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Knowledge in Urban Situations and Architectural Design Practice

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Authors

Name	Institutional affiliation(s)	E-mail
Fredrik Nilsson	Chalmers School of Architecture	fredrik.nilsson@arch.chalmers.se

Contact person

Name	Telephone (including country code and area code)
Fredrik Nilsson	+46 31 772 24 56
Fax	**E-mail**
+46 31 772 24 61	fredrik.nilsson@arch.chalmers.se

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A city is an expression of the actions, rules and ambitions of individuals and collectives as well as it is the frame and a backdrop to the lives that are lived in the urban landscape. It is made up of the material environments in a continuous play with the relations, processes and situations of a dynamic, ever changing nature which today seem more and more complex and difficult to handle. New configurations and patterns emerge constantly, and our means as architects, planners and citizens to see, grasp and direct the changes need to be developed.

The architect Raoul Bunschoten argues that architecture is a practice engaged in speculating on these emergent configurations and orders. It recognizes them, suggests mechanisms to make them instrumental, and gives them form. Architectural practice invents scenarios for built structures and their uses – as physical objects, these structures are part of the existing world; as models, they describe emergent orders, possible realities. (Bunschoten 1998; Bunschoten et al. 2001)

But contemporary urban processes are often part of global conditions, making sets of them into what Bunschoten calls "proto-urban conditions". Proto-urban conditions are submerged forces strongly affecting behavior and actions in urban spaces. Proto-urban conditions require new means of observation and modeling, they impel a necessity for a new approach that deals with urban change and is influenced by factors and interactions between macro-economics, ecology, geopolitics and cultural identity. To understand these processes one must be nomadic, according to Bunschoten, move from place to place, to see the effects of their interaction with local conditions turn into urban constructs and human affairs. To intervene in the processes, one has to create models that show their nature and composition, and create mechanisms that connect them to local sites and structures. (Bunschoten 1998)

In order to address urban development of this contemporary scale and complexity a multi-level approach is necessary – an approach which is both rational and intuitive, straightforward and devious, an approach which requires many means of operation, many techniques of communication, an approach which borrows from many different disciplines, Bunschoten argues. The approach requires conventional planning methods to survey contexts, poetics to deal with symbolism, new graphic and modeling techniques to understand undercurrents and action tendencies. "It needs scientific means of fieldwork and

modeling. It needs management skills and an understanding of organizational forms. It needs to 'read' an environment, speculate on outside influences, understand the mechanics of processes but also the reasons why people take certain decisions, and how they act and decide collectively." (Bunschoten et al. 2001)

The question then arises if architectural practice and design, with their ways of thinking and working on directly situation based factors, could generate other kinds of knowledge about our societies and cities. Modern theory of science has started to redefine the view of science and knowledge, which are being viewed as more local, situation dependent and preliminary. Could architectural design practice make us see the forces, conceptions and values that govern specific situations in the urban situations – by being speculative and using the visualizing means of architectural practice to show us what is "possible" in a specific situation? Is perhaps architectural practice already producing knowledge about particular situations that is not made use of?

I will try to deal with these questions by mapping some recent discussions about science and knowledge. On this map there are some interesting similarities in the discussions on transdisciplinarity and new modes of knowledge production, the notions of "minor" or "nomad" sciences, artificial science and a theory of knowledge based on rhetoric – called doxology. I will try to put these discussions in relation to architectural practice and design. Underlying questions is if and in what way architectural practice could contribute to the production of knowledge. Let us start by turning to philosophy and theory of science and knowledge.

Doxology

The Swedish philosopher Mats Rosengren starts a reflection on the nature of knowledge from 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" are all dreams about the stability and ground of knowledge 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 thing 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 simple condition that it is people with different interests and possibilities that carries the knowledge, creates the practices and formulate the theories.

*) Including illustrations and references

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 is with its relativistic view of knowledge central to all knowledge, according to Rosengren. The basis for knowledge is the good arguments and not the incontestable proofs. That is the arguments that are regarded as good in a specific historical situation, a particular society, group or scientific discipline. Rosengren means that doxology is about situated, changing and interested knowledge. He argues that criteria for knowledge not should be "true" or "objective" in the way of corresponding to a non-human, objective and neutral reality, but interesting in relation to the specific knowledge situation.

Doxology sees knowledge as localized 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. It 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. The same way as Rosengren means that rhetoric can say something about the doxa and knowledges of the situation could the architectural project 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.

Another Mode of Knowledge Production

A new form of knowledge production – called Mode 2 – is also identified as emerging alongside the traditional and familiar Mode 1. (Gibbons et al. 1994) This new mode does not only affect what kind of knowledge that is produced but also how and in what context it is produced. The main feature is that the new mode operates within a context of application where problems not are set within a disciplinary framework – it is transdisciplinary rather than mono- or multi-disciplinary. While the traditional, Mode 1 knowledge is primarily generated by disciplinary university based research characterized by homogeneity and

*) Including illustrations and references

organized in a hierarchical way that also tends to preserve its form, Mode 2 knowledge is created in broader, transdisciplinary social and economic contexts; in non-hierarchical, heterogeneously organized forms, which are essentially flexible and transient.

Transdisciplinarity is achieved by focusing on and following research problems as they emerge in contexts of application and where the heterogeneity of knowledge producers introduces additional criteria of assessment apart from scientific quality. (Nowotny et al. 2001) Transdisciplinarity consists in specific clusterings and configurations of knowledge brought together on a temporary basis according to the specific problem at hand and context of application, which is strongly oriented by problem solving. The effort is cumulative, and the direction of accumulation may travel in different directions after the major problem is solved. Transdisciplinarity is dynamic. "It is problem solving capability on the move." (Gibbons et al. 1994)

This second mode should not be seen as restricted by the "useful". It has a strong feature of an experimental, innovative attitude. This is connected to an interest in studying, manipulating and building specific, concrete and ordered structures and processes – rather than searching for general first principles – where innovative activities and search for knowledge through design are crucial. The experimental and practical design aspects of this inquiry are enforced by the means of new technology. Mode 2 then implies a shift from a search for fundamental principles to research oriented toward contextual results reached through experimental practice. The experimental process is increasingly being guided by principles of design, which means a closer integration of the processes of discovery and fabrication.

What are then the differences between the two modes of knowledge production and could both count as equally scientific? Scientific knowledge has had as its ideal the Newtonian empirical and mathematical physics. The traditional first mode of knowledge production is based on this Newtonian model and problems set and solved in a disciplinary context governed by interests of a specific, largely academic community. The second mode constantly oscillates between the fundamental and the applied, between the theoretical and the practical. Knowledge is developed in contexts of use; results and applications fuel further theoretical advances. When knowledge actually is produced in a context of application it is not applied science, because discovery and application cannot be separated, the relevant science is being produced in the very course of providing solutions to problems defined in the context of application. But knowledge produced outside of the legitimizing structure can be problematic and hard to qualify as scientific.

*) Including illustrations and references

Nomad sciences

Where is then the limit for what could be regarded as scientific? It is obvious that there are several conceptions fighting for domination, and internal and external borders are constantly – and have always been – redrawn. In A Thousand Plateus Deleuze & Guattari point at the existence of a "minor" or "nomadic" science, a kind of science hard to classify and historically follow. (Deleuze & Guattari 1987) It is not a question of "techniques" in the usual meaning neither "sciences" in the "Royal" or legal sense established by history.

The nomad, minor sciences are nothing new and could be traced through the history of science. Central to this minor "eccentric science" is a fluid, hydraulic model instead of a static. It is connected to a theory of flows – where the flow is the real and consistent – instead of a theory of solid bodies in which the fluid is seen as a special case rather than a basis and point of departure. It is modeled on becoming and heterogeneity instead on the stable, eternal, identical and constant. It is concerned with deformations, transformations and operations, where every figure is an "event" rather than an essence.

The nomad sciences have a stronger relation to the practical, experimental work than the Royal, and instead of being concerned with formalizations and finding constants it produces change and transformation. While the ideal of reproduction is a central part of royal science – and entail a permanent, fixed view outside of what is reproduced – the model of nomad science is rather to follow, it explore the multiplicities of reality by traveling through or follow the material without reducing its complexities. You are forced to follow when searching for "singularities" in a material rather than a general form or a first principle, when studying continuous variation instead of finding constants.

The new mode of knowledge production can in this light be regarded as nomadic, but what has to be stressed is an important dependence and reciprocal play between the different kinds of sciences and modes of knowledge production. They work within each other, putting pressure on and displacing each other – one inspires and explores, the other brings order; one creates problems and solutions through activities that expand, the other by formalizations of them. Two scientific models are discerned – one uniting, comparing and reproducing; one dispersing, transient and following. The royal science search for laws through constants and constant relations between variables, it tries to find forms and first principles. The nomad science is concerned with the relation material-forces rather than matter-form; it is not concerned with finding constants between variables but to put the variables in variation, to produce change and transformation.

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Knowledge – Utterabilities and Visibilities

But what is then knowledge, and about what can we have knowledge? Michel Foucault has described knowledge as an open system of the dualities visible and utterable, of decidable and deciding, or if you wish, of material and discursive. Knowledge than consequently have two elements: the visible and the sayable. These always have some kind of form. It can be environments in the form of buildings and things; texts in the form of laws, reports, norms. Knowledge always relates to forms, to concrete assemblages or formations of matter, words and signs. Knowledge consist, according to Deleuze, of the interlacing of the visible and the sayable, every knowledge goes from something visible to something sayable, or vice verse, and this knowledge of visibilities and utterabilities is collected and stored in the "archive". (Deleuze 1990) Every historical moment is a complex, but concrete, formation of things, environments, words and signs – a complex combining discourses, architectures, programmes and mechanisms.

But is everything in a societal situation visible and utterable, can everything be formalized knowledge? Following Foucault, Deleuze means that power delineates a second dimension irreducible to the dimension of knowledge – "knowledge relates to forms, the Visible, the Utterable, in short the archive, while power relates to forces, the play of forces, diagrams". (Deleuze 1995) Power does not have a form; it is a strategy that produces formations, combinations of visibilities and utterabilities. Power is not concerned with the contents of knowledge, but rather its assemblage; it determines knowledge, but since it has no form – invisible and unutterable – it is no object of knowledge in itself. (van der Heeg & Wallenstein 1990)

A diagram – in the conception of Foucault and Deleuze – is not a collection of data as in an archive; it is something other than formations of visibilities and utterabilities. A diagram is a totality of the force relations of power that at a specific moment and place produce the formed material environments and functions in the society. It puts knowledge, interpretations, institutions, norms, rules and the concrete material into relations; it is the map of dynamic and changing societal conditions and forces. If traditional knowledge of the archive is concentrated on the past and the history of forms, than the diagrams are aiming at the future, constantly generative and changing – the becoming of forces continuously producing new realities (and new diagrams).

How do we describe and get knowledge about these relations of governing forces that produce our formed matter and societal functions? Can diagrams be objects of knowledge? Since the power relations constitute a strategy escaping the visible and utterable stable forms,

they can not be objects of knowledge. At least not until they have been realized in the formed and stratified relations that constitute different kinds of knowledge. (Deleuze 1990) The produced formations, the assemblages of matter, discourses and functions, could then be objects of knowledge. Architectural design as a practice of formation, of material organization, of giving form to elusive and contradictory forces of the project has a great capacity to produce knowledge. As Peter Downton writes: "Once in the world of things and ideas, a design can be seen as a repository of knowledge and interrogated to reveal the knowledge its designers have both intentionally and unintentionally embodied there." (Downton 2003) The realized material form could inform us about the diagrammatic conditions and governing forces producing them. But making knowledge – and especially scientific knowledge – diagrammatic, taking the formless and informal diagrams active in forming of assemblages into consideration, is difficult since knowledge is concerned with forms.

Architectural knowledge, practice and design

Architectural knowledge is however not easily defined, but that it is concerned with form, buildings and the material environment is clear. It is not only about the existing material reality; it is also about the way buildings and urban structures are made and the people who inhabit them. Francis Duffy delineates two special characteristics of architectural knowledge: First it is unusually combinatory and complex – linking different user requirements; linking past historical knowledge with prediction of what ought to be done better in the future; linking practicality with artistic judgment; linking many disparate elements since architecture is such a large, complex and value-laden field. Secondly, architectural knowledge is concerned with the deontic rather than the descriptive – things as they ought to be, rather than things as they are. This primacy of judgment that forms a large part of architectural knowledge means, according to Duffy, that absolutes and quantification always will have to take second place to over-riding, relative and qualitative considerations. (Duffy & Hutton 1998)

Design is anticipative and projective, but also explorative and generative. "Everyone designs who devises courses of action aimed at changing existing situations into preferred ones", Herbert Simon writes. Design is not primarily about how things are but how they might be; it is not about the essential and necessary but about the contingent, the possible and accidentally conditioned. The contingency of artificial phenomena has always created doubt about the scientific rank of the field of design. Simon then talks about an "artificial science" different from the natural sciences. In relation to the prevailing academic norms of

*) Including illustrations and references

formalization and well-defined disciplines (modeled on the royal or Mode 1 science) design and science of the artificial seems "intellectually soft, intuitive, informal, and cookbooky". (Simon 1981 [1969]) They could consequently be described as vague, minor nomad sciences.

Architectural design gives form, many times to the problem as well as its solution; design is not primarily about solving well-defined problems, rather "problematic situations characterized by uncertainty, disorder and indeterminacy" (Schön 1983) where conflicts between values, goals, intentions and interests, often with wide social and political implications, have to be handled. Here the "problem setting" is as important as the solution since the problems are not given. The problems must be constructed (in itself a design problem) from the material in the problematic situation – which is confusing and escapes disciplinary structures since it seems unique – and the problem formulation and solution often occurs simultaneously. An essential characteristic of design is its ability to conceive unity from a set of mutually contradictory requirements, factors or elements. Design integrates contradictory demands and transforms them into a unified whole; it can freeze, give form to diagrammatic – and previously formless – conditions and plays of forces in specific situations

Architectural design as a research activity

Is architecture then a science or a practice? Is it a minor science since it can be seen as a minor profession; a vague, nomadic science since it has a strong relation to practice and to the material that it at the moment is working with and is forced to follow in complex and uncertain situations? Design as a way of working and thinking can have both royal and nomadic traits. It can be reproducing and reductive or innovative and liberating – as science also have both sides. But primarily it has to be regarded as a nomad science – it is primarily producing, following and engaged in a specific situation and context of application. Design is aiming at determinations; but these are not valid in general, rather in a local, specific context that it changes during the design process. Design produces knowledge as formations of visibilities and utterabilities, but not with the primary aim of "understanding", signifying or explaining. It is more related to the direct material, its way of working and function. Design can be seen as an interlacing of both royal and nomad science, carrying both their possibilities and problems.

Architectural and urban design can expand the scientific activity and its means of inquiry; design work can consciously be used as a critical research activity. The spatial figures and formations crucial to the design and architectural thinking can instead of reduced fragments

*) Including illustrations and references

create wholes – formations of contradictory elements – to be tested and examined. The spatial figures and images can be used as tools when trying to analyse and understand a complex situation. Experimental design can be a complementary way of widen the field of research and formulate new possible problem areas. What has not been formulated is however hard to research, and there are differences between empirical research and architectural design concerning what is considered possible. Empirical research is often restricted to probable perspectives, while architecture and design reach for possible perspectives that are not probable, that are even considered "impossible". (Jong et al. 2000) The not yet thought or formulated at a certain historical moment are "impossible", they fall outside of the probable or possible – and thereby researchable – perspectives. Probable perspectives can be predicted; improbable possibilities – potentials not yet thought – have to be designed, be given an immaterial form. Architects can construct alternative realities, possible worlds that are improbable or not wanted because they are not yet conceived or visualised as possible before.

Bo Dahlbom has developed the notion of artificial science, and describes it as an exploration of a possibility space. Artificial science is by its dedication to how things might be – not primarily how they are – concerned with design, and is interested in constructing rather than describing, understanding or explaining. (Dahlbom 2002). It studies what might be possible instead of being restricted to what is realized, and Dahlbom argues that an interest in the factual doesn't have to be restricted to already existing facts. Design can then be an important scientific method and give science a new orientation. Rather then studying the boundaries of the possible it can be an exploration of what is within the space of possibilities and potentials; a systematic knowledge of possible facts, including the ones not yet thought as possible – a true production of new, even surprising, knowledge.

Architectural practice as knowledge production

Among architects and architectural design offices working in urban contexts – such as Raoul Bunschoten/Chora, UN Studio, MVRDV, FOA – several see their work as research developing new approaches using architectural tools and thinking to register, diagram and visualize emerging urban phenomena, forces producing the actual materializations, relations between factors in our cities etc. It is done in order to be able to direct dynamic urban processes and produce effective designs as well as give background material for political discussions and understand the contemporary elusive urbanity.

*) Including illustrations and references

The architectural office MVRDV has strong ideas about how to work in and obtain new insights about complex and elusive situations. It is done by formulating architecturally designed extreme hypotheses – often provoking our conceptions – based on a vast amount of statistical data and information taken to its limits. Their work with "Datascapes" is based on the idea that under the chaos of change resides a hidden logic of laws, restrictions, political conflicts, infrastructure etc manifested in the urban fabric. The hidden logic of forces make some formations appear and others not, and MVRDV visualize these forces with architectural form. (Maas 1998); (Maas 1999). It can be seen as attempts to explore possibilities and potentials in a situation, from diagrammatic relations of forces in a specific situation extract and design concrete visibilities. It is explorations of other possibilities – extreme and improbable, but possible – that are potentially there but not yet seen; explorations that with help of architectural imagination and visualization also uncover conditions, alliances and governing forces in transient, elusive and ambiguous situations. By exploring a problem area in an at the same time systematic and designerly work with facts, restrictions etc new possibilities emerge, which are used to guide the realization of the specific architectural project or to fuel and give new perspectives in public, political discussions. (Maas & MVRDV 2003; MVRDV 2000).

Raoul Bunschoten and his office Chora call themselves an ambulating architectural research laboratory combining practice and research. Through concrete urban studies they develop methods to understand, model and direct dynamic urban processes by registrations of "proto-urban conditions" and "prototypes". Proto-urban conditions are those forces and global trends that influence a specific site leading to a material reconfiguration of the local environment. Through field work and using architectural means of notification emerging phenomena and ongoing changes in the urban landscape are detected, trying to see the usually unseen and unknown. Prototypes are organizations of programs in new, singular manners; they are specific architectural and programmatic configurations, organizational structures embedded in architecture and urban space – "embedded diagrams" – combinations of form and operational mechanisms linking matter, space and urban dynamical forces. (Bunschoten & CHORA 2002; Bunschoten et al. 2001).

The architectural office UN Studio is problemizing and developing the role of architecture and architects in the new complex societal and construction processes which involve new political implications rarely reflected on by architects. They see architecture as a public science and the architect as an expert on everyday public information, where the architect can access complex situations by combining specific knowledge and visualizing techniques.

*) Including illustrations and references

(van Berkel & Bos 1999a; 1999b; 1999c)They stress the importance and specificity of architectural thinking as well as the critically generated engagement with the situation in which the production of architecture takes place. Here the architectural imagination and visualization techniques are capable of drawing different and dispersed elements together, making their interrelations visible in other ways.

All these practices are using architectural tools and imagination – now complemented by new technology – to analyze the complexity of contemporary society and explore relations between disparate things in our cities. Form and images are not only the result of analyses; it is a way of approaching complex situations, making them manageable and meaningful. They are tools that give stability and meaning in the elusive. The rational, systematically analytical thinking has been expanded with an architecturally spatial and constructive thinking, which often seems irrational, subjective, vague and nomadic.

Architecture appears as a field where highly different kinds of knowledge amalgamate. Required here is an ability to on the one hand interpret through rational reasoning, on the other to discover unexpected potentials by experimental shaping and designing.

Preliminary conclusions

To research by architectural practice and design have great potentials, and first steps in attempts to develop this field can be seen. (van Schaik 2003) But if it is to be considered as scientific depends foremost on the readiness of the scientific world to start viewing its "minor" procedures, practices and activities in different ways. The architectural profession of designing and researching practitioners could in my view be developed in interesting ways by the notions of transdisciplinarity, Mode 2 knowledge production, artificial science, nomad science, doxology and where architecture can contribute to the development of these notions as well.

Architectural thinking implies a special ability to handle uncertain, changing, complex situations strongly connected to the specific circumstances with all governing and contradictory forces. Architecture can give form to the elusive – realise formations, both immaterial and material – which can be objects of knowledge or discussed in political processes. Architecture also explores realities, not by distanced objective reasoning but by experimenting, actively creating subjects that try to form the world to something intelligible. The tools and thinking of architectural practice can be important instruments in order to explore, discuss and produce knowledge about existential and societal conditions and realities.

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