



THIS IS RESEARCH BY DESIGN



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This chapter discusses recent trends in research by design in the field of architecture and, as such, it attempts to introduce the present challenges and weaknesses of the method. Findings from recent developments and positions in artistic research will be analysed in order to introduce key components of research by design. Furthermore, a scheme is introduced that assists in discussing the different ways that design (as an activity) can be relevant when undertaking a research project. A clear definition of research by design is proposed in the hope of improving both transparency and clarity in current discourse. The aforementioned developments in artistic research provide confirmation for the proposed definition. A few examples will also be given in the later stage of the chapter.

Then, reflecting upon the recent developments in research by design, the chapter concludes with some thoughts on the importance of designing as a vehicle to develop understanding and knowledge, as well as of how to keep an open and liberal attitude toward the form and content of design research while simultaneously maintaining high academic standards.

INTRODUCTION

Ever since the joint declaration of the European Ministers of Education convened in Bologna on 19 June 1999, university education in Europe has been evolving toward a strict Bachelors/Masters/PhD structure.¹ The idea is to establish a transparent structure in which every Bachelors degree requires three years of full-time study, a Masters degree requires two additional years, and a PhD a further three. This organisational plan forces schools of architecture (as well as those of art, design and

cognate disciplines) to increasingly focus on research endeavours and establish appropriate doctoral degrees. Moreover, recent accreditation procedures, such as in Sweden, Denmark and other European countries, now require schools to clearly report on their research structures and outputs. The consequence of these changes is that architectural schools have begun to explore how the core of the field (that is, designing and artistic activity, and its related activities) can become the basis of, or vehicle for, research. This chapter therefore aims to establish a clear and sharp definition of the term 'research by design'. It is proposed as that kind of research in which the process of designing, as well as experience gained from practice, plays a crucial role in research - not only as inputs to be observed, but, more importantly, as the actual methods and outcomes of the research itself.

A growing number of conferences on research by design and artistic research in general have been organised during the last decade, and many proceedings from these conferences have been one of the tangible results. These conferences include: 'The Unthinkable Doctorate' in Brussels, Belgium (2005);² 'Design Enquiries' in Stockholm, Sweden (2007); 'Research into Practice Conference' in London, UK (2008);³ 'Changes of Paradigms in the Basic Understanding of Architectural Research' in Copenhagen, Denmark (2008);⁴ 'Communicating (by) Design' in Brussels (2009);⁵ 'The Place of Research/The Research of Place' in Washington, DC, USA (2010); 'Knowing by Designing' in Brussels (2013), and many others. In addition, the European Association for Architectural Education (EAAE);⁶ the European League of Institutes of the Arts (ELIA);⁷ as well as a number of professional

bodies - for example the Royal Institute of British Architects (RIBA)⁸ and the Architects Council of Europe (ACE)⁹ - are all paying increasing attention to architectural research and its developments, especially that which is grounded on practicing and designing architecture.

Also, after a major effort by an international group of experts, *The Routledge Companion to Research in the Arts* (2010) has been published and includes many interesting experiences and relevant positions for those engaged in artistic research.¹⁰ Likewise, the *Journal for Artistic Research* was established in 2011.¹¹ Research has clearly become a hot topic: buzzwords like 'research-based education', 'knowledge society' and 'knowledge processes', for instance, have put research endeavours high onto the agenda of politicians and academic policy makers. This is especially the case in architecture and the arts, where a lot of specific PhD degrees have only recently been created.

An example is the situation in Flanders in Belgium, where I am based. After signing the Bologna Declaration, the Flemish Minister of Education began a process to reform the university education system, and the Flemish parliament duly adopted a new Higher Education Act in April 2003. The degree structure, based on the three main Bologna 'cycles', constitutes the core of this legislation, and the structure was introduced for all degree programmes in the 2004-5 academic year. A variety of new doctorates in the arts, music, product design, and architecture (including by design) were created. For all these disciplines, therefore, research is becoming ever more important. And as a consequence, more explicit reporting on research outcomes is required, since it now has a growing

impact on governmental financing of Flemish universities.

It is also important to note that teaching staff in the fields of the arts, music, product design, and architecture largely consist of leading practitioners; hence, schools are bringing top-level professional expertise directly into their curricula. These adventurous practices are some of the important foundations of their educational systems. Faced with a period of change in which the development of research has become a crucial concern, most schools in Flanders found they had to address many important questions. What is the context for these educational changes? How should they then develop appropriate methods of research? What indeed is research by or through design? How can it lead to a research project that will eventually lead to a viable PhD award? And what should be the requirements for undertaking research by design?

Within this frame of reference, it seems logical to begin to examine these questions in relation to the highly-developed design competences that are available in almost all the schools of architecture across Europe. On average, half the curriculum for a Bachelors or Masters degree is comprised of practical and design work; this is also in line with European requirements for achieving a balance between theoretical and practical courses (Table 8.1). Thus, it seems logical to try to find ways to extend this kind of balance into new PhD programmes as well, and to acknowledge how designing and making can not only play a crucial role in the intellectual work of the researcher but also contribute to the creation of knowledge.

From the above analysis, it is evident that there was strong pressure from politicians and academic

	CURRICULUM	
	Theoretical components	Practice-based / design components
PhD	?	?
Masters	50%	50%
Bachelors	50%	50%

policy makers following the 1999 Bologna agreement - both in Belgium and other European countries - to increase the research endeavours of universities, and so as to ensure that research activity in Europe would not be eclipsed by that in the USA, Asia, Australasia and elsewhere. This then triggered the organisation of a good many research conferences, and induced research policy documents from European associations in subjects such as architecture. In the following section it will be shown that the understanding of what knowledge is has been shifting over time, with the more recent positions being most helpful for the field.

KNOWLEDGE FORMATION

Following the lines set out in the Frascati Manual, research and experimental development is defined as creative work undertaken systematically to increase the stock of knowledge - including knowledge about humanity, culture and society - and to use of this stock of knowledge to devise new applications.¹³ Although this definition has been discussed exhaustively, the focus on a contribution to knowledge is generally accepted and crucial to this discourse. As one example, the RAE 2008 assessment of UK university research applied the following definition:

'Research' ... is to be understood as original investigation undertaken in order to gain knowledge and understanding. It includes work of direct relevance to the needs of commerce, industry, and to the public and voluntary sectors; scholarship; the invention and generation of ideas, images, performances, artefacts including design, where these lead to new or substantially improved insights; and the use of existing knowledge in experimental development to produce new or substantially improved materials, devices, products and processes, including design and construction.¹⁴

This kind of acknowledgement is generally understood as an important step forward for the fields of architecture and the arts, and is seen as an open categorisation that includes architectural projects and artworks as research outputs. As Fraser has pointed out in regard to the UK's RAE 2008 exercise, design research outputs tended to be rated highly by those on the architecture and built environment panel.¹⁵

How then does this affect the pursuit of design research? The principal criterion for awarding the degree of Doctor of Philosophy is whether a project represents an original and significant contribution to knowledge. This, however, raises the question of what is understood to be knowledge. The following overview describes a wide range of positions toward knowledge

Table 8.1 Balance of the architectural curriculum for Bachelors and Masters Courses in typical European schools of architecture, posing the question of what proportion to apply to PhDs in a design-orientated school¹²

in order to show that it is much more than the traditional understanding of explicit written-down knowledge.¹⁶ The important point is that, in reality, far more kinds of knowledge are needed than just the explicit one.

Already in the 1950s and 60s Michael Polanyi started arguing that there was more than factual and explicit knowledge.¹⁷ In his famous book on *The Reflective Practitioner*, Donald Schön introduced the importance of reflective thinking in the development of understanding and knowledge in creative disciplines.¹⁸ His insights and ideas have been quoted widely, especially within architecture, where they are regarded as one of the primary ways of developing knowledge. However, reflection-in-action has also become a key process in all disciplines where doing and making are essential. What is less known is that Schön's underlying intention was to make an argument against the positivist position, and thereby to stimulate focus on the importance of other types of knowledge. In this sense, he was already aware of the aforementioned developments in research and science, and he wanted to balance those with a focus on other ways of understanding – stressing always the importance of *other* types of knowledge.

Gibbons and colleagues introduced the important distinction between 'Mode 1' and 'Mode 2' knowledge.¹⁹ In their view, 'Mode 1' knowledge is defined as:

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 enquiry and ensure its compliance with what is considered sound scientific practice.

On the contrary, 'Mode 2' is:

Knowledge production carried out in the context of application and marked by its transdisciplinarity, heterogeneity, organizational hierarchy and transience, social accountability and reflexivity ... It results from the parallel expansion of knowledge producers and users in society.

'Mode 1' knowledge therefore includes the scientific knowledge developed in university laboratories, concepts drawn from architectural theory and so on, whereas 'Mode 2' knowledge is the kind that is transferred by architects from practice into the design studio. These definitions were later used by Halina Dunin-Woyseth to stress the importance of multidisciplinary research in the field of architecture.²⁰

Furthermore, based on a distinction raised by Gerard De Zeeuw, Ranulph Glanville has introduced the concepts of 'knowledge of' and 'knowledge for':

What designers need is knowledge for changing the world, not knowledge of what it is. Scientists want knowledge of what it is. They want to tell us how things are. Designers want to change it. Design is not interested in describing what it is, but changing what is.²¹

All of this must be considered within the general context of human learning. Human learning and (social) constructivist thinking are strongly based on experiences, perceptions, and interactions between people.²² It is then argued that, as a result, these groups of people develop a mutual intersubjective understanding.²³ The problem hence with academia today is that it undervalues the diversity

in knowledge, as has been clearly formulated by Glanville:

One of the problems for design and research is that research and the academy has become very specialized; science as a word used to mean knowledge ... It has come to mean a particular type of knowledge formed in a particular way, reflecting a particular world view.

This overly particular interpretation is one of the major problems that the 'creative' and 'making' disciplines currently face as they attempt to incorporate several types of knowledge.

In this context, it is also worth mentioning the difference between 'nomothetic' and 'idiographic' sciences as introduced by Wilhelm Windelbrand.²⁴ Nomothetic sciences are those that search for general laws (or at least generalised knowledge), as is the case in most of the natural sciences. Windelbrand remarks that even a humanistic discipline like history might have a similar aim, so no intrinsic differences exist between disciplines. However, he maintains as a fact that, in the study of history (or art or architecture, it is tempting to add), general laws are not normally of interest, for example for tracing historical development. Rather the focus is on single events, single periods, and single personalities; here the idiographic disciplines are those which study their subjects in terms of their specificity. For example, Stefan Östersjö's doctoral thesis at Lund University in Sweden, titled 'Shut up 'n' Play' (2008) introduced the concepts of 'thinking-in-action', 'thinking-through-practice', 'thinking-through-performing', and 'thinking-through-hearing'.²⁵ This PhD nicely describes the critical moments in developing

insight during practice/play; hence, it acts as an exemplar of research where the 'doing' plays a crucial role.

Donald Schön's ideas were, later on, further developed by Nonaka and Takeuchi when they highlighted the different sub-processes of knowledge: combination, internalisation, socialisation, and externalisation.²⁶ It is the interaction between these sub-processes that brings a field forward. Vital in their arguments is the interaction between explicit and implicit knowledge, something which is especially relevant to the fields of architecture, art and design since they incorporate mainly implicit knowledge (this being transferred in a design studio setting).

The key point that Glanville has made is that there is no such thing as research that is not designed.²⁷ Research itself is design. It is not just setting up something and doing it - it has to be modified, changed and fiddled with until it works; then the results are looked at and learned from, which changes things, and the process is begun again. His conclusion is therefore that it is ridiculous to try to make design subject to the rules of research, when research itself is only possible because of design.

Hence, in this way, designing has the power to facilitate the generation of knowledge, as indicated by J. Christopher Jones:

In any creative process, what some of us call the intuition (of the imagination) must have priority. Reason (and science) must be used to support, not to destroy, this essential confidence and vision. Otherwise, the intuition, or creativeness, which does not perform to order, will 'fly out of the window'.²⁸

From the above observations, it is clear that the scientific understanding of what is knowledge has been changing over time and has been seriously broadened as a consequence. For the discipline of architecture, it is important to find ways to value the insights and outcomes developed during design activities. In a similar way, creating and making are the core processes of the arts in general.

To wrap up this part of the discussion, the field of architecture incorporates a good deal of tacit knowledge, which is crucial but often very difficult to communicate precisely. This is the challenge for the development of research in the domain: on one hand, researchers need to exploit the possibilities and the competences that have, for centuries, been developed in the field (designing and making); on the other hand, this competence needs to be further developed in order to find ways that allow peers to understand and discuss the knowledge being created. Given that similar debates are taking place in various artistic subjects, the following section describes recent developments and the main positions taken.

WHAT IS HAPPENING IN THE ARTS?

As is well known, architecture and the arts were strongly linked in the past. Therefore, it is worth exploring the recent developments in those kinds of arts in order to reflect back onto the field of architecture. In 2006, Jan Kaila published a fascinating document called *The Artist's Knowledge*.²⁹ In his introduction, the problem of the relation to knowledge and the interaction between theory and practice was nicely formulated:

The postgraduate program aimed at producing new knowledge based upon the artist's own artwork, rather than

searching for straightforward models from the world of the sciences ... In this manner it was hoped that a dialogical relationship could be maintained between artistic research, art audiences and art-related institutions and that the troubling isolation often incurred within academic research could be solved ... The so far most unresolved question of the methodology of artistic research and the doctoral studies program is related to theory. How can the artist devise theory from his/her practice, theory which can be linked in part to the almost non-existent tradition of artistic research, which can dispute legitimacy in an investigative manner, but not necessarily resemble traditional academic research methodology.

A similar position comes from Jan Baetens when discussing the relation of literary theory to reading and writing:

Why do we need literary theory? Because literary theory can enhance the quality of literary practice. If literary theory matters, then practice (of reading as well as of writing) really matters ... I have also identified the basic problem of modern literary theory, namely the fact that theory is no longer aimed at producing better practice (of reading as well as of writing), but as something else (and that something else can be extremely diverse, such as theory for theory's sake, for instance). However, linking theory and practice should be the basis of any serious academic education and research ... More in general it should be observed that a fruitful relationship between theory and practice seems to work better if initiated by practitioners, not by theoreticians.³⁰

Henk Borgdorff has been one of the driving forces in developing artistic research throughout Europe; and he states:

Characteristic of artistic research is that art practice (the works of art, the artistic actions, the creative processes) is not just the motivating factor and the subject matter of research, but that this artistic practice – the practice of creating and performing in the atelier or studio – is central to the research process itself. Methodologically speaking, the creative process forms the pathway (or part of it) through which new insights, understanding and products come into being.

In part, then, the outcomes of artistic research are artworks, installations, performances and other artistic practices, and this is another quality that differentiates it from humanities or social science research – where art practice may be the object of research, but not the outcome. This means that art practice is paramount as the subject matter, the method, the context and the outcome of artistic research. That is what is meant by expressions like ‘practice-based’ or ‘studio-based’ research. This points to an important distinction between art practice in itself and artistic research. Artistic research seeks in and through the production of art to contribute not just to the artistic universe, but to what we ‘know’ and ‘understand’.³¹

And Borgdorff continues in his same essay in *The Routledge Companion to Research in the Arts*:

As a rule, an original contribution in artistic research will result in an original work of art, as the relevance of the artistic outcome is one test of the adequacy of the research. The reverse is not true, however; an original artwork is not necessary an outcome of research in the emphatic sense.

The requirement that a research study should set out with well-defined questions, topics or problems is often at odds with the actual course of events in artistic research. Formulating a question implies delimiting the space in which a possible answer may be found. Yet research (and not only artistic research) often resembles an uncertain quest in

which the questions or topics only materialize during the journey, and may often change as well. Besides not knowing exactly what one does not know, one also does not know how to delimit the space where potential answers are located. As a rule, artistic research is not hypothesis-led, but discovery-led ... whereby the artist undertakes a search on the basis of intuition, guesses and hunches, and possibly stumbles across some unexpected issues or surprising questions on the way.

In another essay in the same book, Helga Nowotny, who chairs the European Research Council, confirms the purpose of endeavours in the arts:

Research is the curiosity-driven production of new knowledge. It is the process oriented toward the realm of possibilities that is to be explored, manipulated, controlled, given shape and form, and transformed. Research is inherently beset by uncertainties, since the results or outcomes are by definition unknown. But this inherent uncertainty proves to be equally seductive: it promises new discoveries, the opening of new pathways, and new ways of problem-solving and coming up with novel ways of ‘doing things,’ designing and transforming them. To put research (back) into the arts, to (again) make visible and explicit the function of research in the arts and in the act of ‘creating knowledge’ is a truly ambitious undertaking, because it takes up a vision and a project that originated in the Renaissance. After centuries of separation, it promises to close a loop.

But the techno-sciences, important as they are, are not alone in leading these explorations and pursuits. Artists have quickly realized the artistic challenges offered by hybrid forms and the vast domain of crossing the natural with the artificial. Most significantly, they extend their creativity beyond the range covered by the techno-sciences. True to the humanistic spirit of the Renaissance, they bring the human

back into this world that continues to be transformed by the techno-sciences and their societal impact. It is this humanistic impulse that should continue to invigorate research in the arts. It has the potential to bring forth a new Renaissance.³³

As noted earlier, the *Journal for Artistic Research* has recently been established for the field of the arts. Moreover, networks like SHARE (Step-change for Higher Arts Research and Education),³³ EPARM (European Platform for Artistic Research in Music),³⁴ and ADAPT-r (Architecture, Design and Art Practice Training – research),³⁵ and other initiatives indicate that artistic research has become a priority for the leading European art schools, almost all of which are now busy developing artistic research.

What becomes obvious from these kinds of quotes is the central place given to exploration and curiosity-driven activities. Artistic research is not so much hypothesis-driven, but is built on experiences and explorations. It uses the production of art, and of making and performing, as the key paths to develop insight, understanding, and knowledge. Transferring these developments to the field of architecture, it seems logical to use designing as the main knowledge process for developing research. Complementary to research in history and theory, building physics and sociology, and also research connecting to other disciplines, the act of research by design – if developed appropriately – has the potential to bring another dimension to architectural research. Furthermore, it is clear that in the arts, the main processes in research are the core activities of the field – that is, the making of art, the playing of music, the designing of objects and such like. It should be the same in architecture, so let us now ask what is happening in our field.

BACK TO ARCHITECTURE

As prepared by the Research Committee of the European Association for Architectural Education, the following text formed part of the Research Charter approved by the EAAE's General Assembly in September 2012:

In architecture, design is the essential feature. Any kind of inquiry in which design is a substantial constituent of the research process is referred to as research by design ... In research by design, the architectural design process forms a pathway through which new insights, knowledge, practices or products come into being. It generates critical inquiry through design work. Therefore research results are obtained by, and consistent with experience in practice

Architectural research meets the general criteria of originality, significance, and rigour. It produces forms of output and discourse proper to disciplinary practice, to make it discussable, communicable and useful to peers and others. It is validated through panels of experts who collectively cover the range of disciplinary competencies addressed by the work.³⁶

Later in the research charter, it adds:

The following characteristics could help to guide architectural research to a high level of quality and open up new horizons:

- the research is meaningful and relevant for practice, for the discipline, and for society; it explores limits and expands them;
- it contributes to design practice, to the exploration of spatial understanding and/or the creative design process;
- it contributes to knowledge through intellectual work that is characteristic of architecture and design practice;

- the results are consistent with experience in practice;
- the research endeavors to make its processes and foundations as clear and explicit as possible;
- method, context, process and results are communicated and submitted to regular peer review; they refer to the work of peers;
- the research explores emotional, intuitive and/or artistic aspects of the domain, it engages architectural competences and experience in practice;
- it creates and exploits transdisciplinary connections.

From this EAAE document, therefore, a few points emerge which are important for propelling research by design in a positive manner. Firstly, in terms of research by design, the act of designing is the key process to develop understanding and knowledge. Secondly, peer reviewing is essential to maintain quality (as indeed it is for all other disciplines). Thirdly, research by design needs to be openly connected to practice and studio work. And finally, we should be careful not to impose a strict list of qualitative aspects, as a sort of checklist, but rather keep things open for interpretation by practitioners, reviewers and research assessment panels. Perhaps above all, the EAAE Research Charter repeatedly stresses the importance of the link to practice for research to thrive.

What is common between research by design and scientific research is that their assessment is based on inter-subjective standards which are shared within the specific field; it is precisely this plane of reference that is established through the discourse of peers. And peer review has long since established itself within the field of architecture through the evaluation of design competitions, award juries, etc. The intention of research in all disciplines is to expand the horizon and to enrich

the world. High-level research shifts boundaries by discovering new areas and understandings. Careful investigations, explorations, and broadening experiences reveal new aspects of architecture and practice. And the quality of research output is best judged by those in the field itself, including those who practice architecture outside of academia. This principle is not affected by the fact that channels other than traditional academic journals are used.

Unlike other research that is chiefly analytical and seeks to understand current realities, architecture and design try to project into the future, and thus to change things. Research outputs should also follow the media which are most appropriate for the field: maps, drawings, sketches, models and so on. Results have to be related to the practice of designing and making in a meaningful way; this kind of practice, as well as design studio work, are the essential aspects for research by design. A good example of the exploitation of the potential of non-textual communication was the final PhD exhibition by Arnaud Hendrickx, who works at Sint-Lucas School of Architecture and recently got a RMIT degree (see Figures 8.1-8.4). The doctoral research by Hendrickx explored the idea of 'Substantiating Displacement' through a range of design work and installations. In this manner, his final exhibition in the spaces of an old factory created a specific experience aimed to make the audience understand and feel the tangible aspects of displacement.

A SCHEME TO DISCUSS THE ROLE OF DESIGNING AND PRACTICE IN RESEARCH PROCESSES

Based on the work of Gerard De Zeeuw, I developed an investigatory scheme into general research processes that was published in my 2002 essay

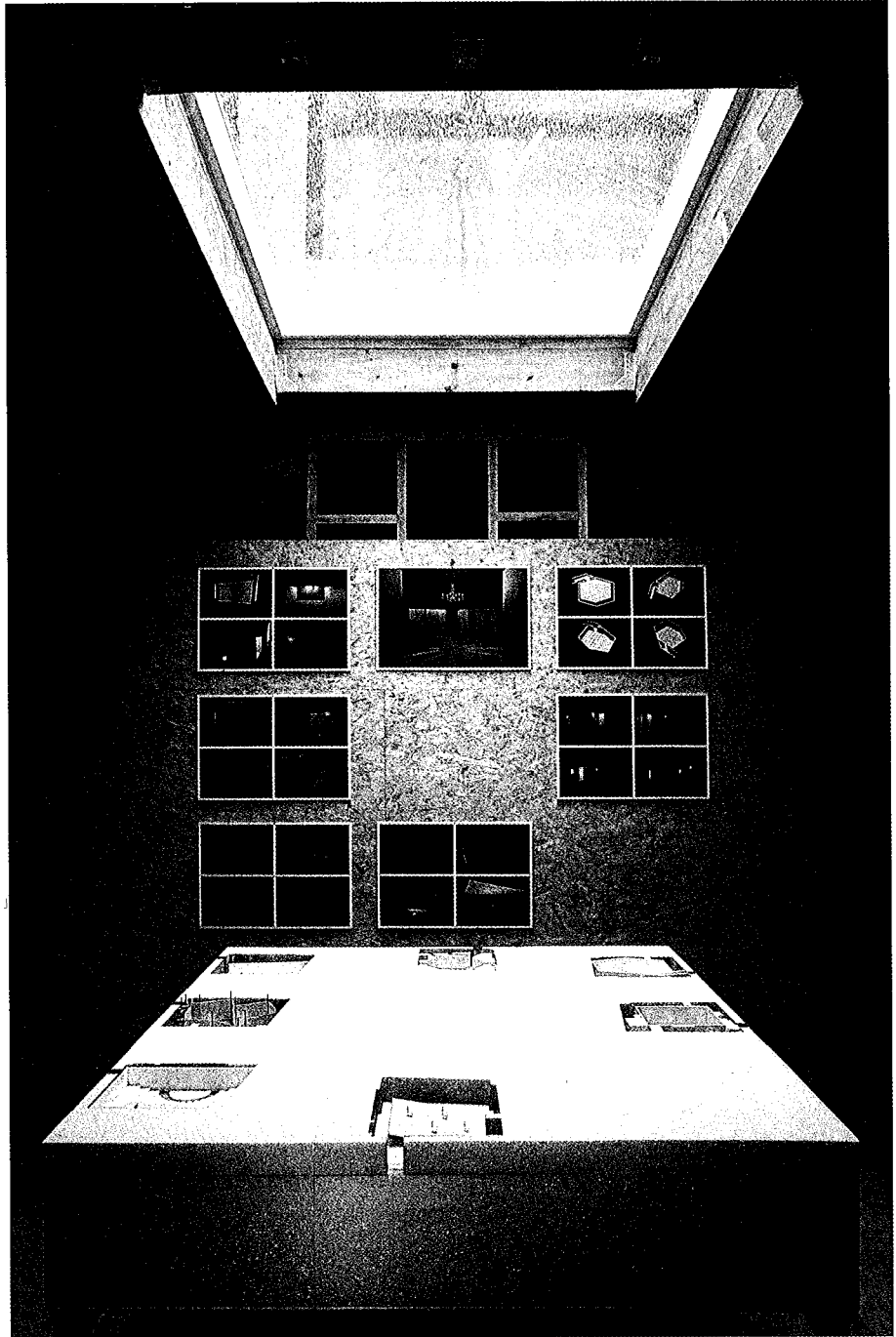


on the nature of architectural research.³⁷ For the purposes of this present chapter, it is sufficient just to show the diagram in Figure 8.2, and give an explanation of the terms involved:

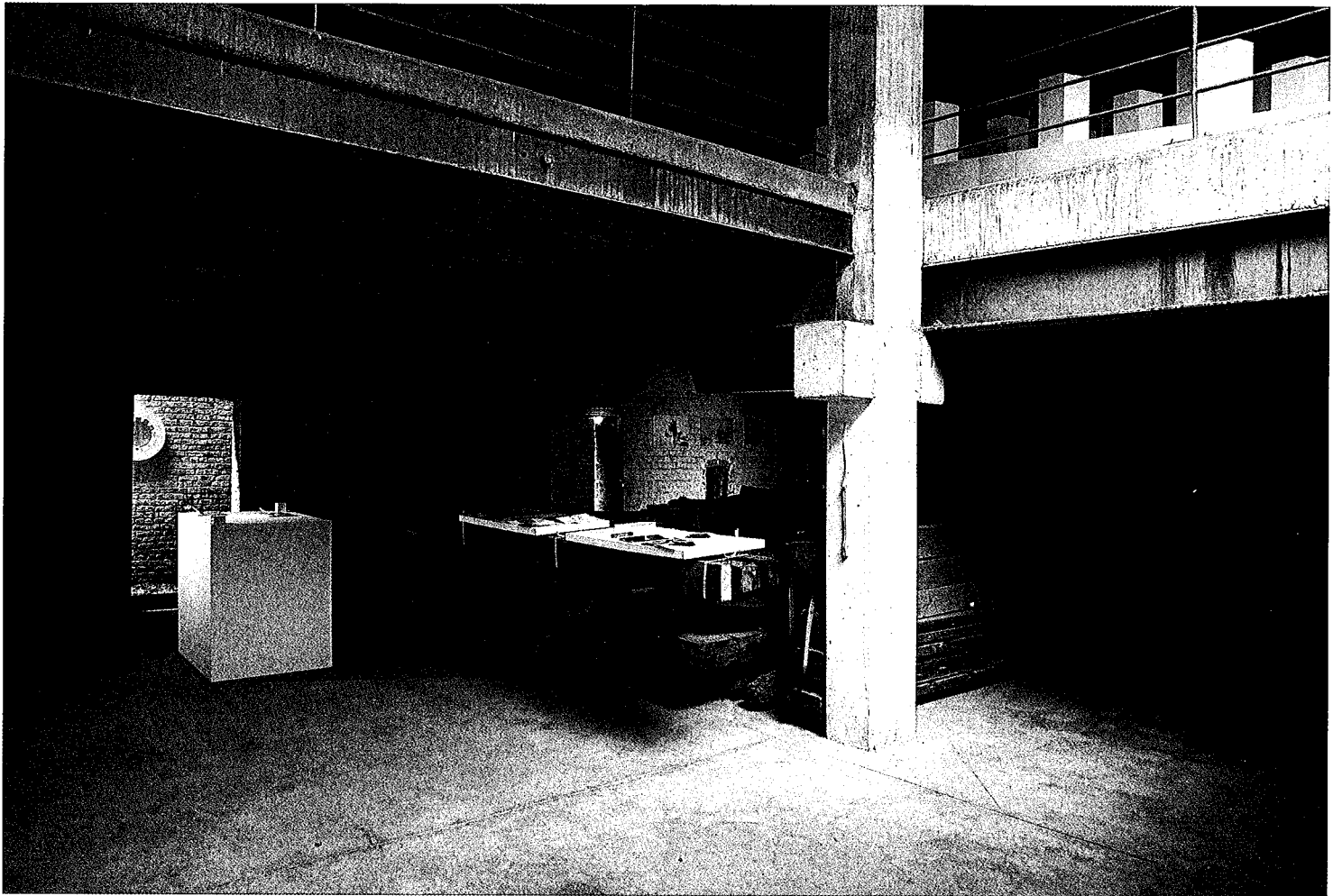
Input refers to what in relation to the research activity will be known as 'local statements' at the start-up. These may include answers/reports from people who have been interviewed

(by the researcher, or by others as reported in the literature, e.g., in interviews, earlier research) about their experiences concerning some tool or some form of support, as well as external observations on people working as architects. The input may also comprise some of the starting ideas and thoughts of the researchers who are interested in the design process. It also includes literature review and what is known at the start of the project.

8.1 Overview of the PhD exhibition on 'displacement' by Arnaud Hendrickx in an old industrial building in Brussels cleaned up for the purpose



8.2 Scale models and drawings as part of the doctoral explorations by Arnaud Hendrickx



8.3 Part of the exhibition showing the reuse of 'found' spaces and materials

Operations refers to anything that is (proposed to be) done to change the input. Operations include getting more input (new interviews, new experiments, new experiences), subdividing and thus combining part of the input, replacing some of the input by improved versions of the input.

Output/Knowing refers to anything which results when the application of an end rule to the process of operating (the applying operations) on the input comes to a stop.

Output may include general statements, but also actual 'design rooms', of which it can be said that they implement the stated conditions, or else 'teaching tools' which ensure that students achieve certain pre-specified results.

Deliverables refers to all tangible manifestations of the outputs. Examples include computer programs, design rooms, design tools and databases, papers and/or exhibitions.

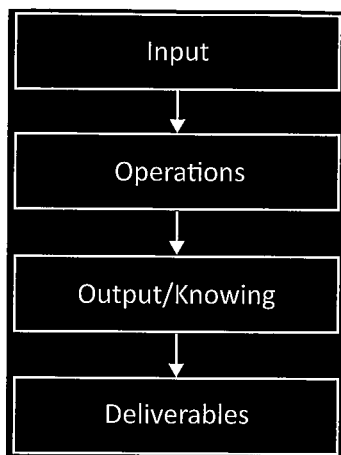


What is perhaps most important for an understanding of research by design is the question of in which phase of the research process should the design and/or practice work take place? Three different possible situations can be distinguished:

1. Designing and/or practice takes place in the early *input* phase: this is the case

when, for example, a designer finds his or her research on earlier designs and experiences. In such instances, drawings, and possibly actual buildings, play a crucial role in the research of or observations on design and/or practice. This is what is sometimes referred to as research 'on' architecture.

8.4 Uncanny spatial installations created by Hendrickx as part of his PhD defence presentation



2. Designing and/or practice takes place in the final phase of making the *deliverables*, with it then being part of the illustration of the outcomes from the research process. Hence the research outcomes are incorporated into architectural projects and/or artworks. These projects are thus used as 'illustrations' of theoretical concepts.
3. Designing and/or practice forms the key component of the entire research *operations*. This can happen while realising new design projects, or when work from practice becomes one of the main ways of generating understanding within the research. Hence, designing, making, studio work, practice, and/or artwork are the generators of insight, understanding, and knowledge: they are part of the intellectual work and complementary processes of reflection and knowledge creation.

It is important to note that this kind of distinction is seldom applied exclusively. In a number of research projects, there is a mixture of methods and processes: a combination of the three types formulated above. Yet it is the third category, when the design and/or practice drives the whole research project throughout its entirety, which seems to offer the most fertile condition for research by design.

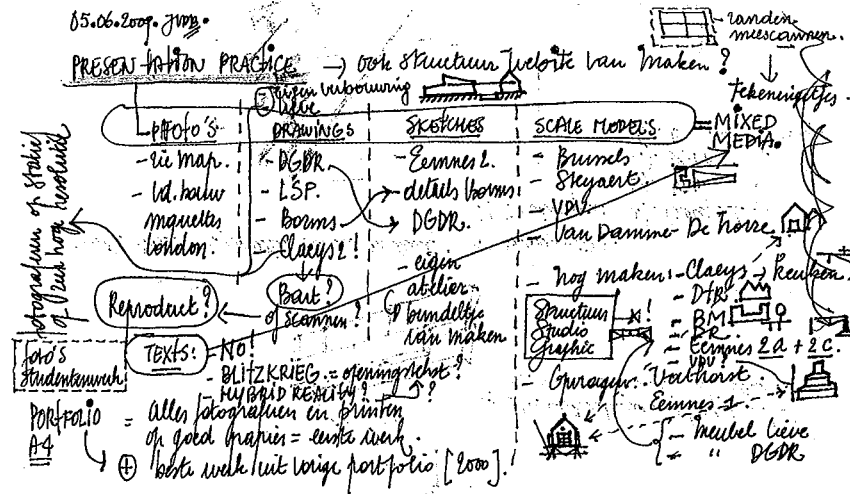
It is worth explaining why. Traditionally, research tries to take a distant view, as it does in architectural history and theory. In research by design, however, it is the researcher who is also the designer, and who develops knowledge through their design activities. This process thus differs from normal practice in that it also includes explicit knowledge formation that is openly communicated and peer-reviewed.

And this is why it is so important that the term 'research by design' should only really be used for the type of research described under item 3) above, or for that research in which the activities listed in that item are primary and essential. This definition of research by design is proposed here in the hope of improving transparency and clarity in current discourse, so that everyone knows what is being proposed by the term.

As described earlier, designing can be recognised as the core of a type of research process within the field of architecture. This is identical to what is happening in the arts, where the artist-researcher continually produces art or plays music - that is, they utilise the acts of making and doing - as the central process in the generation of understanding and/or knowledge. So, the key issue for 'developing architectural research is to incorporate practice and design studio work into it. Instead of simply research 'on' architecture, researchers should try to establish research 'in the medium' of architecture:³⁸ this means to investigate architecture through architecture and not through history, theory, social science or environmental science (although, of course, those types of work are also valuable research).

The basic rationale behind all this is that it is important to value the qualities of designing, and hence to avoid intermediaries when undertaking research. It is the designer themselves who needs to exploit their design competence to obtain understanding and knowledge. In such cases, the designer looks back at finished work and gives an overview, and extracts key aspects of his or her understanding, and explores these aspects through further design work, as well as through connections

8.5 Extract from the general research scheme as given in Verbeke (2002)



to the work of other practitioners. It means that their research work is regularly peer-reviewed. The designer must also project into the future, mentioning key aspects that will be useful for the field. Research results and outcomes are presented through drawings and text in an exhibition and a written exegesis.

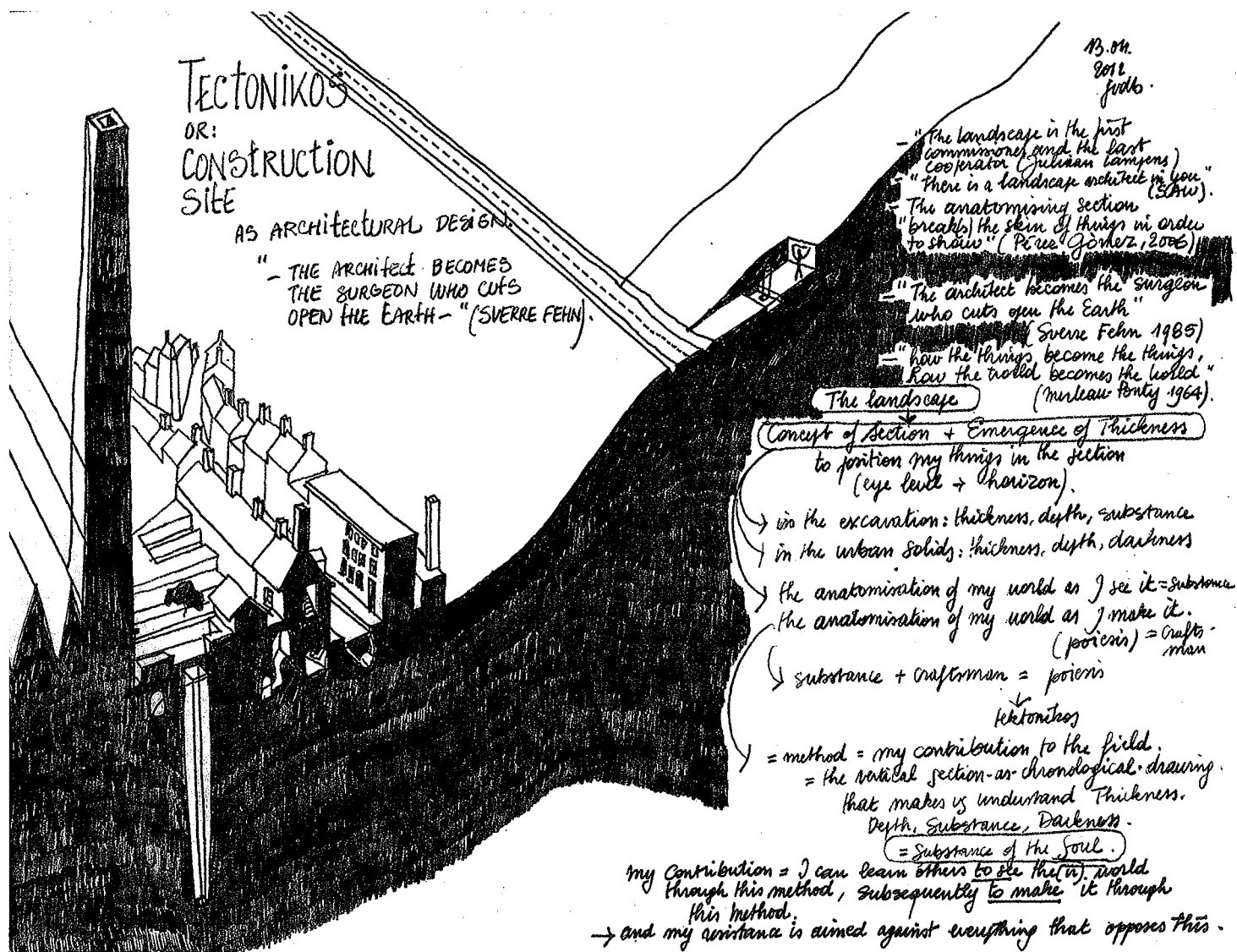
This way of working in research by design has been developed, for instance, at RMIT University in Melbourne for many years and has been described in detail by Leon Van Schaik and others.³⁹ The RMIT approach has lately been extended to Europe, workings with myself and colleagues at the Sint-Lucas School of Architecture in Ghent and Brussels, and as a model it functions as a key example for any serious developments in research by design. As Van Schaik has pointed out, it is the reflection on, and contemplation of, the processes of designing and making which impact on the results of the research in a fundamental way, and as a result give it its unique quality.

SOME RECENT EXAMPLES OF RESEARCH BY DESIGN

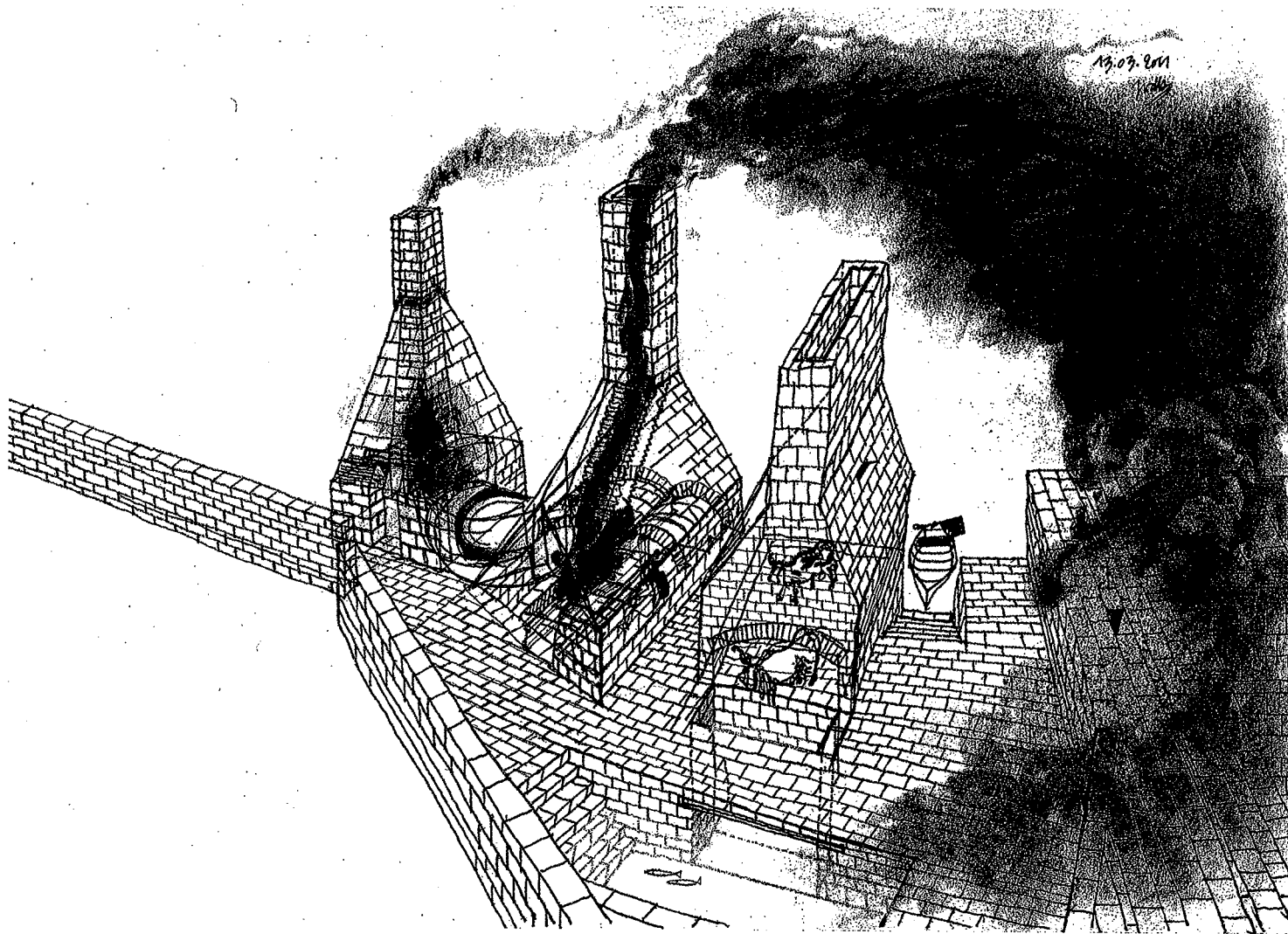
The following three cases are given as very different examples of possible ways to undertake research in connection to practice, design, and creative practice work. While these doctorates can be said to be representative of the principles of research by design, they are also extremely distinct in their subject and approach. The first is another, like Arnaud Hendrickx, whose recently completed thesis was mentioned earlier. It also could not have been realised without the crucial contribution of designing and making/performing.

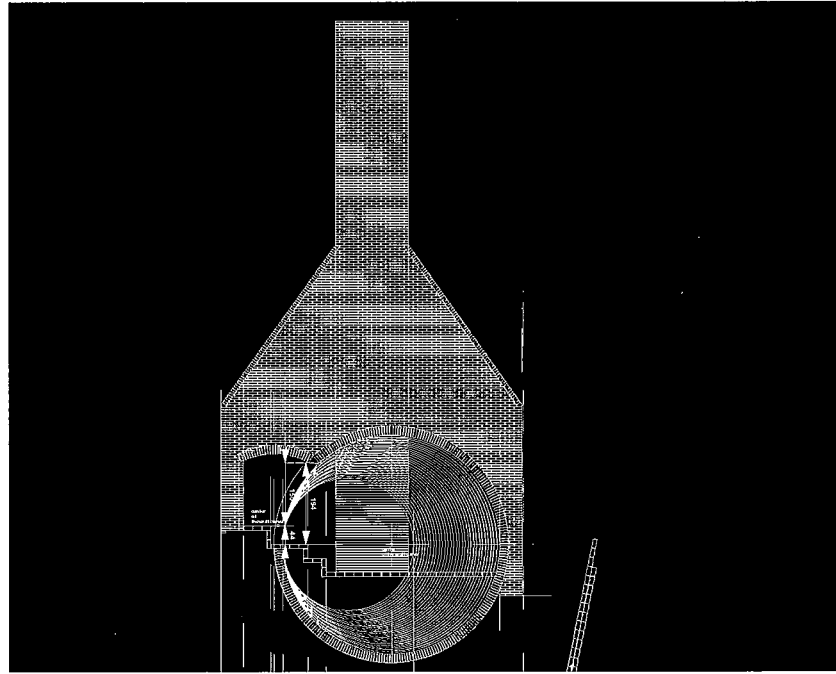
This PhD project was by Johan Van Den Berghe, a member of staff at Sint-Lucas, and it began in, and then went back to, his own award-winning architectural practice. Under the title of 'Theatre of Operations, or: Construction Site as Architectural Design', Van Den Berghe's research was conducted as a series of observations made about past and present design actions. As such, his research could be seen as participant observation that builds on design work

8.6 Initial ideas trying to structure the PhD research progress presentation by Johan Van Den Berghe



8.7 Imaginary section drawn by Johan Van Den Berghe through his grandmother's house in an old Belgian industrial town to help organise his thoughts and projects



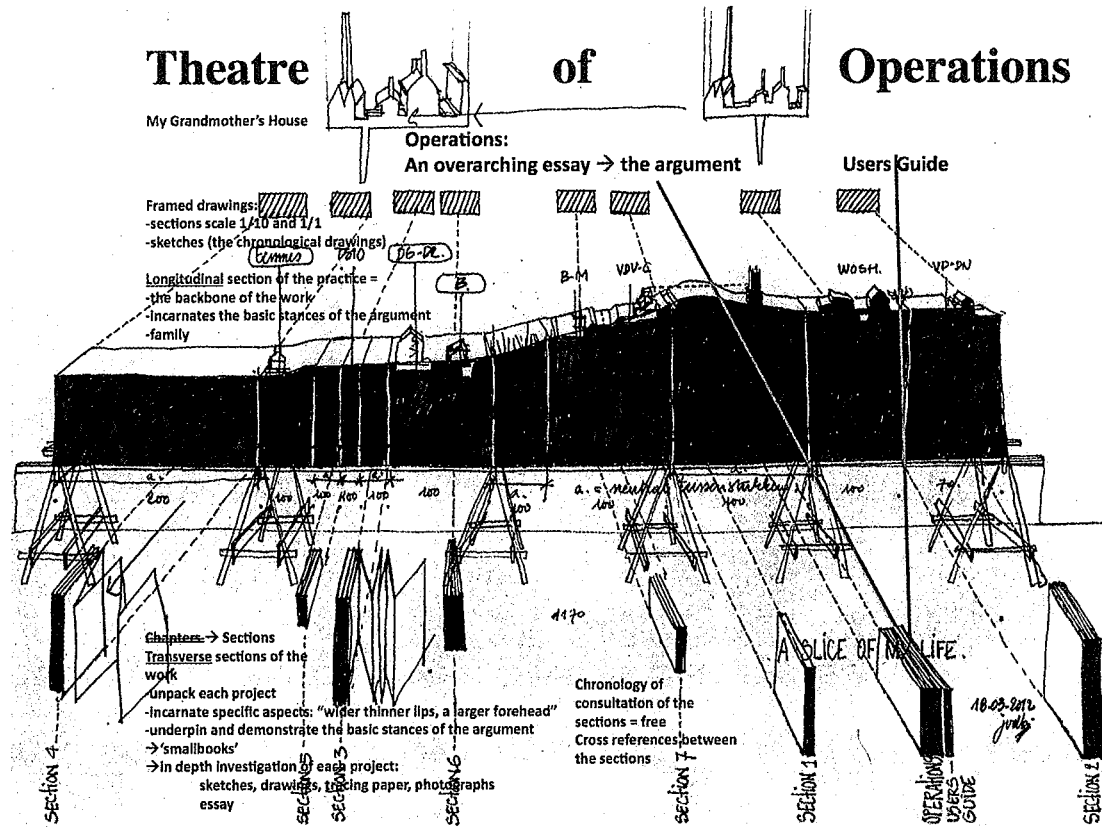


which is an integral part of the doctoral research. Some of the architectural projects in his thesis are described as if they were a crime scene investigation (that is, the projects of his practice as if they were 'victims'). Other projects are treated more like the reconstruction of far older crimes from the past which need to be recreated (such as 'My Grandmother's House'). Still other projects are offered as 'new crimes' which are still in the process of being committed.

Through investigations of his own work and the work of other architects, through intensive reading, by making new designs as the core of his PhD, by self-validation, peer-reviewed presentations and discussions, and writing his text, Van Den Berghe worked his way through the research process.

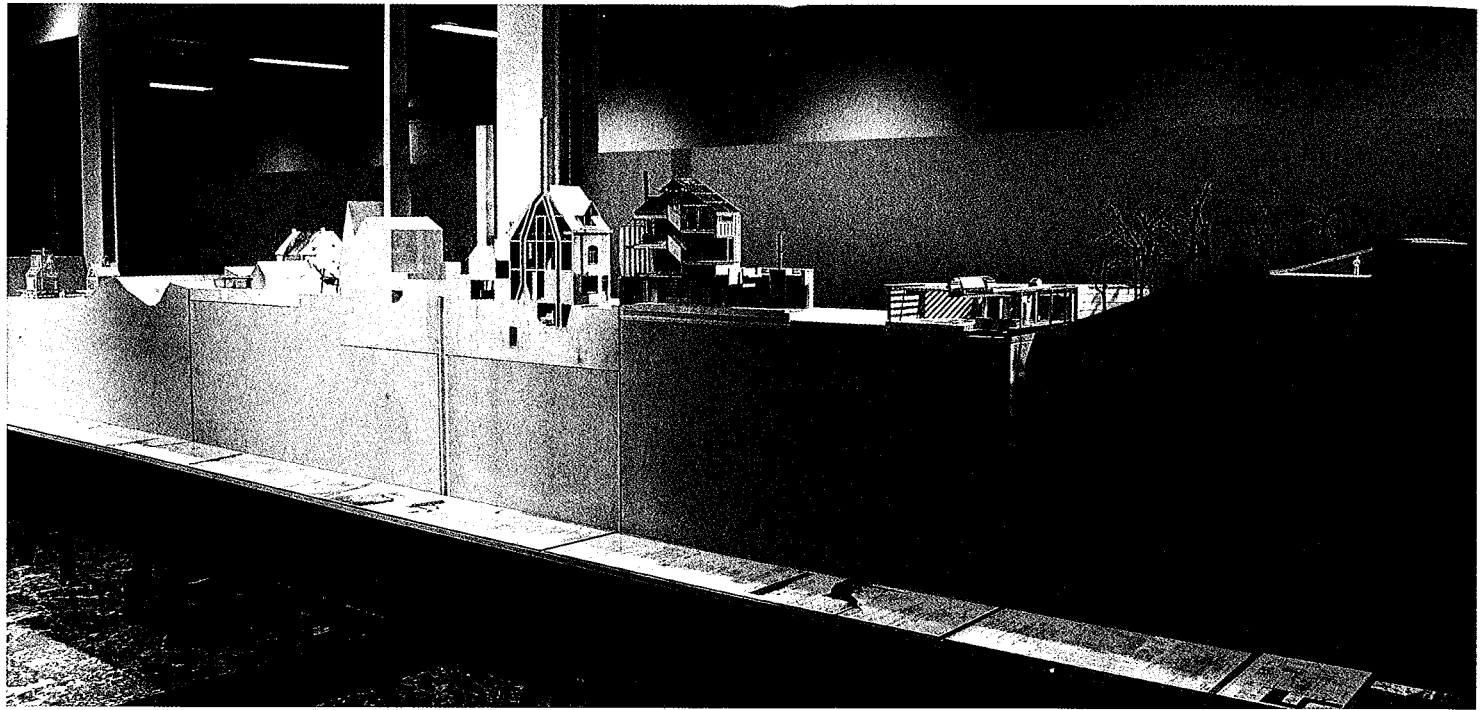
The contribution to the field is manifold, yet all elements hide under his basic assumption – that is, that it is wrong when the creative process in architecture is considered all too automatically as a unidirectional one that begins with the poetic image of the designer and is then subsequently substantiated on the construction site. Van Den Berghe's research reveals that this assumed unidirectionality is a false assumption, and that the process of creation, including its built substantiation, is much more negotiated and two-directional. He also argues, through a careful analysis of his work and that of his architectural peers, that the poetic image is more often triggered by construction practice. In other words, the 'dream' is triggered by the 'substance'.

8.9 Detailed constructional drawing for a brick chimney illustrating the impact of materialisation on the 'dream' of the designer



Following the framework set out by Leon van Schaik, Van Den Berghe also explored his own mental space by moving from an implicit to an explicit awareness of its potential in the creative process. He discovered in his work, and in the work of others, a series of concepts and made them explicit: these included the emergence of thickness, the concept of section, depth as the first dimension, the meaning of eye level in the perspective, the passing of time, the Greek notion of *tektonikos*, the chronological drawing, x-ray images, and ideas of chronology and substance as found on the drawing

table. Together, these investigations were used by Van Den Berghe to support the main argument, and to make it work for his (future) architectural practice; these too are parts of his contribution to the field. They co-exist as a specific moment in a specific place, merging the moment of *to dream* with the place of *to make* into energetic momentum: this is the acute moment of creation when the designing architect is able to place themselves at the strategic intersection of time and space, and thus create new forms. Van Den Berghe calls this moment of acuity the 'State of Emergency'.



8.11 Large sectional model for the final exhibition, bringing together scaled models of real and imaginary design projects in an attempt to synthesise the main conclusions of his PhD research

The other two doctorates that I wish to refer here are taken from music schools elsewhere. One is the aforementioned PhD by Stefan Östersjö, titled 'Shut up 'n' play! Negotiating the Musical Work', which was delivered at the Malmö Academies of Performing Arts at Lund University, Sweden in 2008. The research incorporates the interaction between Stefan Östersjö and several composers. It is through this process of interaction, the playing and performing, that a deeper understanding is able to be developed. As noted, this PhD discusses useful concepts as 'thinking-through-playing' and 'thinking-through-performing': thus the collaborations with the composers are described in great detail to explain the critical moments

in the development of joint understanding and knowledge.

The PhD research of Carl Van Eyndhoven (who works at the Lemmensinstituut in Leuven) reconstructs the *carillon* music (both in terms of repertoire and performance practice) which existed in the southern Netherlands in the seventeenth century. *Carillons* were instruments made up of rows of bells set within a church tower or municipal building. Since there are no primary musical sources with *carillon* music dating from this period, he had to use the so-called *versteekboeken*, collections of arrangements that were placed onto the large drums of the automatic playing systems of the *carillons*. By playing these arrangements himself on

a *carillon* - originally, they had only been meant to be played automatically - Van Eyndhoven acquired new knowledge about the way that *carillonneurs* had played music in the seventeenth century. Through this 'research by playing', as performance pieces, he succeeded in reconstructing a historical musical vocabulary which had been lost. Hence in all these examples, the PhD research work serves to report, monitor, connect, and reflect from and upon experience and practice. Practicing and designing are the core processes for developing new understanding and knowledge.

CONCLUSION

It should be clear from the above that artistic research and research by design are developing in a wide manner at this very moment. Research endeavours like these have become crucial for all schools of architecture (and those in the arts). The idea behind this momentum for new PhD research programmes is to build upon the already strong competences of the field in terms of designing, making, and developing projects, as well as to find ways to value knowledge and experience derived from practice.

Research by design is hence high-level research in which these core competences of the field in designing and making - including that also of leading architectural practices - are the main pathways to establish new understanding and knowledge. It creates cutting-edge exploration and progress, both in practice and in studio work. It results in the development of spatial understanding and human ecology which daily impacts upon behaviour and living conditions. It is not about analytical thinking in the narrow sense, but rather

about exploration - that is, searching, searching, and searching again to find new insights and aspects of architecture. It is about extending horizons, changing borders, stimulating curiosity and exploration. It is about imaging, visualising and projecting alternative worldviews, as well as developing spatial understanding and making possible future worlds - and thus also contributing to the understanding of underlying processes of the present.

In order to increase clarity in current communications on the subject, this chapter has introduced a scheme with which to structure our discussions of research activities. It also proposes that the term 'research by design' be used only for the kind of research where design activities (including activities undertaken in 'real world' practice) are the central means to develop understanding and knowledge. In establishing research by design as a new development, it is important to continue to explore and develop other directions and research lines.⁴⁰ Researchers should learn from these in order to improve the outcomes and research outputs. This continual process of exploration will help to develop the knowledge base for the discipline in all its strength, variety, and plurality. Above all it implies an open and liberal attitude toward the form and content of research by design, while at the same time maintaining high academic standards of the research content. In order to achieve this highest level of quality, it is important to organise peer review on a regular basis, communicating externally and connecting to knowledge and experience drawn from practice. Within the broader debate on what research is, the experience and the perspective of the designer should be valued.

ACKNOWLEDGEMENTS

The author wants to thank Johan Van Den Berghe, Arnaud Hendrickx, Stefan Östersjö and Carl Van Eyndhoven for providing input and material about their PhD projects. He is also thankful to Halina Dunin-Woyseth for her valuable feedback on a first draft. This chapter is a majorly reworked version of my previous paper on 'Recent Trends in Research by Design(ing)', as published in 2012 in the *Proceedings of the 3rd Symposium of Architectural Research 2011: Research & Praxis* by the School of Architecture, University of Oulu, Finland.

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