



CHALMERS

Chalmers Publication Library

Four Arrows of Knowledge. Some Notes on Practice-Based Research

This document has been downloaded from Chalmers Publication Library (CPL). It is the author's version of a work that was accepted for publication in:

Hantverksvetenskap

Citation for the published paper:

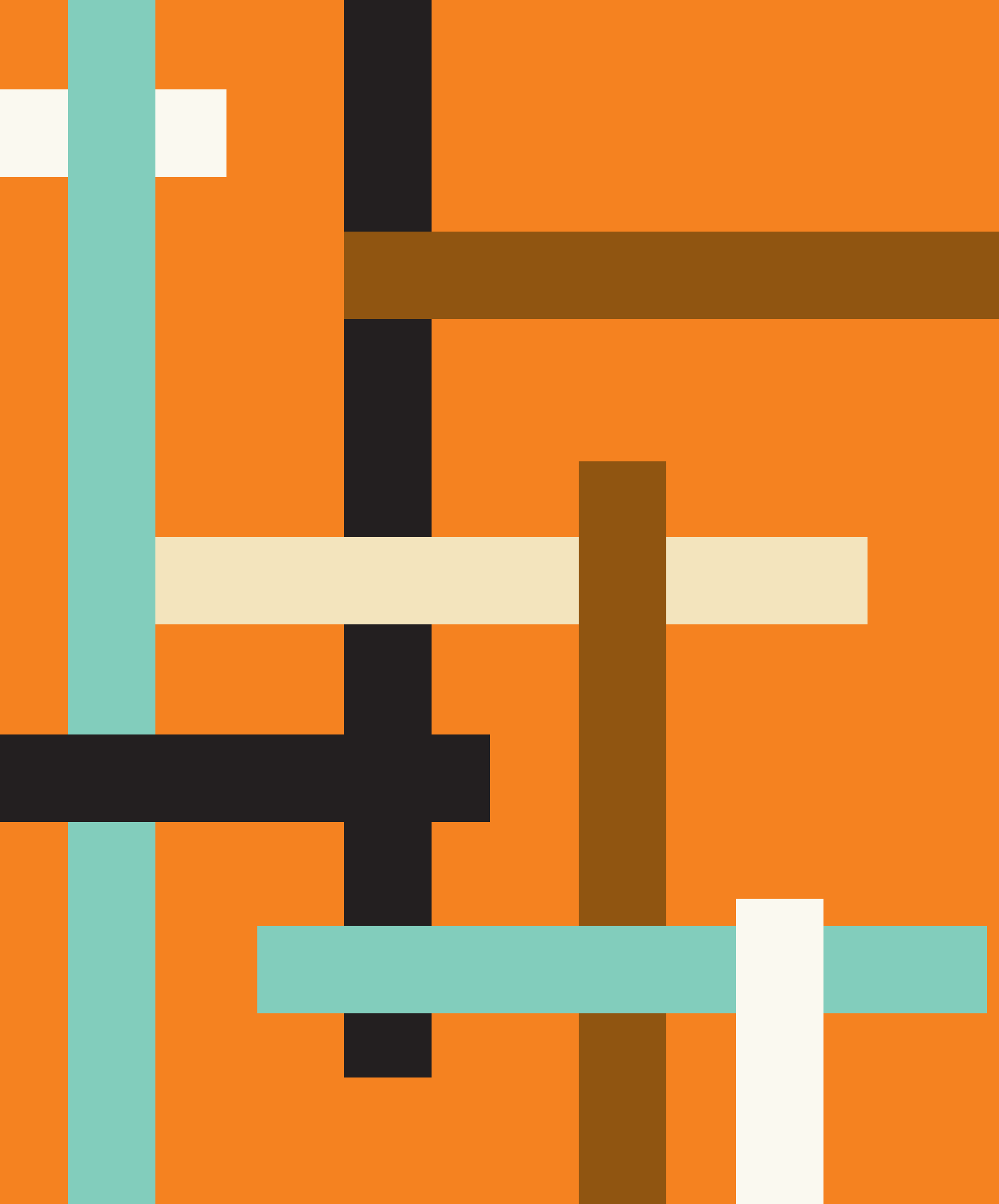
Nilsson, F. ; Dunin-Woyseth, H. (2017) "Four Arrows of Knowledge. Some Notes on Practice-Based Research". *Hantverksvetenskap* pp. 37-46.

Downloaded from: <http://publications.lib.chalmers.se/publication/250870>

Notice: Changes introduced as a result of publishing processes such as copy-editing and formatting may not be reflected in this document. For a definitive version of this work, please refer to the published source. Please note that access to the published version might require a subscription.

Chalmers Publication Library (CPL) offers the possibility of retrieving research publications produced at Chalmers University of Technology. It covers all types of publications: articles, dissertations, licentiate theses, masters theses, conference papers, reports etc. Since 2006 it is the official tool for Chalmers official publication statistics. To ensure that Chalmers research results are disseminated as widely as possible, an Open Access Policy has been adopted. The CPL service is administrated and maintained by Chalmers Library.

(article starts on next page)



FOUR ARROWS OF KNOWLEDGE

Some notes on practice-based research

Halina Dunin-Woyseth
Fredrik Nilsson

There are broad and intensive discussions going on about design and architectural research around the world today. These discussions have been going on for quite some time, but there is still a lot of confusion about it both in the milieus of the practitioners and of architectural researchers themselves. This confusion is mainly caused by the core activities of the discipline – design and architectural practice.

There is a long tradition of studying architecture »from outside« by researchers from other disciplines. An example of such studies is the well-established discipline of art history. But even art historians themselves have recognized that a perspective »from within« has been missing in their studies of artefacts and the production of these artefacts. E. H. Gombrich has been perhaps the one most preoccupied with the question of skill as a missing aspect in the discipline of art history. He believes that the focus of academic inquiry should be placed on the craft of art (Gombrich, 1991:68). He refers to the 16th century Italian art historian Giorgio Vasari, who provided such focused knowledge and made the growth of representational skills the standard account of the development of Italian art from the thirteenth to the fifteenth century. This craft approach

to art (of which architecture was one), however, ceased to play the central role after the Romantic period. Gombrich has gone so far as to claim that »we do not yet have a history of art worthy of its name«, and argues that the missing »technological approach«, or the “craft aspect” of the academic inquiry, has to be restored in order to secure this inquiry a renewed viability (Gombrich, 1991:68; Gombrich, 1993:177; also Abrams, 1989).

During the last forty years there have been ongoing debates on the importance of the »craft aspect«, or the »making aspect«, as a core focus of the design-related research addressed by designers qua makers of design. One way of doing it was the attempts to develop a discipline of architecture or a discipline of design. The British philosopher Gilbert Ryle delineated two categories of knowledge, »knowing that« and »knowing how« (Ryle, 1945-46). And just as with the field of the contrasting knowledge that has been maintained by the established academic disciplines, the architectural and design scholars submit that there was a case for sustaining and maintaining the field of »knowing how« through a discipline of its own (Dunin-Woyseth and Michl, 2001:2).

Ideas about disciplinarily viable design knowledge have been considered by several scholars. Already in

1969, Herbert A. Simon introduced the concept of »the science of design« in his seminal book *The Sciences of the Artificial*. To the science disciplines, the exploration of natural things, he opposed the science of design, which deals with »...artificial things, how to make artefacts, that have desired properties, and how to design« (Simon, 1969:55). In 2001 Piotrowski and Robinson edited the seminal 140 141 publication *The Discipline of Architecture* with the contributions of several prominent architectural scholars such as Sherry Ahrentzen, Stanford Anderson, Carol Burns, Russel Ellis, Thomas Fisher, Linda Groat, David Leatherbarrow, Donald Watson and others (Piotrowski and Robinson, 2001). In the Scandinavian context, two works that followed upon these ideas can be mentioned: *Artifacts and Artificial Science* (Dahlbom, Beckman and Nilsson, 2002) and *Towards a Disciplinary Identity of the Making Professions* (Dunin-Woyseth and Michl, 2001).

These attempts at constituting architecture and design as disciplines on their own could be discussed in the light of existing research cultures of the academia. John Ziman mentioned that newcomers to research enter a self-perpetuating »tribe«, where their behaviour is governed by many unspoken rules. These rules differ with regard according to discipline, country and decade, but the sub-tribes of academia span a common culture (Ziman, 2001:31). In 1942, Robert Merton, the famous American sociologist and philosopher of science, maintained that the 'prescriptions, proscriptions, preferences and permissions' that scientists feel bound to follow could be summarized into a small number of more general norms (Merton, 1973). These norms were institutionalised into what later became known as the CUDOS mechanism (Ziman, 2001:45). The initial letters of the Mertonian norms define the criteria for recognition of the scholars from their international research community. These criteria are: 'Communism' – meaning common ownership of scientific knowledge; 'Universalism' – standing for the inclusion of all knowledge producers, regardless of origin, age, colour, sex etc; 'Disinterestedness' – understood as the absence of bias with regard to special non-academic interests or values; 'Originality' as the demand for novelty with

regard to scientific insights; and organised 'Scepticism', meaning the systematic and critical inquiry into all knowledge claims (Ziman, 2001:31-46).

After several decades of academic research in architecture, the community of interest for this kind of architectural practice is still limited, and the interest of the traditional »building practitioners« for the results of the scholarly production is rather weak. Merton's »sub-tribe« of architectural academic researchers is mainly constituted by university teachers of theoretical subjects in architecture. The notion of communism with regard to architecture as a discipline is questionable because of the still lacking »critical mass« of those carrying out architectural research as an academic inquiry.

Universalism as another criterion for viability of an architectural or design discipline seems to be dependent on the verbal mode of communication of the research results. The language of publications produced by academic architectural researchers and accepted for dissemination by peer-reviewed academic journals is often highly esoteric, and therefore less accessible for practitioners of architecture, who most often express their work in non-verbal modes of communication. Another aspect of the language as a hindrance for universal communication can be that the majority of peer-reviewed research journals are published in English, which often constitutes yet another barrier for the communication of more nuanced issues – even for those who master the esoteric language of academic architectural research in their mother tongue.

Disinterestedness seems to be a very difficult criterion to satisfy, even for the traditional academic disciplines (Ziman, 2001:156). "Nobody imagines that scientists are bloodless robots, indifferent to the reception of their research claims. They have the strongest possible interest in gaining public recognition of their discoveries" (Ziman, 2001:159). But the »sub-tribe« of academic architectural researchers should be able, as well as are other researchers, to build a reputation for reliability where credibility is the prime personal asset of the individual researcher and of all of them as a collective body.

Originality is that criterion which seems to be most

innate in an architectural or design discipline. As Gombrich and Abrams pointed out, there is a latent demand for supplementing the traditional perspectives on architecture and design, i.e. those “from outside”, by a perspective »from within«, the perspective of the practitioners themselves, the »craft« perspective. And this is in order to gain a more whole understanding of the object of joined studies, i.e. of architecture and design, both as products and processes.

Organised scepticism with regard to academic research in architecture seems to be in a process of »acculturation« in the architectural and design discourses. The growing number of research journals in architecture, the new demands of the Bologna process in higher education for developing more knowledge-intensive professional fields, are creating new opportunities for organised scepticism to evolve as a younger cousin of the professional criticism that constitutes the core of architectural practice and its tradition.

This brief glimpse at the five Mertonian criteria for academic viability of the evolving disciplines of architecture and design shows that there are some serious obstacles for establishing these disciplines, both with regard to the professions of architecture and design and to academia. On the other hand, some potentials of such development have also been observed. The professions do not seem to have any interest in the academisation of the professions. The academic »tribes« of the established disciplines might be interested in a perspective »from within« of the profession-based researchers, but they would demand stronger academic standards on the part of the architectural researchers in order to engage in a dialogue of equals. The architectural and design researchers are still a small academic community, still building a critical mass in order to survive as a new academic »sub-tribe«, robust enough to win in a competition for research funding.

It seems that it is necessary to support the development of architecture and design as disciplines of their own and to be equipped for a qualified dialogue within academia, while at the same time, searching for new forms of architectural research which could more strongly engage the practitioners who have the strongest

potential to develop their own field of expertise. While the former strategy would depend on developing a discourse on the premises of academia in order to make the object of studies “academically researchable”, the other one should generate a new mode of research based on the premises of the field of the expertise itself. Then another challenge within this strategy will be how to engage in a dialogue with other knowledge producers, those from academia and otherwise.

Basarab Nicolescu has formulated the three fundamental postulates that modern science was given to extend the quest for law and order on the plane of reason as: (i) that there exist universal laws, of a mathematical character; (ii) that these laws can be discovered by scientific experiment; and (iii) that such experiments can be perfectly replicated. In spite of an almost infinite diversity of methods, theories, and models that have run throughout the history of different scientific disciplines, the three methodological postulates of modern science have remained unchanged until our day. But only one science – physics – has entirely satisfied the three postulates, while the other scientific disciplines only partially live up to the three methodological postulates. In other words, there are degrees of disciplinarity, even in the traditional sciences (Nicolescu, 2002:9-10).

The philosophers of science like Ziman, Gibbons, Nowotny and others talk about the advent of »post-academic science« (Ziman, 2001:67): »...this term indicates continuity as well as difference. The continuity is so obvious that many people assume that nothing has really changed. Post-academic science was born historically of academic science, overlaps with it, preserves many of its features, performs much of the same functions, and is located in much the same social space – typically universities, research institutes and other knowledge-producing institutions.« (Ziman, 2001:68). But although the academic and the post-academic sciences merge into one another, their cultural and epistemic differences are sufficiently important to justify the new name.

What the advent of post-academic science can mean for architectural and design research “from within” the

practice and for its search for new modes of generating and communicating it within the context of an equal dialogue with other knowledge producers are interesting questions. Not least since one might imagine a fruitful development. Because when trying to grasp, explain and legitimise in a scientific context the way architectural practice generates knowledge, it becomes clear how immature our field is in relation to more traditional forms of research and other scientific disciplines. But during the last decade new means and tools have been developed to conceptualise and use the potential of design in knowledge production.

The concept of design as an approach, a way of thinking and managing the complex, transient situations of today has been stressed as a key factor in dealing with our contemporary post-industrial »world of flows«, just as technology and science were in the industrial era. A world of flows favours those who are capable of seeing patterns among disparate things and underlying relationships between apparently unrelated functions – which is the trained capacity of the designer (Fisher, 2000:12). Also the now widely discussed new form of knowledge production – called Mode 2 – opens for a search for knowledge through design. The main feature of the new mode is that it operates within a context of application where problems are not set within a traditional disciplinary framework – it is transdisciplinary rather than mono- or multi-disciplinary. The approach is to focus on and follow 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. The process is dynamic, and 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. There is an orientation towards problem solving, but it involves the strong feature of an experimental, innovative attitude (Gibbons et al., 1994; Nowotny et al., 2001).

Bryan Lawson has argued that from this we should be encouraged to see that the bigger picture appears to be changing in our favour. The description of this new form of ‘in practice model’ of research, that according

to Gibbons et al. has emerged and is becoming increasingly important, has great similarities with design. Lawson states that it is possible that we unknowingly »are just ahead of the game rather than behind it after all« (Lawson, 2002:114).

In 1997 Christopher Frayling led a group that presented the seminal report *Practice-Based Doctorates in the Creative and Performing Arts and Design*. Here it is argued that the development of research methods in the social sciences and humanities, as well as in the more eclectic approaches now adopted within traditional science, has led to a situation where a substantial amount of research, though not practice-based, does not conform to a narrow (and probably mythical) definition of a traditional ‘scientific’ model of research. It is no longer possible to polarise research efforts as either conforming or not conforming to the ‘scientific method’, which previously was the guarantor of ‘real research’. »There is already a continuum from scientific research to creative practice« (Frayling et al., 1997:15).

Frayling and his group argue for a set of definitions of standards framed in such a way that they are sufficiently rigorous to secure the quality of research, but sufficiently inclusive to allow all subjects to find expression within them. This inclusive model would involve either demonstrating that the activities and outcomes could be seen as consistent with a traditional scientific model, or broadening the model so as to encompass the entire continuum from scientific to practice-based research. The creative process involved in practice-based research could then be seen as a form of research in its own right and, as such, equivalent to scientific research.

In the report three principles are delineated, that would be applicable to all research at the doctoral level: (i) the submitted work must make a recognisable contribution to knowledge and understanding in the field of study concerned; (ii) the research must demonstrate a critical knowledge of the research methods appropriate to the field of study; and (iii) there is a submission – whatever its form – which is subject to an oral examination by appropriate assessors.

The above then involves mastery of the existing knowledge-base of the subject, a critical and analytical

attitude towards it, an ability to apply it so new knowledge or understanding is generated, and an ability to communicate all this within the 'contribution' itself.

Lawson has made some valuable reflections that could be put in relation to this. He cites Bruce Archer's formulation "Research is systematic enquiry whose goal is communicable knowledge" (Archer, 1995) and also the definition of research used by the Higher Education Funding Council (HEFC): »Research is to be understood as original investigations undertaken in order to gain knowledge and understanding.« He notes that while both Archer and HEFC refer to 'knowledge', HEFC also includes 'understanding' – which is also the case in Frayling's report – and that the phrase 'contribution to knowledge' is a good choice since it seems to carry less baggage than the word 'research'.

Some interesting reformulations have been done by Lawson concerning how we should assess research when we no longer can rely on a 'scientific method'. The central question is then: »To what extent has the work driven the field forward?« In other words, »how has the work contributed to what is considered good and useful knowledge by those working in the field?« (Lawson, 2002:110). He also argues that it would be very dangerous for anyone – even in a research assessment exercise – to be telling each field too specifically what it should regard as good knowledge. What has driven the field forward must be judged by those working in that field – a »from within« perspective is needed.

For some years now, the term transdisciplinarity has been spreading around the world, appearing in different discussions and places, and giving rise to new insight, conceptualisations and perplexity. At the heart of the transdisciplinary approach is a quest for a deeper understanding of our present world, and with a palpable direction towards the future. According to the theoretical physicist Basarab Nicolescu, the term transdisciplinarity first appeared three decades ago almost simultaneously in the works of such varied scholars as Jean Piaget, Edgar Morin, and Erich Jantsch. It was coined to give expression to a need to transgress disciplinary boundaries. Up until a few years ago, however, the term was virtually unknown, and it is still confused with two

other relatively recent terms, multidisciplinary and interdisciplinarity (Nicolescu, 2002).

The need for bridges between the different disciplines in science led to the emergence of the concepts of multidisciplinary and interdisciplinarity around the middle of the twentieth century. There are some relationships and similarities between them, but some crucial differences between the two approaches also deserve attention.

Multidisciplinary relates to studying a research topic not just »through the lenses« of one discipline but of several disciplines at the same time. Any topic in question will ultimately be enriched by incorporating the perspectives of several disciplines, and multidisciplinary brings, thus, something extra to the discipline in question. But we must, according to Nicolescu, remember that this »extra« is always in the exclusive service of the home discipline. In other words, the multidisciplinary approach supersedes the disciplinary boundaries, while its goal remains limited to the academic framework of disciplinary research.

Interdisciplinarity has a different goal than multidisciplinary. It concerns the transfer of methods from one discipline to another. Like multidisciplinary, interdisciplinarity overrides the disciplines, but its goal still remains within the academic framework of disciplinary research, as is the case with multidisciplinary.

In contrast, transdisciplinarity concerns that which is at once between the disciplines, across the different disciplines, and beyond all disciplines. Its goal is the understanding of the present world. From the point of view of classical thought, transdisciplinarity appears absurd because it has no object. In contrast, within the framework of transdisciplinarity, classical thought does not appear absurd; it simply appears to have a restricted sphere of applicability (Nicolescu, 2002:44).

Disciplinary research concerns, at most, one level of reality – or, in most cases, only fragments of one level – but transdisciplinarity relates to the dynamics engendered by the action of several levels of reality at once. To see and make use of these dynamics, it is necessary to master disciplinary knowledge; transdisciplinarity is nourished by disciplinary research, and from

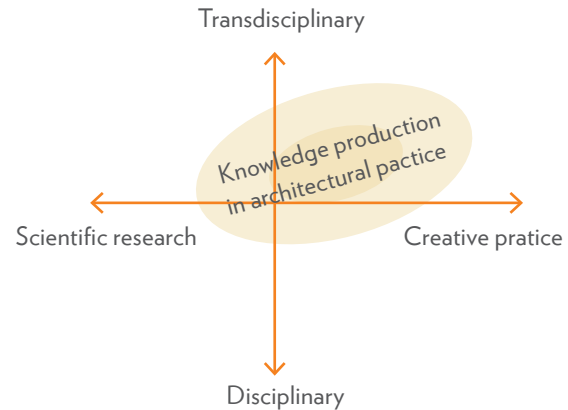
this, disciplinary and transdisciplinary research should not be seen as antagonistic, but rather as complementary.

Just as there are degrees of disciplinarity, Nicolescu argues that transdisciplinary research generates different degrees of transdisciplinarity. Transdisciplinary research – which has the primary goal to understand present situations and solve life-world problems – will in some stages be closer to multidisciplinary; research that corresponds to another degree will be closer to interdisciplinarity; and that corresponding to yet another degree will be closer to disciplinarity. »Disciplinarity, multidisciplinary, interdisciplinarity, and transdisciplinarity are like four arrows shot from but a single bow: knowledge« (Nicolescu, 2002:46).

The descriptions of »a continuum from scientific research to creative practice« and transdisciplinarity in relation to disciplinarity all seem very interesting for a conceptual development of design and architectural research. Here there are possibilities for more equal dialogues with more traditional disciplines at the same time as the practice of design – the »craft aspect«, the making – would be the point of departure. But how can we »map« the contributions to knowledge made by practice-based research? Where in the field of different forms of knowledge production can the specific knowledge generated in architectural practice be positioned and »mapped«?

Let us make a tentative exercise. If we place scientific research and creative practice as two poles of tension on a continuous horizontal axis, and disciplinary and transdisciplinary research as two poles of the vertical axis, we get a field or matrix in which we can position and »map« different research approaches. We would argue that research related to architectural practice moves in the area where creative practice and transdisciplinarity overlap, even though a lot of efforts are involved in more scientific and disciplinary approaches. In its relatively short history, architectural research has many times attempted to move the field towards the scientific and disciplinarity.

Knowledge production in the area around transdisciplinarity and creative practice has earlier been seen as completely outside of research and scholarship. During



Four arrows of knowledge.

the last decade we have experienced an ongoing discussion, an interest even from the scientific world, that has made it possible to start conceptualising the knowledge field of design and architecture in new ways. A more inclusive model of scientific research is actually developing where more practice-based approaches are possible, and it is on the way to achieving academic recognition as well as gaining the vital interest of the practitioners.

But there are still important questions to be addressed, conceptual developments to be formulated, and arguments to be legitimised for the specific knowledge field of architecture and design. We must still find better ways to take care of and utilize the knowledge produced in architectural practice, as it constitutes the core of architectural knowledge. In any case, we are now better prepared to start exploring the present world with other methods, approaches and even 'hunches'.

LITERATURE

- Abrams, Meyer Howard (1989),
»Art-As-Such: The Sociology of
Modern Aesthetics« in M. Fisher
(Ed.): *Doing Things with Texts:
Essays in Criticism and Critical
Theory*, 135 – 158, New York and
London: W.W. Norton.
- Archer, Bruce (1995), "The nature of
research", in *Co-design* No 2.
- Dahlbom, Bo, Beckman, Svante &
Nilsson, Göran (2002), *Artifacts
and Artificial Science*, Stockholm:
Almqvist & Wiksell International.
- Dunin-Woyseth, Halina & Michl,
Jan (Eds.) (2001): »Towards a
Disciplinary Identity of the
Making Professions. The Oslo
Millennium Reader«, in *Research
Magazine* No 4 / 2001
- Fisher, Thomas R (2000), *In the
Scheme of Things. Alternative
Thinking on the Practice of Architec-
ture*, Minneapolis: University of
Minnesota Press.
- Frayling, Sir Christopher, Stead,
Valery, Archer, Bruce et al. (1997),
*Practice-based Doctorates in the
Creative and Performing Arts and
Design*, Lichfield: UK Council for
Graduate Education.
- Gibbons, Michael, Limognes,
Camille, Nowotny, Helga et al.
(1994), *The New Production of
Knowledge. The dynamics of science
and research in contemporary societies*,
London: Sage Publications.
- Gombrecht, Sir Ernst Hans Joseph
(1991): »Approaches to Art
History: Three Points for
Discussion«, in *Topics of Our Time*,
62 – 73, London: Phaidon.
- Gombrecht, Sir Ernst Hans Joseph
(1993): *A Lifelong Interest:
Conversations on Art and Science
with Didier Eribon*. London:
Phaidon.
- Lawson, Bryan (2002), »The subject
that won't go away. But perhaps
we are ahead of the game«, in *Arq:
Architectural Research Quaterly*,
Vol. 6, No 2 / 2002.
- Mereton, Robert (1973), *The
Sociology of Science*, Chicago IL:
University of Chicago Press
- Nicolescu, Basarab (2002), *Manifesto
of Transdisciplinarity*, New York:
State University of New York
Press.
- Nowotny, Helga, Scott, Peter &
Gibbons, Michael (2001), *Re-Thin-
king Science. Knowledge and the
Public in an Age of Uncertainty*,
Cambridge: Polity Press.
- Piotrowski, Andrzej, & Robinson,
Julia Williams (2001), *The
Discipline of Architecture*, Minnea-
polis: University of Minnesota
Press.
- Ryle, Gilbert (1945-1946), »Knowing
How and Knowing That«,
Proceedings of the *Aristotelian
Society*, 46: 1 – 16.
- Ziman, John (2001), *Real Science.
What It Is, and What It Means*,
Cambridge: Cambridge Univ.
Press.

