rationally irreconcilable categories of experience are brought together, and that the world by that is articulated in new forms. Familiar categories are abandoned, imagination increases, and the world appears as more complex through the emergence of more possibilities and alternatives. Dahlman concludes that “when the world is accepted as a new articulation, the knowledge has increased and the relation to the world has changed”. (Dahlman 2004, p.206)

The presence of structural intuitions, visualizations, explorative work with images and words within architecture and design are not hard to see in the work of Cecil Balmond. As an engineer he is strongly involved in conceptual stages of architectural projects that push the boundaries of existing solutions and geometrical orders. Patterns are central to Balmond, and he tries to see behind the surface of all formed objects – by nature as well as mankind – to see the structuring and forming processes and patterns within. (Balmond 2002; Holm & Kjeldsen 2007) In the book *Element* he explores through images – diagrams, drawings, photographs that he often sketches on – and short poetic texts, the patterns and structures that are around us in nature. (Balmond 2007) Here are no references to architecture, but fascinating geometrical forms and forming mathematical principles emerge or are revealed in Balmond’s explorative work with both words and visual images.

Frei Otto’s book *Finding Form* has many similarities with Balmond’s *Element* in the ways that shaping principles in nature are sought and shown through a large amount of images. But Otto’s working tools primarily are physical models that are used to simulate form-finding and optimizing processes. He has developed several practical methods to analyze the processes in nature, technology and architecture where form is generated by itself. Many of them are today possible to simulate with computers – and Otto started that development in the 1960s – but knowledge from the work with the physical models has made several of the calculations possible. (Otto 1995; Nerdinger 2005) The physical, material models are also strong vehicles in the finding, communication and understanding of the constructive principles as well as the architectural expression and overall design.

There are strong influences from the working methods of Otto on many contemporary experimental architects. Reiser+Umemoto worked with chain models of their proposal for the Musical Theater in Graz to find the structural principles (Baltzer & Forster 2004), and Lars Spuybroek has adopted several methods of thinking, practical modeling and presenting. (Spuybroek 2004) These models and presentation techniques have triggered new spatial solutions, but are also important in the communication of the ideas even though it many times may look merely as rhetorical moves.

Rhetoric and Design Thinking

Rhetoric is of great importance within all architectural practice, you have to present good arguments for your proposal and be able to communicate it with a broad audience. Rhetoric, the art of oratory, was invented in the antiquity as a knowledge of how to influence by words. Since all mass-communication at that time were oral it has mostly been dealing with the spoken word, but it is at the same time practical knowledge, technique and application. (Hägg 1998, pp.9-10) Rhetoric is obviously important in all kinds of communication, not least in the discussion, presentation and communication of architectural projects, and also in the design process as such.

Within architectural competitions the importance of rhetoric is especially obvious, and Elisabeth Tostrup has studied this specific field of design practice. The winner of an architectural competition is not the most objective presentation, but the designer who is able to create a proposal based on the best arguments. (Tostrup 2007, p.62) Tostrup states that the material of the competition expresses the *hegemonic* architecture of its time – the network of political, economic and social relations where some actors have a dominating position – and the proposals are trying to communicate its arguments within the field of prevailing values, thoughts and ideas. The rhetoric of architectural competitions – and almost all designers’ proposals one might add – works with a three folded rhetoric, Tostrup argues; through the *physical architecture* of the proposal, through the *visual presentation* of drawings, images, models, and through the *text* material including the program as well as the description of the proposal. (Tostrup 2007, p.64) By studying different competitions she tries to analyse what is valued as “the best architecture” in the given situation, what ways of thinking, ideals and prejudices that is hidden beneath the rhetoric of the designs.

But Tostrup also shows that the rhetorical aspect is intrinsic in all design processes as it is exercised in the individual architect’s studio; important decisions in the process are confirmed by, and identified with, convincing arguments. Tostrup argues that the specific rhetorical material in architecture consists of two forms of argument, the *visual* and the *verbal*, and that the rhetorical argumentation enters into the design process where the creation of architecture involves a *reflective interaction*, an inner dialogue, between images and language. “The architect begins with an idea of a form, which he continues exploring through a series of moves (drawings, models etc.), considering its consequences and implications, while attempting new moves in a constant dialogue between visual perception and verbal, conceptual affirmation.” (Tostrup 1996, p.8)

The reception and perception of the work of architecture, comprehended through its visual form or intellectually conceived through linguistics, depend on a common background of experiences and concepts, which acts

as a foundation for inter-subjective communication. In this communication around the project the words and the images play different roles. Here Tostrup underlines the double-edged freedom verbal language possesses with respect to the concrete conditions of architecture, such as materials and constructions. With this freedom the verbal language may on the one hand be an active force in the process of generating ideas and formal possibilities, it may act as a link in the efforts to raise the direct perceptions of the world to a level of intellectual reflections. On the other hand, this very linguistic freedom may create an incomplete and misleading impression of agreement since the visual references may not be perceived with a similar degree of inter-subjectivity. But here the capacity of designers to visually explore both outer and inner spatial worlds is an asset. (Tostrup 1996, p.9) A designer trained in conceptualisation and verbal articulations as well as concrete visual formulations that link concepts to material construction can have a very important position in this communication.

Richard Buchanan has stated that a new conception of design is needed, a new conception of the discipline, recognising the inherently rhetorical dimension of all design thinking. There is a specific indeterminateness of design and design thinking – that the subject matter of design is indeterminate in relation to other disciplines – since it is applied to new and changing situations, limited only by the inventiveness of the designer or team. Then the most important is not the products as such, but the art of conceiving and planning products, Buchanan argues. “In other words, the poetics of products – the study of products as they are – is different from the rhetoric of products – the study of how products come to be as vehicles of argument and persuasion about the desirable qualities of private and public life.” (Buchanan 1995, p.26) From this perspective, design history, theory, and criticism should balance any discussion of products with the particular conceptions and arguments that stand behind the product in its historical context.

Buchanan describes all making as an integrative, synthetic activity, and with reference to Aristotle he stresses the importance of distinguishing the element of forethought from the specific considerations and activities relevant to each kind of making. “Forethought is an ‘architectonic’ or ‘master’ art, concerned with discovery and invention, argument and planning, and the purposes or ends that guide the activities of the subordinate arts and crafts.” (Buchanan 1995, p.31) The element of forethought in making is what subsequently came to be known as design. Already in the ancient world, the core art of rhetoric served as a basis for systematic forethought in the forms of making in words, providing the organization of thought in narrative and argument as well as the composition and arrangement of words in style.

Rhetoric has exerted powerful influences on arts of making in other materials than words, and has often provided a way of connecting ethics, politics, and the theoretical sciences with the activities of making. Buchanan shows the

complex relations between rhetoric and making, and from the Renaissance the practical arts of making were distinguished from the fine arts as well as from the theoretical sciences and rhetoric. Design, separated from making as well as the intellectual and fine arts, were in many ways left without an intellectual foundation of its own.

Buchanan points at the similarities between the problems identified by Herbert Simon and problems discussed by Aristotle. He sees Simon’s proposed solution of a science of design as having features that are both rhetorical – an emphasis on deliberation and decision making – and poetic, in the sense that all human made products could be analysed and understood from the activity of making. A science of the artificial could be seen as interested in the elements of forethought – and thereby the rhetoric – operating behind all arts of making.

Design thinking is about making, and it applies to making of theories which attempt to explain the natural operations of the world, just as much as it applies to making policies and institutions, and the making of objects. “Design is the art of shaping arguments about the artificial or human-made world, arguments which may be carried forward in the concrete activities of production in each of these areas, with objective results ultimately judged by individuals, groups, and society.” (Buchanan 1995, p.46)

We all, as human beings, are always making and constructing our tools, models, metaphors, images and notions to help us handle and predict the changing world around us. By building more and more knowledge about the material world, we have also been able to distance us from it; it has become an object seemingly ruled by laws independent from ourself. But is there any knowledge really independent of us?

Knowledge Making and Rhetoric

The starting point in a discussion about knowledge and rhetoric is for the Swedish philosopher Mats Rosengren the fact that all the knowledge we as human beings have – from theoretical understandings to practical attainments – are our human knowledge. By talking about “our human knowledge”, all dreams about the stability and ground of knowledge are abandoned. Rosengren shifts the valuation of the terms in the classical opposition between *doxa* – what we believe about the world and ourselves – and *episteme* – how things really are. Rosengren argues that all knowledge is doxical and he tries to sketch another kind of theory of knowledge – a doxology. (Rosengren 2002) A doxology has to consider both the practical and theoretical aspects of knowledge, as well as the condition that it is people with different interests and possibilities that carries the knowledge, creates the practices and formulate the theories. The basic thought in this doxology is that what we traditionally see as knowledge, truth, and objectively set quantities to check our human endeavours against,

actually are human – by human beings created – measures. Thereby these measures are changeable and formable. (Rosengren 2006)

We have to do a theoretical turn away from the given epistemological certainty, accept that no clear and sharp border between true knowledge and pure beliefs can be drawn, and see the conditioned, assumed and biased knowledge. Since no truth, evidence or knowledge exists outside or beyond its human context, the rhetoric, with its relativistic view of knowledge, is central to all knowledge, according to Rosengren. The basis for knowledge is the good arguments and not the incontestable proofs. What counts is the arguments that are regarded as good in a specific historical situation, a particular society, group or scientific discipline. Rosengren argues that doxology is about situated, changing and interested knowledge. He argues that criteria for knowledge neither should be “true” nor “objective” in the way of corresponding to a non-human, objective and neutral reality, but interesting in relation to the specific knowledge situation.

Rosengren takes the meaning of doxa in his doxology from the ancient contrast between knowledge and what you believe is true, opinions. Doxa delineates the network of convictions, habits, practices, traditions and models of thought that surround us all. Doxa is what we hold as true, our beliefs, prejudices, opinions that are prevailing within a society or group of people. He argues that the opposition between episteme and doxa, the difference between knowledge and opinions is a chimera that is based on a misunderstanding of the roles and status of opinions in our production of knowledge.

If we take Protagoras’ statement “man is the measure for everything” seriously, than it has vast consequences for what traditionally has been considered truth and knowledge, Rosengren argues. It means that we never can know anything in the way Plato and the Western scientific thinking strive for. It tells us that every notion of an objective, neutral, given and uninterested knowledge is an illusion. But there is no need to abandon concepts like knowledge, truth, facts and objectivity; they should rather be understood as immanent, valid only within the framework of our human measurements. Science and philosophy have developed methods to separate the true from the false, the real from the illusionary – episteme from doxa. “Rhetoric do not discover truths, it creates the truths that are needed for the moment. Or, if you would like, it creates doxa, but never episteme.” (Rosengren 2006, p.79)

Rosengren states that we are never discovering or finding truths, values or facts – we are always creating them. But this does not mean that we can create without limitation or just everything. Our acts of creation are not free, it is limited, but not determined, predestined or reduceable. Rosengren is deeply influenced by Cornelius Castoriadis and his notion of autonomy, meaning that we ourselves create the laws of the world (auto nomos), they are not given, but all stem from us. Opposed to autonomy is heteronomy (hetero nomos – laws coming from outside), and heteronomous thinking has dominated Western

thought in religion, politics, history and philosophy. Every attempt to base our human world in something outside of or beyond this world is a thought of heteronomy. The doxology that Rosengren is arguing for is a way of trying to think autonomy, to take away the myths of pure reason and the neutral objectivity of science. All knowledge, all facts are interested, meaning that they are always produced in a specific context as an answer to a particular strive for knowledge. “We have ourselves created, and are continuously creating, all our knowledge, all our politics and our world – so the question is first and foremost how we create and not if this creation of ours is corresponding, or not corresponding, to something ‘out there’.” (Rosengren 2006, p.21)

Doxology sees knowledge as localised and produced in and through action – the practices that produce and maintain knowledge is inseparable from knowledge itself. Rosengren sees rhetoric as a thought-organ, a organon, that is something that you use to create as well as act. Rhetoric can become a tool for scientific inquiries into our human knowledge. (Rosengren 2002) That is done by shifting the role of rhetoric from showing how to influence a certain person or audience at a certain occasion to instead being an instrument to show what this person or audience believe, value and know in a specific context and moment.

The way Rosengren describe elements in rhetoric – how to make an inventory of the topic, arrange and deliver your arguments based on reason, emotions, confidence etc – has apparent similarities with central parts of architectural practice and design activities. In the same way as Rosengren means that rhetoric can say something about the doxa and knowledges of the situation, the architectural project or design proposal could be able to do so as well – show what is possible to do or imagine, what values that are prevailing, what conceptions and knowledges that are accepted, and who has the privilege of formulating the problem. This in many ways relates to Tostrup’s notion of the hegemonic architecture of a certain period or situation.

Architectural practices like MVRDV, Chora, Diller+Scofidio and PLOT/BIG have produced a lot of projects, with strong rhetorical consciousness, aiming primarily at showing underlying structures in society or instigating debate through the architectural projects, in which very strong interaction between the verbal, textual and visual argumentation is at work. (MVRDV 2005; Bunschoten et al. 2001; Martinussen 2004) Design and spatial installations with closer relation to contemporary art, as in the work by Penezić & Rogina Architects, Vicente Guallart, An Te Liu and Droog & Kesselkramer exhibited at the Architectural Biennale in Venice 2008, (Betsky & Jodidio 2008) have great potentials of visualizing and communicating the prevailing doxa.

Concluding remarks

The intention of this paper has not been to present any direct results or findings. But by discussing the different notions and functions of images in relation to words in science and research, and the central role of rhetoric in design as well as knowledge production, the intention has been to point at some relations and possible paths for further development of theories and practical procedures in the field of design, research and knowledge production. Designs and proposals can, as doxology, be a way of showing prevailing relations, norms, values, and truths in specific situations. Thereby can also unexpected solutions be shown, surprising possibilities that where not thought of before, that where “impossible”, maybe “unacceptable” within the current doxa, before they where visualized, given a form and presented. Here design thinking and new doxological notions of knowledge can give new ways of producing knowledge.

Hopefully the paper has highlighted some aspects of the constant interplay between the visual and the verbal, between the words and the images, in our quest to conceive as well as construct the world around us.

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