Building (Trans)Disciplinary Architectural Research - Introducing Mode 1 and Mode 2 to Design Practitioners

Chapter 6
Building (Trans)Disciplinary Architectural Research – Introducing Mode 1 and Mode 2 to Design Practitioners

Halina Dunin-Woyseth and Fredrik Nilsson

Workshop in explorative architectural design research at Chalmers School of Architecture, Göteborg, Sweden. Photo © Chalmers School of Architecture

6.1 Preamble

The objective of this chapter is to discuss Mode 1 and Mode 2 knowledge production through the lenses of the authors' educational practice at the doctoral level, conducted in Scandinavia and Belgium. Our audience has been primarily prospective or already enrolled PhD students recruited from the practice of architecture, design

H. Dunin-Woyseth (✉)
Oslo School of Architecture and Design, Pb 6768 St. Olavs plass, 0130 Oslo, Norway
e-mail: halina.dunin-woyseth@aho.no

F. Nilsson (✉)
Department of Architecture, Chalmers University of Technology, SE-412 96, Göteborg, Sweden
e-mail: fredrik.nilsson@chalmers.se

I. Doucet, N. Janssens (eds.), *Transdisciplinary Knowledge Production in Architecture and Urbanism*, Urban and Landscape Perspectives 11,
DOI 10.1007/978-94-007-0104-5_6,

and arts. The text will present our own conceptualisation of the complex issues of knowledge production and it should be considered as a contribution to research education for practitioners, rather than to the issues of Mode 1 and 2 per se.

This chapter is based on a series of lectures with ensuing seminars, which we as tutors offered at various academic institutions during the period 2003–2009. These lectures have explored the potential of transdisciplinarity and Mode 2 knowledge production for practitioners in various design professions. During those years we received valuable feedback from our audience of PhD students and prospective students, which helped us to revise the content and form of the lectures. The lectures have been focused on several complex issues concerning various existing "knowledge landscapes" as well as on the more recent developments with regard to the emerging new modes of knowledge production. The aim of these lectures and seminars has been to present some aspects of the development of research within architecture and urban design as a field of practice and inquiry, and to help the prospective or novice PhD students to position better their own research within these "knowledge landscapes" (Dunin-Woyseth, 2009a; Dunin-Woyseth & Nilsson, 2009b).

The lectures have attempted to grasp the meta-level issues of the new mode of knowledge production and the opportunities it brings with regard to design research. They have consisted of two parts, the first of which introduced the development of architectural research mainly in the Scandinavian countries together with the essential features of Mode 1 and Mode 2 (Dunin-Woyseth, 2009), and a second part, which related these features to contemporary architectural and design theory, and various practices in architecture and urban planning (Nilsson, 2004, 2007). In this chapter these aspects are intertwined into a presentation primarily consisting of three diachronic parts. The first part discusses how doctoral dissertations by practitioners have developed in the Scandinavian countries from the early 1970s until approximately the beginning of the 1990s. The middle part, starting from the period between the early 1990s and continuing until around the first 5 years of this century, presents the development of "doctoral scholarship" in the same geographical region. The third part is devoted to recent international developments in new modes of knowledge production and suggests several possible ways how design-related knowledge can become an important contributor to the new "knowledge landscapes". This part is related to the authors' experiences in research education in Belgium.

As the "scaffold" for constructing this chapter, the authors propose, firstly, to discuss the Scandinavian and Belgian[1] development of the doctoral scholarship in architecture, and secondly, the international debates that constituted the backcloth of this development regarding the three major modes of knowledge production: monodisciplinarity, interdisciplinarity, and transdisciplinarity.

> Interdisciplinary research can be considered as a means to share disciplinary knowledge in order to create new concepts and theories, create a product, or solve specific problems. In contrast, transdisciplinary contributions involve a fusion of disciplinary knowledge with the know-how of lay-people that creates a new hybrid that is different from any specific constituent part. Trandisciplinarity is not a process that follows automatically from the bringing together of people from different disciplines or professions, but requires an ingredient

> that some have called 'transcendence'. It also implies the giving up of sovereignty over knowledge, the generation of new insight and knowledge by collaboration, and the capacity to consider the know-how of professionals and lay-people on equal terms. Collectively, transdisciplinary contributions enable the cross-fertilization of ideas and knowledge from different contributors, they can lead to an enlarged vision of a subject as well as new explanatory theories (Formas, 2006, p. 42).

The main corpus of the chapter, consisting of the three diachronically organised parts, builds upon four components: (i) a brief description of the development of the doctoral scholarship in Scandinavia during a given period, (ii) some issues concerning contemporary architectural and design theory, and various practices in architecture and urban planning, which relate to the period in question; (iii) an inference from both, i.e. (i) and (ii), and, (iv) a diagram, which further illuminates the inference in a visual mode. The rationales that back the construction of the diagrams have been discussed elsewhere (Dunin-Woyseth & Nilsson, 2008; Dunin-Woyseth, 2009).

6.2 "Patchwork Quilts" of Knowledges and Doctoral Scholarship in Architecture and Design

6.2.1 The Mid-1970s Until the Beginning of the 1990s

Before this period, during a "preparatory phase" of doctoral research until the mid-seventies, PhD students derived their subject of research from their professional or pedagogical practice. The motivation to take a doctoral degree was most often to conclude a professional career by reflecting on one's professional interests. The doctoral students carried out their research in the framework of an individual arrangement with their supervisors, most of whom were not scholars, but highly esteemed practitioners. The doctoral theses represented a kind of professionally internal discussion with the subject matter, and the attempts to engage in an academic dialogue with the traditional knowledge disciplines were few and far between. The language of these theses was most often that of informed professionals, not that of scholars seeking broader academic communication.

For the pedagogical purpose of simplifying we may identify architecture and its practice with the profession of architecture. This makes it possible to regard it as an autonomous field, where professions are identified with "certain characteristics that differentiate the professions from specialised vocations in general; the most important being the professionals' claim of autonomy within a field" (Burns, 2000, p. 262). It has also been argued that "most professionals are consumed by establishing boundaries around themselves that determine who can legitimately engage in a particular craft" (Sutton, 2000, p. 205). Similarly, academic disciplines are here regarded as autonomous fields where "disciplines are defined by groups of objects, methods, their corpus of propositions considered to be true, the interplay of rules and definitions, of techniques and tools" (Foucault, 1972, p. 222). Every discipline tries to group ideas and knowledge in certain ways, and various combinations of alignments form the separate disciplines. The specificity of each assemblage forming a

Fig. 6.1 The "preparatory/first phase" in developing doctoral scholarship in architecture and design (until the mid-1970s) in Scandinavia. In this and in the following diagrams, the *lower part* represents the level of professional architectural practices, the *upper part* represents the level of academia with "clouds" of disciplines. The *arrows* show the interaction and communication, which sometimes are non-existing or weak and therefore marked with a cross

discipline is reached through the theories used. "What determines and maintains any alignment, what gives it its singularity and delimits its boundaries, what assists in adjudicating its decisions, is its *theory*" (Johnson, 1994, p. 2).

The relations between architectural doctoral scholarship and the world of academic disciplines in this preparatory period can be described by the well-known metaphor of "a badly made patchwork quilt" even if a more known metaphor for such relations is "knowledge landscapes" (Becher & Trowler, 2001, p. 29). The "patches" of established *monodisciplines* functioned autonomously in their academic world, while architectural practice and its scholarship created another "patch" of closed universes, that of *profession-based fields* (Fig. 6.1).

In the middle of the 1970s, the schools of architecture in the Nordic countries were pressured by their national authorities to develop a more academic profile, i.e. a more research-oriented one. For architectural vocational studies such a demand was a serious challenge as there was no strong tradition for this aspect of the field. The schools and faculties of architecture began to look for more strategic and institutionalised ways in their effort to build up such an academically oriented profile. Some theoretical disciplines, especially the social sciences and humanities, offered models to follow. This period, until the beginning of the 1990s, we called the "second phase" in the development of doctoral scholarship in architecture.

Architectural and urban design practice was in relation to research mostly regarded as a sort of "applied science". As a consequence of this, PhD students were expected to "renounce" their professional backgrounds as designers and architects. In the doctoral theses of this period it is difficult to trace any awareness of a scholarly stance from their authors. Consequently, the "dialogue" between architectural research and various academic disciplines, addressed in order to discuss architectural matters, lacked on the part of architecture any awareness of its own intellectual identity. There were but few examples of the newly acquired doctoral knowledge and insight being applied in professional practice. Most often, doctoral

research in architecture and design could be regarded as bleak imitations of humanistic, social and technological research. That model of doctoral work seems not to have addressed important questions like: What is unique about design knowledge? Does the concept of design knowledge as "an applied science" allow for adequate theoretical and epistemological foundations for design thinking? Do such questions also concern other professional disciplines?

During this period the discussions on post-modernism as well as post-structuralism were highly influential on the development of architectural theory. The critique of modernism opened up to a lot of other fields, and the theoretical debate brought in influences from several disciplines, e.g. sociology, psychology, history, and in the 1980s not least philosophy (See Nesbitt, 1996; Hays, 1998). The advanced conceptual developments were at this time in many cases based in disciplines outside of architecture itself.

Criticism of adopting methodologies "from the outside", firstly from the social sciences and then from the humanities, by the architectural scholars, was clearly expressed by some informed practitioners at the end of the 1990s (Burns, 2000, p. 266). In the Scandinavian context, architectural research was criticised for having taken over theories and methods from other disciplines without reflecting on the specific character of the architectural field (Lundequist, 1999, p. 7). Social sciences were influential on architectural research, but they primarily can describe what "is", necessarily presented as "seen as". It can contribute with certain types of knowledge, but it is never complete with regard to what is addressed by architecture and its practice (Mo, 2001, p. 93). The explorative, future-oriented aspects of constructing unseen possibilities through design are not addressed or elaborated through these scientific approaches, and support for developing important parts of the discipline is missing. "Our job is to give the client, on time and on cost, not what he wants, but what he never dreamed he wanted; and when he gets it, he recognizes it as something he wanted all the time" (Skjønsberg, 1996, p. 49). To look forward and construct the future is a central part of architectural design. What humanistic studies have in common is "an interest in history, in the reading of texts, in interpretation (also of art), and in hermeneutics, which is seen as a tradition, philosophy, form of scholarship, and research method all in one" (Mo, 2001, p. 97). People in various disciplines think that architecture is "just" an application of the kind of academic study that they themselves are doing. But "architecture [. . .] cannot be seen as a trivialised art form, an aestheticised engineering practice, or a dressed-up sociology. Other disciplines can give perspectives on it, but never capture the entirety" (Björn Linn cited in Mo, 2001, p. 131).

Looking at this period in architectural doctoral scholarship in the Nordic countries and at the issues mentioned above concerning the contemporary architectural theoretical debate, one could, using again the metaphor of a "patchwork quilt", notice the development of new "seams" that are apparent but not yet strong enough. They were too weak to keep together the *field of architecture*, characterised earlier by its closeness between practice and inquiry. Architecture was too weak in its intellectual independence to keep together with the well established "patches" of the academic *monodisciplines*. This "new" doctoral scholarship lost its professional

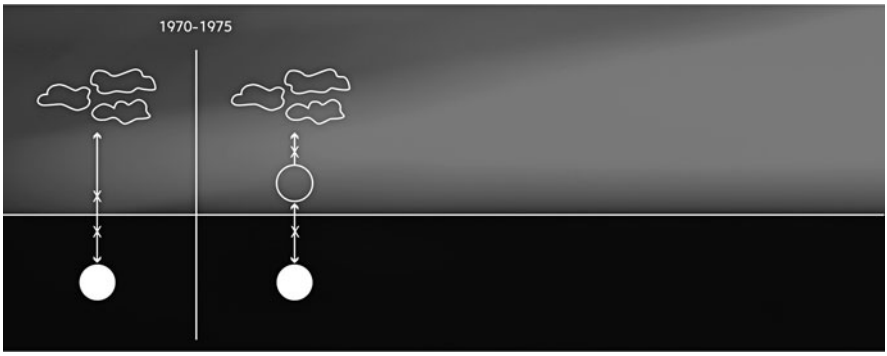

Fig. 6.2 The "second phase" in developing doctoral scholarship in architecture and design in Scandinavia

relevance, but at the same time it did not manage to develop an equal scholarly position to interact in an *interdisciplinary context* with the academic monodisciplines (Fig. 6.2).

6.2.2 The 1990s and the Turn of the Millennium

A discussion about the desirability of a more architecturally pronounced epistemological stance began at several Scandinavian schools of architecture early in the 1990s. The new university laws in Scandinavia, which demanded a more academically professional model of scholarship (including doctoral programmes with organised research education) from all institutions of higher education with university status, provided a direct incentive for this discussion. This period we dubbed "the third phase" in the development of the doctoral scholarship in architecture.

In March of 1992, a Nordic network for co-operation in research education for design professionals was established. Their members represented several Scandinavian schools of architecture offering professional training within design, architecture and spatial planning, which were called in this milieu "the *making* professions". These schools were in the process of establishing their doctoral programmes based on mandatory research education. There was a strong need to discuss issues at a broader level than national contexts, possible contents, and methods of research education in the fields of *making* knowledge. The Network continued to co-operate, and organised a series of Nordic courses in research education, sponsored by the Nordic Academy of Advanced Study (Nordisk Forskerakademi). These courses contributed to the "third phase" in the development of doctoral studies where the focus was on establishing the identity of design thinking (Dunin-Woyseth, 2002, pp. 7–18).

During this "third phase" several attempts were made to answer questions like the following: Is it possible to find unity in the diversity of our approaches to design and design research? How do artefacts come into existence? What are these artefacts

and what are their properties? What are the outcomes of artefacts in the individual and collective lives of human beings?

The challenge of developing architectural and design scholarship has been to comply with the demands of the two worlds: on the one hand, with the world of its own profession, and, on the other, to abide by the rules of the academic world. While the main criterion of viability in the former world is its relevance to the practice of the professions, in the latter it is its ability to fulfil the criteria of scholarship. In the United States, a debate from the 1990s around architecture as a discipline was presented in the publication "The Discipline of Architecture" (Piotrowski & Robinson, 2000). One of the contributors, Stanford Anderson, recognised there both the profession and the discipline of architecture. They are two realms of activity which "intersect" each other; they are partially but not wholly coincident. What the author means by the "discipline of architecture" is a collective body of knowledge that is unique to architecture and, though it grows over time, is not delimited in time or space (Anderson, 2000, pp. 292–294). A Scandinavian concept of the *making disciplines* has been an attempt to formulate a kind of quality supportive framework for *making* discourse rather than of a sensu stricto traditional discipline (Dunin-Woyseth & Michl, 2001). It has been an attempt to respond to both the criteria of professional relevance and, not least, to that of a qualified dialogue with academia.

Developments during the 1990s in architectural and urban theory showed a growing number of notions of architecture that went from the static to the dynamic, where architecture was in a close dialogue with other disciplines. These changes in notions were in a context where the societal role of architecture was being discussed; a society influenced by global networks of economy and production described by change, elusiveness and flows, where borders are blurring and vast urban landscapes are emerging. Concepts such as "inclusive fields of organized materialization" (Zellner, 1999) and "field conditions" were frequently used to summarise an interest that is concerned both with broader socio-political contexts and the local conditions that govern the materialisation of architecture (Allen, 1997). Sanford Kwinter argued at this time for an architecture no longer marked by the usual devotion to objects, but instead becoming an organon, a means to gain knowledge, a system of inquiry, innovation and technique (Kwinter, 1998).

But how can we define the knowledge specific to architecture as a discipline? Francis Duffy delineates two specific characteristics of architectural knowledge: Firstly, it is unusually combinatory and complex, 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 (Duffy & Hutton, 1998; See also Simon, 1981 [1969]). Architectural design as a practice of formation, of material organisation, of giving form to elusive and contradictory forces in the specific project has the capacity to produce various kinds of knowledge (Nilsson, 2007). 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,

p. 107) The realised material – or immaterial – form could inform us about the diagrammatic conditions and governing forces producing them (Nilsson, 2004).

In these epistemological, as well as ontological, stances it is important not to conflate the notion of "form" with that of "object". The problems of form are, according to Kwinter, rather about the mechanisms of *formation*, about processes in which discernible patterns are emerging out of a less finely-ordered field. Design may offer methods that diagram the proliferation of fundamental resonances between the form of the object (or the form of expression) and the form of the content that produces the object, which could give the possibility for "a pragmatic description of historical emergence (why this object, institution or configuration here, in this place, at this time, and not that?)" (Kwinter, 2003, p. 97). At the same time, there was a growing discussion on the relation between the human and non-human worlds; how we are influenced by and are forming alliances with the artefacts produced in society, with consequences for culture as well as for science (Latour, 1993).

Around the turn of the millennium there was a renewed and intensified discussion about the specific traits of architectural research, and the international architectural theory debate was focused on architectural practice and its relation to research (Lootsma, 1999; Nieuwenhuis & Ouwerkerk, 2000; Sigler & van Toorn, 2003). Architects and offices like Stefano Boeri, OMA, Raoul Bunschoten, MVRDV, Foreign Office Architects presented their work as research and used methods that appeared to be systematic investigations of contemporary societies and cities[2] (Maas, Rijs, & Koek, 1998; Hensel & Verebes, 1999; Bunschoten, Hoshino, & Binet, 2001; FOA, Ferré, & Kubo, 2003). These projects as well as those set up at Harvard, Berlage, and ETH Studio Basel tried to understand recent changes in urban environments. Bart Lootsma has pointed out that it seemed an enormous change in relation to the period in which architecture withdrew to the "boudoir", focusing on linguistic games and emphasising its disciplinary autonomy. But Lootsma states that the research seemed to be largely ahistorical. "Current research focuses on the "new", on changes that seem to unsettle the discipline." The research within contemporary architecture fits into different research traditions employed by previous architects, not least those of the early modern movement (Lootsma, 2001, pp. 6–9).

Within these discussions on research, Alejandro Zaera-Polo emphasised the importance of exploring architecture-specific knowledge. Contemporary research is, according to him, directed to fields of knowledge that are either supra-disciplinary (economics, sociology, philosophy) or sub-disciplinary (engineering, construction management). The possibility of producing knowledge able to effectively analyse and articulate at both levels is a niche to exploit, and architecture as a discipline involving many others has potentials in doing so through research engaged directly in processes of transformation of the built environment (Arets & Zaera-Polo, 2003, p. 21).

As with architectural practices like FOA, MVRDV, Chora, and UN Studio, the use of architectural tools and imagination – now complemented by new technology – increasingly has become a means to analyse the complexity of contemporary society and to explore the relations between disparate things in urban contexts (Nilsson,

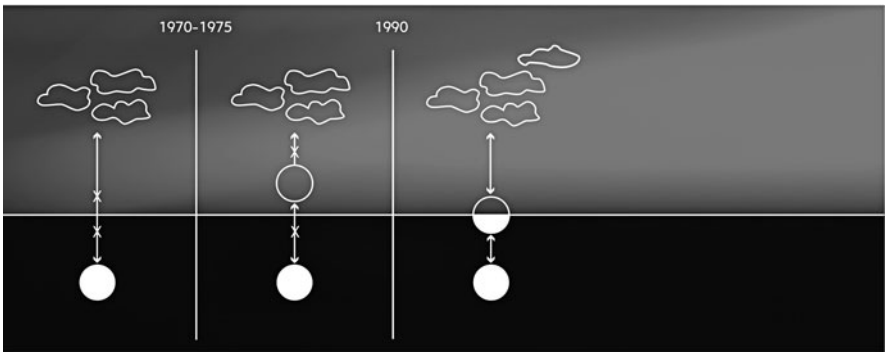

Fig. 6.3 The "third phase" in developing doctoral scholarship in architecture and design

2004, 2007). Architecture as a discipline constitutes a field where highly different kinds of knowledge amalgamate. Its professional skills consist of abilities, on the one hand, to interpret through rational reasoning, and on the other, to discover unexpected potentials by experimental shaping and designing. The potential for using this in research became more and more evident at the beginning of the new millennium, with possible benefits for both academia and professional practice.

The "third phase" of the doctoral scholarship at various schools of architecture in Scandinavia can be again discussed in the terms of the metaphor of a "patchwork quilt", as can the issues in contemporary architectural debate, as introduced above. The most important feature of this period was a growing awareness of the potential of designerly ways of thinking as a prospective, equal in status, contributor to knowledge production, one in accord with both the ontological and the epistemological premises of new developments in the world. A more critical use of the theoretical and methodological frameworks of the established *academic disciplines* in architecture-derived research projects resulted in the production of doctoral works at the level of more mature *interdisciplinary* research. New intellectual self-confidence was to be observed in numerous doctoral theses from that period. The "seams" between design scholarship and the discipline-based academic knowledge have been strengthened. Research into new ways of conducting research, based on activity specific to the field, was encouraged in architecture academia. "Patches" of field-specific architectural scholarship began to emerge in the "quilt" of forms of knowledge (Fig. 6.3).

6.2.3 Mode 1 and Mode 2 of Knowledge Production with Regard to Architectural and Design Scholarship

In the Nordic countries, the network for co-operation in research education held the professionalism of research education as its aim (Dunin-Woyseth & Nielsen, 2004). Between the years 1999–2001, the network organised a Scandinavian research education programme called the Millennium Programme in which more than 50 Nordic

PhD students participated. At the conclusion of the programme, the network's teachers agreed that the current status of research education offered adequate training opportunities for the growing Nordic community of architectural and design researchers. However, this seemed to apply mainly to traditional disciplinary and interdisciplinary academically-initiated research. The network teachers decided that the next phase of co-operation should be committed to the preparation of young researchers to meet the demands for new types of a broader research competence in problem-solving research. A new Nordic pilot study course, sponsored by the Nordic Academy of Advanced Study, was arranged in 2003. Its intention was to introduce the Nordic doctoral students to the international discussion on new modes of knowledge production. Since the Nordic course on Mode 1 and Mode 2 in 2003, the issue of new modes of knowledge production has been addressed in research education at the Oslo School of Architecture and Design, at the department of Architecture at Chalmers University of Technology in Göteborg, at the Sint-Lucas School of Architecture in Brussels, and through the individual doctoral projects of the PhD students.

While the development of the doctoral scholarship in architecture and design was in the previous periods induced by the Nordic national university laws, thus prompting the establishment of organised research education in this geographic region, the Bologna-Berlin guidelines of 2003 extended such development to a broader European context. The intentions of the European guidelines seem to stimulate doctoral research more towards Mode 2 than towards Mode 1 knowledge production (Bologna-Berlin Communiqué, 2008).

For some years now, the term "transdisciplinarity" has been spreading around the world, appearing in different discussions and places, and giving rise to new insights, conceptualisations and perplexity. According to the theoretical physicist Basarab Nicolescu, a characteristic of transdisciplinary approaches is the quest for a deeper understanding of our present world, together with a palpable orientation towards the future. The connection to design thinking is obvious. The term transdisciplinarity first appeared four decades ago and was coined to give expression to a need for transgressing disciplinary boundaries. Up until some years ago, however, the term was virtually unknown, and it is still confused with two other relatively recent terms, multidisciplinarity and interdisciplinarity (Nicolescu, 2002). Multidisciplinarity relates to studying a research topic not just "through the lenses" of one discipline but of several disciplines at the same time. Interdisciplinarity concerns the transfer of methods from one discipline to another. Like multidisciplinarity, interdisciplinarity overrides the disciplines, but its goal still remains within the academic framework of disciplinary research, as is the case with multidisciplinarity. 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. 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 (Nicolescu, 2002, pp. 44–45).

It was through the now canonical work "The New Production of Knowledge" by Michael Gibbons and five other leading knowledge scientists that the notion of transdisciplinarity became widely spread in relation to the description of two parallel and competitive modes of knowledge production. "Mode 1: The complex of ideas, methods, values and norms that has grown up to control the diffusion of the Newtonian model of science to more and more fields of inquiry and ensure its compliance with what is considered sound scientific practice. Mode 2: Knowledge production carried out in the *context of application* and marked by its: *transdisciplinarity*; *heterogeneity*; organisational hierarchy and transience; social accountability and *reflexivity*; and quality control, which emphasises context and use-dependence. Results from the parallel expansion of knowledge producers and users in society" (Gibbons et al., 1994, p. 167).

The definition of Mode 2 introduced the notion of transdisciplinarity, described in the following way: "Transdisciplinarity is a new form of learning and problem solving involving cooperation among different parts of society and academia in order to meet the complex challenges of society. Transdisciplinary research starts from tangible, real-world problems. Solutions are devised in collaboration with multiple stakeholders. A practice-oriented approach, transdisciplinarity is not confined to a closed circle of scientific experts, professional journals and academic departments where knowledge is produced. [. . .] Through mutual learning, the knowledge of all participants is enhanced, including local knowledge, scientific knowledge and the knowledges of concerned industries, businesses, and non-governmental organizations (NGO's). The sum of this knowledge will be greater than the knowledge of any single partner. In the process, the bias of each perspective will also be minimized" (Thompson Klein et al., 2001, p. 7).

The protagonists of transdisciplinary research maintain that in spite of its growing importance and extent it does not replace the traditional forms of research, such as disciplinary research. Even if it is competing, it is still an additional form of research that involves partners from outside academia (Häberli et al., 2001, p. 8). The founders of the Mode 1/Mode 2 movement maintain that in order to master the tasks of Mode 2, one has to get through an apprenticeship in Mode 1. One has first to develop a kind of intellectual identity of Mode 1 in order to be able to acquire multiple cognitive and social identities for practising research in Mode 2 (Gibbons et al., 1994, pp. 148–150).

Transdisciplinarity and Mode 2 have appealed to the design scholars as a new "in-practice model" of research that has great similarities with design. This mode opens for various ways in which the design professions could contribute to knowledge production. Bryan Lawson even states that it is possible that architects and designers unknowingly "are just ahead of the game rather than behind it after all" (Lawson, 2002, p. 114).

In the middle of the first decade of the new millennium, the concept of transdisciplinarity has begun to be discussed within international architectural theory (See Stanek & Kaminer, 2007). It can be seen as connected to the focus of previous years

on architectural practice and discipline, and its relation to research. Within the architectural debate, Zaera-Polo launched a critique on advanced academic architectural research, which to a large extent had its focus on philosophy, sociology, literature, and cultural studies, and which had not succeeded in defining a system of assessment internal to the discipline of architecture. "Often this has resulted in some of the most advanced research in architecture looking like bad movies, bad sociology, or bad literature" (Zaera-Polo, 2005, p. 4).

The concept of transdisciplinarity was also placed in relation to the call for a stronger discipline of architecture, and Mark Linder argued that it is also related to debates on interdisciplinarity and theory. Here transdisciplinarity offers a view that is distinct from pervasive notions of interdisciplinarity. It understands the combination of various disciplines as a means to establish shared methods or concepts, while simultaneously insisting on the value of distinctly disciplinary identities, tools, techniques and technologies. According to Linder, transdisciplinary work can be seen as navigating a contested field of discourses that has been claimed and structured by different disciplines, and those discourses are constantly being reconfigured as they are shared by, or interact with, various disciplines. Transdisciplinary work is demonstrating the flexibility of disciplinary identities, and the negotiations between disciplines produce reconfigured modes of practice. "Because it continues to use properly disciplinary techniques, concepts, and vocabularies and, at the same time, is open to the alterations that emerge when they make undisciplined appearances or appear in altered forms in other disciplines, transdisciplinary architectural work, whether by architects or others, will both intensify and expand the discipline" (Linder, 2005, p. 15).

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, p. 15).

The authors have investigated through their research educational work at the Sint-Lucas School of Architecture in Brussels and Ghent how this relevance and potential could be true in the context of doctoral scholarship in architecture and design (Dunin-Woyseth & Nilsson, 2006, 2008, 2009b). Through our various studies of ongoing doctoral projects at that institution we explored how transdisciplinary approaches could be used in research within the creative professions of architecture and design. We noticed that it could involve various degrees of transdisciplinarity, which includes the use of disciplinary, interdisciplinary and transdisciplinary components in the research design of doctoral projects, as well as of the designerly components per se. Several projects tend to apply more academic approaches of interdisciplinarity (practice-disciplinary knowledge - practice), while others adopt

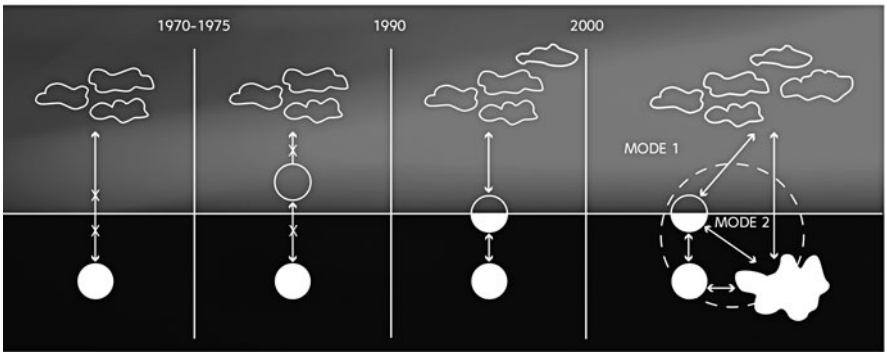

Fig. 6.4 The recent developments in doctoral scholarship in architecture and design (beginning in the new decade)

more practice-internal modus operandi (practice to practice) (cf. Janssens, 2009; Godts, 2009). Yet, they all can be discussed in terms of transdisciplinarity as they include forms of knowledge other than from academic disciplines, and their interest is anchored in their creative professions.

The developments in our practice of research education for practitioners in architecture and design both in Scandinavia and in Belgium, as well as the developments in the "meta-debates" on new knowledge production seem to complement each other. The "patchwork quilt" metaphor allows the consideration of these developments in several ways. It provides for a more abundant richness of the various kinds of "architecture patches", on the one hand, and on the other, strengthens the "seams" between these "patches" and the world of the disciplinary and interdisciplinary knowledge in an equal dialogue. It also opens the way to strengthening "autonomous patches" of architecture where transdisciplinary research is conducted within the practice of architecture, without input from the epistemological world of the academic disciplines (Fig. 6.4).

6.3 Mode 1 and/or Mode 2 for Future Doctoral Scholarship in Architecture and Design?

The belief in the relevance and potential of transdisciplinary research as the main concept for doctoral scholarship in profession-based doctorates has been realised in various doctoral programmes in United Kingdom, Australia and New Zealand (Davies & Rolfe, 2009). Some scholars even maintain that: "Doctoral Mode 2 knowledge generation is a key consideration in professional doctorate study" (Sparrow, 2009, p. 5). There are even inquiries conducted on how university departments may need to reorient their doctoral training programmes to prepare students for Mode 2 knowledge production (Bruun, Langlais, Rask, & Toppinen, 2005).

Yet, the authors agree with the protagonists of Mode 2 who maintain that, in spite of its growing importance and extent, Mode 2 does not replace the traditional

forms of research, such as disciplinary research. Even if it is competing, it is still an additional form of research that involves partners from outside academia where it is, as the founders of the Mode 1/Mode 2 movement maintain, important to develop a kind of intellectual identity of Mode 1 in order to be able to acquire multiple cognitive and social identities for practising research and communicating findings in different contexts. The authors regard "research by design" as a form of post-academic science, and as such, its prospective practitioners should be introduced to the principles of traditional research as applied to their own field, but they should also be trained in some transferable and generic research skills which are common to Mode 1.

While discussing various scenarios for doctoral scholarship in architecture and design we find promising the approach to research formulated by Johan Verbeke when he was rector of the Sint-Lucas School of Architecture in Brussels and Ghent. In 2006, he wrote that his institution should give a central position to a syncretic and integrated approach to research, where it would be possible to continue traditional Mode 1-related inquiries to architecture, but that it should have a special emphasis on strengthening design-based, practice-embedded research (Verbeke, 2008, pp. 12–13). The latter has features of Mode 2-related explorations, as opposed to traditional architectural inquiry, based in various academic Mode 1 disciplines.

Let us make a tentative exercise in diagram formation. 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 attempted many times to move the field towards scientific research and disciplinarity (Fig. 6.5).

Knowledge production in the area around transdisciplinarity and creative practice has been seen earlier as being completely outside of research and scholarship. However, during the last decade we have experienced an ongoing discussion, an interest even from the scientific world, which has made it possible to start conceptualising the knowledge field of design and architecture in new ways. A more inclusive model of research is currently 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 utilise 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", thus not leaving Mode 1, but expanding design scholarship to embrace the promises of Mode 2.

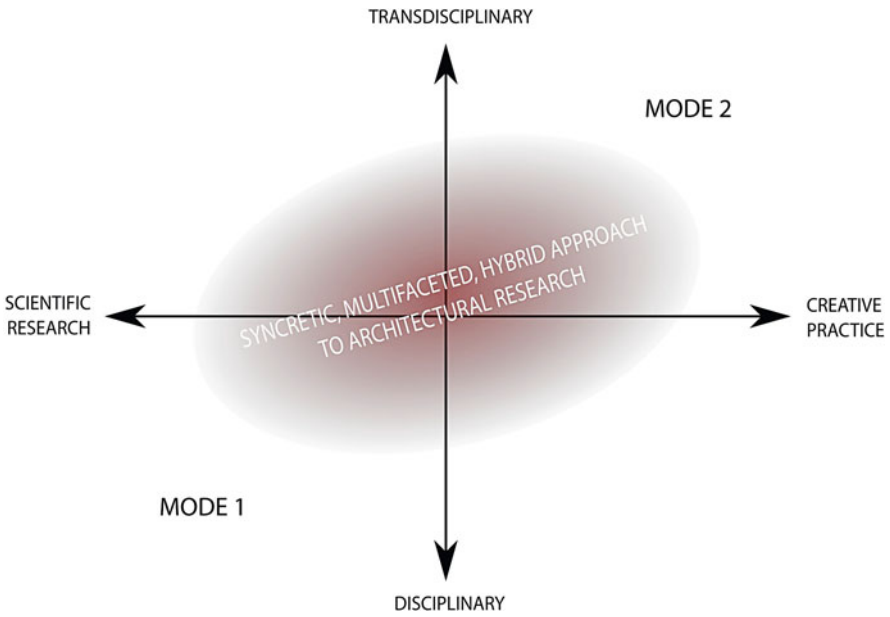

Fig. 6.5 Expanding architectural research with syncretic, multifaceted, hybrid approaches within the field of dialogues between Mode 1 and Mode 2 of knowledge production

Acknowledgments This chapter builds upon and draws from numerous publications of each of the authors and on texts which they have co-authored over the years. We would like to thank doctoral students and participants at seminars and workshops for valuable feedback. Special thanks to Dr. Monika Hestad, Associated Lector, Central Saint Martin, London, for the graphic design of our diagrams 1–4.

Notes

1. The Belgian developments are described from the perspective of the Sint-Lucas School of Architecture Brussels-Ghent, which we have followed closely since 2005 and not least as professors 2007–2009.
2. Abbreviations are frequently used for the names of architectural offices, and those referred to here are Office of Metropolitan Architecture (OMA), Foreign Office Architects (FOA), MVRDV (Maas, van Rijs & de Vries) and United Network Studio (UN Studio).

Bibliography

Allen, S. (1997). From object to field. In P. Davidson & D. Bates (Eds.), *Architecture after geometry*. London: Academy Group, (pp. 24–31).

Anderson, S. (2000). The profession and the discipline of architecture: Practice and education. In A. Piotrowski & J. W. Robinson (Eds.), *The discipline of architecture*. Minneapolis, MN: University of Minnesota Press.

Arets, W., & Zaera-Polo, A. (2003). Equipping the architect of today's society. In J. Sigler & R. van Toorn (Eds.), *Hunch 6/7*, Rotterdam: Episode Publishers (pp. 12–40).

Becher, T., & Trowler, P. (2001). *Academic tribes and territories. Intellectual enquiry and the cultures of disciplines*. Buckingham: Open University Press.

Bologna-Berlin Communique (2003). *Realising the European higher education area. Bologna-Berlin communique*. Retrieved December 2, 2009, from http://www.bologna-bergen2005.no/Docs/00-Main_doc/030919Berlin_Communique.PDF

Bruun, H., Langlais, R., Rask, M., & Toppinen, A. (2005). Moving to mode 2: Re-mode-ing research education in university departments. *International Journal of Learning and Change, 1*, 46–65.

Bunschoten, R., Hoshino, T., & Binet, H. (2001). *Urban flotsam. Stirring the city*. Rotterdam: 010 Publishers.

Burns, C. (2000). Aligning education and practice. In A. Piotrowski & J. W. Robinson (Eds.), *The discipline of architecture*. Minneapolis, MN: University of Minnesota Press.

Davies, R., & Rolfe, G. (2009). *The Welsh experience of developing a work-based 'second generation' doctorate in professional practice*. Paper presented at UKCGE International Conference on Professional Doctorates, London.

Downton, P. (2003). *Design research*. Melbourne: RMIT University Press.

Duffy, F., & Hutton, L. (1998). *Architectural knowledge. The idea of a profession*. London: E & FN Spon.

Dunin-Woyseth, H. (2002). The 'millenium programme': Looking back, looking forward. *Nordic Journal of Architectural Research, 15*(2), 7–18.

Dunin-Woyseth, H. (2009). On designed knowledge artefacts. In J. Verbeke & A. Jakimowicz (Eds.), *Communication (by) design*. Brussels: School of Architecture Sint-Lucas (pp. 277–293).

Dunin-Woyseth, H., & Michl, J. (Eds.). (2001). *Towards a disciplinary identity of the making professions*. Oslo: AHO.

Dunin-Woyseth, H., & Nielsen, L. M. (Eds.). (2004). *Discussing transdisciplinarity: Making professions and the new mode of knowledge production*. Oslo: AHO.

Dunin-Woyseth, H., & Nilsson, F. (2006). Thinking, doing, writing, researching – The Brussels experiments in forms and processes of knowledge. In N. Janssens (Ed.), *Reflections +3. Research training sessions 2006*. Brussel-Ghent: Sint-Lucas Architectuur (pp. 169–172).

Dunin-Woyseth, H., & Nilsson, F. (2008). Some notes on practice-based architectural design research: Four 'arrows' of knowledge. In A. Hendrickx, N. Janssens, S. Martens, T. Nollet, J. Van Der Berghe & J. Verbeke (Eds.), *Reflections +7*. Brussels: Sint-Lucas Architectuur (pp. 139–147).

Dunin-Woyseth, H., & Nilsson, F. (2009). *Building a culture of doctoral scholarship in architecture and design. A Belgian-Scandinavian case*. Paper presented at UKCGE International Conference on Professional Doctorates, London.

Dunin-Woyseth, H., & Nilsson, F. (2009b). Visual thinking as bridge building. Testing a pedagogical concept, drawing some new insights. In S. Martens, A. Jakimowicz, & J. Verbeke (Eds.), *Reflections +9*. Brussels: Sint-Lucas Architectuur (pp. 43–49).

FOA, Ferré, A., & Kubo, M. (2003). *Phylogenesis. FOA's ark*. Barcelona: Actar.

Formas (2006). *Evaluation of Swedish architectural research 1995–2005. Report 7:2006*. Stockholm: Formas.

Foucault, M. (1972). *The archaeology of knowledge & the discourse on language*. New York: Pantheon Books.

Frayling, C., Stead, V., Archer, B., Cook, N., Powel, J., & Sage, V. (1997). *Practice-based doctorates in the creative and performing arts and design*. Lichfield: UK Council for Graduate Education.

Gibbons, M., Limoges, C., Nowotny, H., Schwatzman, S., Scott, P., & Trow, M. (1994). *The new production of knowledge. The dynamics of science and research in contemporary societies*. London: Sage.

Godts, M. (2009). KILLSPACE. In S. Martens, A. Jakimowicz, & J. Verbeke (Eds.), *Reflections +9*, Brussels: Sint-Lucas Architectuur (pp. 140–147).

Häberli, R., Bill, A., Grossenbacher-Mansuy, W., Thompson Klein, J., Scholz, R.W., & Welti, M. (2001). Synthesis. In J. Thompson Klein, W. Grossenbacher-Mansuy, R. Haberli, A. Bill, R.W. Scholz & M. Welti (Eds.), *Transdisciplinarity: Joint problem solving among science, technology, and society*. Basel: Birkhäuser.

Hays, K. M. (Ed.). (1998). *Architecture theory since 1968*. Cambridge, MA: The MIT Press.

Hensel, M., & Verebes, T. (1999). *Urbanisations*. London: Black Dog Publishing.

Janssens, N. (2009). *Critical design in urbanism.* (*Publication for 50% doctoral seminar*). Göteborg: Chalmers University of Technology.

Johnson, P. (1994). *The theory of architecture. Concepts, themes and practices*. New York: Van Nostrand Reinhold.

Kwinter, S. (1994). Who's afraid of Formalism. *ANY*, (7/8), 65.

Kwinter, S. (1998). Leap in the void: A new organon? In C. C. Davidson (Ed.), *Anyhow*, Cambridge, MA: The MIT Press (pp. 24–27).

Latour, B. (1993). *We have never been modern*. Cambridge, MA: Harvard University Press.

Lawson, B. (2002). The subject that won't go away, *ARQ, 6*(2), 109–114.

Linder, M. (2005). TRANSdisciplinarity. In P. Dean (Ed.), *Hunch 9 – Disciplines*, Rotterdam: Episode publishers (pp. 12–15).

Lootsma, B. (Ed.). (1999). The need of research. *Daidalos 69/70*.

Lootsma, B. (Ed.). (2001). *Research for research*. Amsterdam: Berlage Institute.

Lundequist, J. (1999). *The idea of architectural research and its relation to philosophy*. Stockholm: Kungl Tekniska Högskolan.

Maas, W., Rijs, J. V., & Koek, R. (Eds.). (1998). *FARMAX. Excursions on density*. Rotterdam: 010 Publishers.

Mo, L. (2001). *Philosophy of science for architects*. Trondheim: NTNU.

Nesbitt, K. (1996). *Theorizing a new agenda for architecture: An anthology of architectural theory, 1965–1995*. New York: Princeton Architectural Press.

Nicolescu, B. (2002). *Manifesto of transdisciplinarity*. New York: State University of New York Press.

Nieuwenhuis, A., & Ouwerkerk, M. V. (2000). *Research by design. Conference book*. Delft: Faculty of Architecture, Delft University of Technology.

Nilsson, F. (2004). Transdisciplinarity and architectural design. On knowledge production through the practice of architecture. In H. Dunin-Woyseth & L. M. Nielsen (Eds.), *Discussing trans-disciplinarity: Making professions and the new mode of knowledge production*, Oslo: AHO (pp. 30–46).

Nilsson, F. (2007). Forming knowledge – On architectural knowledge and the practice of its production. *The Unthinkable Doctorate*. Bruxelles: La Lettre Volée.

Sigler, J., & van Toorn, R. (Eds.). (2003). *109 provisional attempts. Hunch 6/7*. Rotterdam: Episode Publishers.

Simon, H. A. (1969). *The sciences of the artificial* (2nd edn.). Cambridge, MA: The MIT Press.

Skjønsberg, T. (1996). *The flat space*. Oslo: AHO.

Sparrow, J. (2009). *Doctoral level feedback and reflection for academic writing in Mode 2 knowledge contexts*. Paper presented at UKCGE International Conference on Professional Doctorates, London.

Stanek, L., & Kaminer, T. (2007). Trans-disciplinarity: The singularities and multiplicities of architecture. *Footprint*, 1.

Sutton, S. E. (2000). Reinventing professional privilige as inclusivity: A proposal for an enriched mission of architecture. In A. Piotrowski & J. W. Robinson (Eds.), *The discipline of architecture*, Minneapolis, MN: University of Minnesota Press (pp. 173–207).

Thompson Klein, J., Bill A., Grossenbacher-Mansuy W., Häberku, R., Scholz R.W., & Welti M., (Eds.). (2001). *Transdisciplinarity: Joint problem solving among science, technology, and society*. Basel: Birkhäuser.

Verbeke, J. (2008). Research by design in architecture and in the arts. *Reflections +7*. Brussels: Sint-Lucas Architectuur.

Zaera-Polo, A. (2005). Disciplines. In P. Dean (Ed.), *Hunch 9 – Disciplines*. Rotterdam: Episode Publishers.

Zellner, P. (1999). *Hybrid space*, *New forms in digital architecture*. London: Thames and Hudson (pp. 4–5).