

**doctoral
education
in schools of
architecture
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e u r o p e**

editor **Maria Voyatzaki**



European Network of Heads of Schools of Architecture

Doctoral Education in Schools of Architecture across Europe

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Mapping doctoral education across Europe is a way of mapping the state of the art of what constitutes research in architecture nowadays, which could, in turn, be a way of mapping architecture itself. Should architectural research correlate with a viewpoint on architecture? This and many other questions have given rise to the present book, that were highlighted and thoroughly discussed at the recent International Forum on Doctoral Education in Europe, held in Riga, Latvia 12-14 March 2013 and hosted by the Riga Technical University, School of Architecture and supported by the University of Umeå, School of Architecture. The Forum was entitled "Archidoctor Universalis: Future of Research in European Architectural Education".

The Forum, though another event of the European Network of Heads of Schools of Architecture (ENHSA, www.enhsa.net) addressed tremendously valid questions and thus felt the need to open up and express its concerns to a broader academic audience. As a consequence, right after the event, ENHSA prepared a call for papers whose responses could be encompassed in a book. The call was rather extensive and thorough and all authors had to freely choose to respond to the issues raised. The call read as follows:

The theme

The changes occurring nowadays in architectural education and professional practice have a significant impact on the way innovation and new architectural knowledge are generated. Schools of architecture are directed by the current dynamics to reform their doctoral education strategies, structures and processes in order to make a more effective contribution to architectural research and innovation. As the doctoral education is the least developed and discussed after the Bologna declaration, the question of the structure, the contents and the expected outcomes of the so-called third cycle of higher architectural education remains an interesting subject in the process of creating the European Higher (Architectural) Education Area. The Forum will investigate the expected structures, contents and outcomes of the doctoral education in architecture. The Forum will also investigate how the appropriate profile of the researcher of architecture is to be offered by schools of architecture in Europe and how the researcher is able to generate useful and innovative architectural knowledge as well as experience for the society.

The Rationale

In the fast changing environment of the so-called information society, architecture as a cultural phenomenon, seeks to be associated with a new framework of values and principles, of knowledge, skills and competences, of tools and means, of priorities and preferences - in other words to form a new paradigm. The consequence is that new values, new aesthetics and styles as well as new orientations are quickly grounded in the consciousness of architects, opening up architectural experimentation on education and research to new possibilities of architectural creation and generation of architectural knowledge. **In this new environment the profile of the researcher in archi-**

ecture as the generator of innovative architectural knowledge and experience cannot stay the same.

Innovation is increasingly seen as the motor of economic and cultural development and is considered more than ever one of the most fundamental objectives of architecture's social project. Innovation is manifested as a process of relocating architectural thinking and of creating new forms of expression and creative paths. It is conceived as a window introducing new ideas about the social experience of space. It is eventually a value transgressing the requested architectural 'other' able to ensure new architectural forms for a new social demand. **There is a need for a more ambitious and broad-based innovation strategy in the domain of architectural creation, education and research in order to embrace the requested innovation.**

The majority of schools of architecture in Europe declare that beyond teaching they run doctorate research programs. There is a significant amount of doctoral research in Europe, which, although not systematically recorded, can be estimated on average per year to be to produce between 110 to 140 doctorates. However, beyond this significant production of research training, the generation of architectural innovation related to ideas, forms, techniques, materials and practices based upon technological advances, is primarily developed outside higher education institutions. **In its majority, innovation is generated by the advanced experimentations occurring in a distinctive part of architectural practice or by research in the domain of the building industry and not by schools of architecture.**

Architectural education institutions generate only a small part of this innovation across Europe. It is not easy to estimate the impact of this research outcome of schools of architecture on the domain of education or on professional practice. Schools appear rather conservative and resistant to incorporate innovative ideas and approaches in their academic curricula. There is always a considerable time lapse between the emergence of innovation and its integration into the academic life of the school. **It is becoming increasingly imperative for Schools of Architecture to redefine their research strategy in order to assure a more dynamic impact in the production of architectural innovation and a better placement of the international competition of their degrees. In order for this objective to be achieved, it is necessary to reconsider the existing architectural doctoral research (infra)structures and to redefine the profile of the contemporary researcher of and in architecture.**

The existing tendencies

Since the turn of the century, an extended academic debate has been in progress on the reconsideration of the nature and the characteristics of architectural doctorates, as reflected in a large number of international conferences: Ohio 1999 (Doctorates in Design Conference), La Clusaz (Foundations for the Future: Doctoral Education in Design Conference), Delft 2000 (Research by Design Conference), Paris 2000 (Research and Architecture), Montreal 2002 (Conference in Design Theory and Methodology), Stockholm- Helsinki (Four Faces: The Dynamics of Architectural Knowledge), Tokyo 2003 (Asian Design Conference - Doctoral Education in Design), Marseille 2004 (La Question Doctorale), Delft 2004 (Conference on Research and Design), Dublin 2004 (Between

Research and Practice), Brussels 2005 (The Unthinkable Doctorate), the program *Villard d'Honnecourt* in Venice (2004-), Brussels 2009 (Communicating by Design), Istanbul 2011 (Doctoral Education in Architecture), Brussels 2013 (Knowing by Design).

As the European University Association (EUA) states in its annual publication Trends 2010, the European tradition of the doctorate – as the production of a piece of original research under the supervision of one professor, with very little emphasis on taught courses – has been increasingly questioned in recent years. Discussions in Universities have focused on the need to make doctoral degree holders internationally more competitive, which has led to a decade of successful experimentation with the introduction and funding of structured programmes and graduate or research schools in some countries. The changes brought to doctoral education in the past few years have focused on the need to embed doctoral programmes at institutional level by:

- Creating structures, such as doctoral/ research or graduate schools, in order to provide a dynamic research environment and create reliable quality standards for supervision and support.
- Introducing more taught courses and training elements to broaden the perspectives and competence profile of doctoral candidates, including e.g. transferable skills provision, in some cases with credits attached, and without losing the strong role of the mentor.

Schools of Architecture in Europe have not yet made significant progress on this subject. Higher Education in Europe has changed tremendously since the Bologna Declaration was signed. One of the results of the transformation is the renewal of doctoral studies. While the two-cycle education of under- and graduate has become quite universal, its final destination – the third cycle of doctorate is still emerging. Here both traditions and innovations intertwine, different research cultures run parallel and the three-letter title (PhD) standing for *doctor philosophiae* can mean several different things, especially in architecture. Even though the discussion about doctorates in architecture appears to be popular among academics, as substantiated by the number of conferences on the subject mentioned above, investigating the nature of the research in architecture and of doctorates in Architecture, the Doctorate as part of an educational process leading to a profile of contemporary researcher of architecture has been only marginally discussed.

The objectives

The main objective of this call was to investigate the European potential of doctoral education in architecture as generator of a potential profile of contemporary researcher, able to produce innovative architectural knowledge and experience. We wished to know how this potential would be articulated in the different Countries of Europe and beyond. We wanted to establish networks to know more about it.

The essays have been organised upon three complementary themes:

1. Forms and reforms of Doctoral education in Schools of Architecture in Europe

The first theme of the Forum is what we actually have in doctoral education in Europe. The recent transformations in research at doctoral level and more generally in architectural research and innovation. How is it seen in the different schools of architecture? Has it changed in time? Has the Bologna process had any influence? We have less than one-century experience in architectural doctorates. What, in the past, was the expected profile of the architectural researcher? To what extent did doctorates in architecture follow the changes occurring in architectural thinking and creating? To what extent did architectural doctorates in the past reflect the requests for innovation addressed by the society and by architectural practice? Which are the implemented innovative approaches in the way doctoral education is structured in your institutions? What are the perspectives for the future?

2. Thesis and hypothesis for the future of doctoral education in Architecture

The second theme will investigate what we wish to achieve in doctoral education in Europe. We are interested in how the structure of PhD courses can influence the content and outcomes of doctoral education. Will it remain the original individual piece of research? Will it shift into a collection of publications brought together only for final examination? What should the conditions for publications be either as part or a requirement for the doctoral dissertation? How will it be incorporated in the so-called “research by design”, “research through design”, “artistic research” or “practice-based research” in the existing doctoral education structures? Has the curriculum of the Bologna system and ECTS system shifted doctoral education closer to taught courses of the third cycle? What are the basic rules and criteria for the supervision of a PhD in your university? What are the basic rules and criteria for the teaching of a PhD in your university? What are the basic rules and criteria for the evaluation of a PhD programme in your university?

3. Synthesis of the researcher’s profile to generate architectural innovation

The third theme will reflect on the outcomes of doctoral education in terms of the profile of the graduate and the impact of the work generated. We want to question the relevance of doctoral education for the profession and education of architecture. How are practitioners benefiting from doctoral education? Are practitioners involved in doctoral education? Has the Bologna Process urged for doctoral education? Have there been any changes in the history of doctoral education concerning its goals in your university? Which are the main characteristics of the contemporary profile of a doctoral student? Which competences and skills does he or she have to fulfil beyond the specialised knowledge? Does our educational system at the bachelor and master’s level adequately help the development of such skills and competences? Does this system create the basic profile of a researcher in architecture or does it only assure an identity suitable for practice? How and under what circumstances does such a profile have to be prepared?

The call was addressed to Research Coordinators and Heads of Schools of Architecture in Europe and their representatives. It was very well received and we are delighted to announce its success not only in terms of the representativeness and geographic spread but also in terms of the richness and diversity of responses.

In the present book there are 34 contributions from 19 European countries. Three out of the thirty four contributions were offered by our keynote speakers at the Riga Forum, namely Ben Campkin, Henrik Oxvig, and Lara Schrijver, whom we would like to thank for both their inspiring presence at Riga as well as for devoting their time to contribute to this book. Last but not least, we wish to thank all the contributors of this book for their patience, perseverance and hard work.

We hope that the present book is the beginning of a new quest, a way of opening up a constructive debate towards a doctoral education of architecture, which is not only valid, relevant, operational and useful to society, but also novel, inspired and inspiring just as architecture, overall, has to be.

Juri Soolep, Constantin Spiridonidis, Maria Voyatzaki



Maria VOYATZAKI

ENHSA Co-ordinating Team

(Ad)ventures of Doctoral Research in Architecture

Attachment, Autonomy, Ambivalence

Maria VOYATZAKI
ENHSA Co-ordinating Team

Doctoral Research and Architecture

Over the last fifteen years we have been experiencing a strong intensification of the debates on doctoral research in architecture with extended debates among academics being generated and recorded in a large number of international academic Conferences such as: Ohio 1999 (Doctorates in Design Conference), La Clusaz (Foundations for the Future: Doctoral Education in Design Conference), Delft 2000 (Research by Design Conference), Paris 2000 (Research and Architecture), Montreal 2002 (Conference in Design Theory and Methodology), Stockholm-Helsinki (Four Faces: The Dynamics of Architectural Knowledge), Tokyo 2003 (Asian Design Conference - Doctoral Education in Design), Marseille 2004 (La Question Doctorale), Delft 2004 (Conference on Research and Design), Dublin 2004 (Between Research and Practice), Brussels 2005 (The Unthinkable Doctorate), Riga 2013 (ArchiDoctor Universalis, Future of Research in European Architectural Education).

Why has Doctoral research, as a process of generating new architectural knowledge, become an attractive issue for contemporary architectural education debates? Why is this happening now? Why does it appear to be an issue to be investigated, re-considered and redefined? What are we looking for in such a debate? Are we looking for a new mission for doctoral research? A new organisational framework capable of giving a strong impulse to its development? A new content and nature of the research questions? Doctorates in architecture have existed for over half a century, yet the debate appears to be more vivid at present than ever before. Why now? What are the reasons that make the investigation of the nature and the processes of doctoral research in architecture a burning issue? Over all this period of time we have had significant changes in architectural thinking and creating. However, the debate on architectural research was neither as vibrant when the first doctorates appeared, nor as prolific when the transition from 'modern' to the 'postmodern' filled millions of pages. Indeed neither did it have such an effect when the financial crisis, at the beginning of the seventies, burst and strongly affected the conditions of architectural thinking and creation, nor when deconstructivism questioned the profound structures of architectural contemplation. In fact, in all those cases doctoral research did not appear to play an important role and to provide answers to the questions that architecture posed.

What we want to argue in this essay is that the reason for this intensification of the academic debate is a shift of paradigm in doctoral education with academia looking for a new relationship with architectural practice. This requested new normal is emerging from the new conceptions about architecture, architectural design and about the human as the final destination and recipient of architectural creations and trajectories. Architectural academia is now facing new challenges, which it has to deliberate in the midst of all its introversions while seeking to establish a new set of principles and values related to the production of new architectural knowledge and experience.

Architecture is always about the generation of the new. Architecture has to always reject the existent, the 'already there' in order to invent, to reveal, to establish the 'other' as the new normal, exposed to a new denial or rejection in the near future. Architecture always seeks to create the original, innovative and significant for architectural creation and/or for architectural thinking that will be accepted by society and the cultural context in which it is addressed.

To accept this reality is not always easy. Proposals of the so-called avant-garde architecture are not always accommodated as the new normal. They may easily and rapidly disappear as mere ideas, conceptions and approaches to architecture, being unable to support their operability as vehicles of the emergent values and principles a culture encourages in a certain period of time. Mark Wigley¹ asserts that Architecture is the art of limits, keeping a permanent dialectic with the crisis defined as a request for change, as the former is propelled by the latter.

Doctorates in architecture, as all doctorates, are always about new knowledge. They investigate the existent in order to reveal something new and original, to establish it as an accepted truth and to support it for its future appropriation, exploitation and development, in other words, to extend the already established and accepted by introducing new aspects and meaningful facts that allow for its reconsideration and

re-establishment. Doctoral research in architecture is primarily a process of generating new knowledge and experience in architecture. It is a 'production' process whose quality assurance is established by an academic system of control and protection that supervises the process and guarantees the validity of the outcome. It is a process that presupposes the existence of a valid and accredited infrastructure, what we can call 'a toolkit', which directs, controls and defines the norms and the modalities of this production and legitimizes its products. Innovation in doctoral research is a condition expressed by the term 'originality'. Even though the meaning of these two words is not exactly the same, in the final analysis, they describe the same need: to escape and deviate, to transcend from the existing to establish the new, to break through.

Doctoral research was almost an ex-post investigation and/or legitimisation of the current trends of architecture as presented in the different forms of architectural discourses and the experimentations of architectural practice. As it has always been attached to academia, doctoral research has always been looking at the original and innovative as conceived by the academia, that is to say as a contribution to the expansion and deepening of architectural knowledge. However, academia has always been slow in preparing for new threats, dangers, tasks and targets. According to Buchanan² "the more overwhelmingly urgent the looming crises provoked by systemic collapse of interdependent aspects of our global civilisation, the more frivolous the pursuits of academe".

Academia has never been keen and sufficiently agile to absorb the developments in architectural practice and the 'architectural' ideas generated and discoursed by the advancements of practice. It has always been resistant to the new, the avant-guard, the experimental. On the one hand, any innovation of the practice was eventually incorporated in the realm of academia after a time lapse and significant conflicts among the different power structures established in the academic institutions; on the other hand, architectural practice produced its own discourses and philosophical statements, creating doctrines, enhancing the schism between academia and practice, fomenting their competition and reinforcing their sterile, mutual isolation and introversion.

Doctoral research, as always part of architectural academia, has played a very specific role in this competitive situation. Its mission has been to investigate and deepen the way that academia has absorbed the profound logics dominating the different architectural paradigms, as they have alternated over the last half century. It has primarily been the reinforcing mechanism of the profound and ideological structures of the paradigm generating a kind of auto-referential knowledge more useful for the academic conception of architecture and marginally useful for the enhancement of the impact of architecture on society.

Doctoral research on Architecture

An overview of the recent history of doctoral research in architecture allows us to detect three distinct paradigms that, we propose, can be condensed in three words: Attachment, Autonomy and Ambivalence. As architecture is, by nature, a permanent quest for the 'other', these three words express the different conceptions and values of

the processes, methods and strategies through which doctoral research validates its investigation of the relationships between architecture and the requested 'other'.

Attachment

In the first case, according to the Attachment paradigm, doctoral research has been motivated by a conception of the other according to which it should be constructed, formulated, designed and structured upon scientific knowledge and expertise. We could detect two distinctive phases of this attachment paradigm of doctoral research. The first flourished in the sixties and the mid seventies and its main philosophical and ideological understanding was built on the belief that only rational thinking could become the vehicle that could drive architecture towards the expected 'other'. In the context of this approach, architectural creations were conceived by architectural academia as dissected into tangible parts in a rational, pseudoscientific, but well-accepted de-composition method.

In this intellectual environment doctoral research was cantered to the investigation of the fundamental characteristics of the expected other, either through its historical trajectories of architectural experiences or through the examination of its technical aspects, illuminated by the positive sciences. It was also interested in the impact of architecture on human behaviour illuminated and guided by the social sciences. In all these cases doctoral research was strongly attached to the 'toolkit' of positive and behavioural sciences. This attachment coloured doctoral research with a scientific coverage producing knowledge ON architecture to be used for a more qualitative architectural outcome. This knowledge 'on' architecture primarily concerned the development of scientific knowledge on the input in architectural design.

In the second phase of the Attachment paradigm, doctoral research became progressively detached from the positive sciences and engineering shifting into the humanities. The interest was no longer focused on the input of architectural design, but on the impact of its outcome. This shift was based upon a new conception of the expected 'other', this time, not as being formulated with the support of positive sciences and engineering, but as emerging from the social and cultural dynamics. In this case the knowledge ON architecture³ was considered as an obligation to be structured upon humanitarian knowledge and expertise. The main philosophical and ideological understanding of this paradigm was built on the belief that critical thinking should be the driving force towards the 'other'. This approach considered architectural creations as meaningful manifestations of cultural values in space and architectural academia elaborated conceptualisations on architectural design as the syntax of meaningful typologies.

The doctoral research stemming from this paradigm focused on the social aspects of architectural creations and was expected to offer significant insights into the ways that social values are manifested through spatial forms and structures. Urban studies, participatory processes and political thinking played a dominant role in the way the 'other' was conceived. In this case, the production of architectural knowledge ON Architecture was based upon the belief of the social relativity of the truth and the catalytic role of critical thinking to detect the values on which it was grounded. Architec-

tural critics progressively shifted away from what was called architectural theory in the previous paradigm and the understanding of the way social values were translated into forms made a significant contribution to comprehending architectural creation.

Autonomy

In the case of the Autonomy paradigm of doctoral research we could observe a significant shift on the focus of research. It was no longer the input in architectural activity or its outcome but the design process itself. This was emerging from the interest in architectural thinking to be detached from other subject areas, methods and priorities that affected the way architecture was conceived and designed. The idea was to focus on the design process, the very central action of architectural creation. By isolating architecture from its proper dependencies this shift has encouraged a consideration of architecture as an 'intangible, inexplicable and therefore self-indulging and narcissistic pursuit' (Till 2007). Doctoral research in this paradigm was looking into enhancing the knowledge of architecture by investigating the act of creating it. Research in architecture through design, research in architecture on design, research in architecture for design appear to be different forms of association between research and design, in other words, between academia and practice.

There are very important implications of this detachment of architectural academia from the autistic introversion expressed by the methodological loyalty to engineering and the humanities and its orientation towards the particularities of architectural creative practice. At first glance, academia appears to be circumventing the philistine cynicism of practice, which has always been the declared reason for their distance. On the contrary, academia seems to be considering practice as a significant ground for the production of architectural knowledge. This transformed attitude takes its ultimate regulatory legitimisation, when in many countries the doctorate ceases to be a necessary condition to teach architecture and can be substituted by (a rather unclear definition of) equivalent, recognised architectural practice.

This new situation creates an unclear and vague middle ground. One of its extremities is a handsome-hybrid understanding of this match where social needs, material constraints and creative gestures can meet in an experimental environment. The other extremity is an impure alloy amalgamating, in a confusing and unclear way, aspects of thinking and making presented as innovation and as creative experience and original knowledge. We are already in a new paradigm of doctoral research, which we can define as the Ambivalence paradigm. Doctoral research is now defining itself as research for architecture, that is to say, as contribution to the way architecture is created, generated and constructed.

Doctoral research for Architecture

In the mid nineties a PhD thesis, entitled "An Insight into the Design Process of Unconventional Structures" was nearing completion. The researcher, an architect by origin, in her effort to delve into an unknown area for architects, that of the non-standard structures was offered by the University a designer with no prior experience in academic

research as supervisor. Despite the mutual interest of researcher and supervisor on design methods, the design process and the pursuit of the novel, it soon became apparent that a specialist in non-standard structures was necessary for the supervision of the thesis. A structural engineer specialising in the computability of non-standard structures replaced the architect-supervisor. The research trajectory swayed among epistemological extremes of the obvious, structural engineering design and non-standard computation, design theories and design processes and methods to the less obvious such as group dynamics, social psychology and psychoanalysis.

Once the viva time came and, despite the fact that an imaginative engineer and a rigorous architect were put in place to examine the thesis, the first questions posed threw up in the air a well-established academic register⁴ of terms such as originality, contribution to knowledge, validity of method(s) and findings, generalisability of findings and reliability of results. Surely, this could not have been the first time these issues had been raised at the examination of a PhD thesis, but it was most certainly that the thesis would not have been a breakthrough in the history of doctorates in architecture. However, it was and has been a clear lesson to the paradoxical, contradictory and controversial traits of a discipline that deals with wicked problems, cultivates and exercises creativity, is sometimes self-referential while it can only survive by picky backing on other disciplines, has to be socially responsible and relevant while taking its own trajectory and make, even unaffordable, mistakes in striving for novelty, adopt, when it has to, some epistemological bias as a pinnacle for its own sake, has to understand but not necessarily to learn in order to contemplate.

The bottom line of this ambivalent situation is that any misunderstanding can be reduced to two very straightforward questions: How could the toolkit for appreciating a kind be the appropriate toolkit for appreciating another, if we are to follow the German proverb that the (right) toolkit makes the Master⁵? What if this kind is not clearly and sharply defined?

Both questions were encountered on the PhD case mentioned earlier. It is interesting to note that in hindsight and since the thesis completion, notions such as bottom-up and emergence, buzz words for the discourse of contemporary architecture and computational theory have been in place, but were called something else such as Grounded Theory⁶ and open-ended research.

Ambivalence

Although notions like Grounded theory and open-ended research have been around for a long time, the time then was not ripe to accommodate them in the architectural discourse and methodology in the modern or post modern secluded world of architecture to which everything arrived with a time lapse (the idea of *ωπαίων/οραίον -ώπα/όρα -ώριμο/όριμο*⁷). By accepting the unpredictability of the future and the validity of chaos theories, systems and games theories and so on, the contemporary paradigm of Ambivalence no longer thrives on focused innovation but praises serendipity⁸ as a way forward.

No matter how idealistic this may sound, the questions arising are: how can research and its education in-through-for or para- architecture, nowadays, play a pivotal

role in providing answers to societal and other crises? How can research in architecture be creative, innovative and serendipitous? This answer lies in the very acceptance of a world of interdependence and sympathy: the apparent split and mutually antipathetic parts have to come together sympathetically, irrespective of the many questions that remain to be answered, lying at the core of this extended academic debate on doctoral research, such as:

1. How can subjection to clear analysis, discipline, focus and concentration marry up with lateral thinking, thinking outside the box?
2. How can discipline be combined with openness and sensitivity to change if architecture and its research are meant to be reflective?
3. If contemporary design is about inventing the method inasmuch as inventing the question, should research in architecture invent the research method as well?
4. How can research results be generalisable while they are novel and original?
5. How can architecture reinstate and preserve its autonomy while working with the other?
6. How can the idealism of the architecture researcher match the commercialisation of knowledge yielded from industrial funds?

Architectural doctoral education, just like architecture and its education in general, has to deal with paradoxes, juxtapositions, contradictions and wickedness. It is certain that in times of transdisciplinarity and the necessity for differences to compose the whole, exclusions are out of the question. How can architectural doctoral education be inclusive, sympathetic so as to embrace all diverse, possible methods and schools of thought in the same way that medicine, after long experience and immense enthusiasm for new methods of laparoscopy has reconsidered, re-contextualised and appreciated anew the merits of open surgery?

Before deciding on this sympathetic approach, could it be argued that the new species emerge in this dynamic world before we have time to create the mechanism to evaluate their potential? How can we be good masters without a clear toolkit? How could this weakness not expose the new standard to vulnerability? How could we discourage suspicious associations of the dominance of research-by-design that would coincide with the demand for the academia to recruit on the basis of PhD holders which, on rather a few occasions, is a legitimisation of designers, with an obscure design record⁹, in the academia.

Overall, such questions correspond to René Descartes' (1596-1650) revolutionary and, in his time, radically new criteria for clear, distinct, and rational cognition. As Søren Kjørup declares, "The cornerstone of conceptual logic of the Enlightenment was Descartes' distinction between 'clear' and 'distinct' concepts or ideas. (...) You have a clear idea about something that you can distinguish and recognize, but you have a distinct idea if you also know the criteria by which you make the distinction and are able to point to the marks or characteristics defining whatever you have the distinct idea about."¹⁰

No matter how dominant serendipity is in this paradigm, clear and distinct ideas are necessary. The way to reconciliation and reinstatement of mutual respect can only be achieved on two levels: by accepting that both species are necessary for architecture to fulfil its social responsibility and by inventing the appropriate and relevant toolkit for operation and evaluation. This, in turn, is consistent with the nature of contemporary architectural thinking to encompass all contemplations of the other.

In times of hybridisation there seems to be new species arising from the various mutations with the involvement of agencies, agents and catalysts that offer new research methods, new researchers' profiles, new evaluation mechanisms and new mentalities that accept the valid question left unanswered as much as the valid answer. Eminent economists and analysts suggest that despite any prediction or austerity measure and by taking into account the power of emergence and chaos theories, what lay people can do to help is to change mentality. Similarly, in the case of doctoral research in architecture emphasis is placed not only on the special nature of architecture, but also on the special, dynamic, systemic context in which architecture has been accepted to no longer be made from scratch. Irrespective of the nature of research or the respective toolkit, relevance and reflexivity are imperative in times of crises¹¹. The achieved novel can only prove relevant if it has a long-lasting impact on society.

Doctoral research for innovation and creativity

Innovation has commonly been accepted to be a new proposition that has an impact on society and its only validity and relevance lies in its long-lasting effects. Doctoral research in architecture, as any research, is about the pursuit of innovative ideas and, in the case of architecture, in particular, their impact on society is even greater. The question of innovation in research for architecture becomes even more acute in times of crises in society. Three propositions can be formulated as the main axes that the academic community debates have to give pertinent and consistent answers to rather soon. Firstly, to identify the appropriate toolkit, which will be capable of evaluating and of further developing the emerged forms and types of research that have already been implemented. Secondly, to define the context that can accommodate more than one type of doctoral research since the paradigms we have already mentioned coexist simultaneously with each having significant gains to offer. Thirdly, to take responsibility by preventing any perpetuation of an elitist, '*bourgeoisie à la mode*' pursuit that contradicts the very existence of a socially and culturally sensitive innovation. For example, such type of doctoral research in architecture encouraged or even imposed in times of various crises, by lobbies sustained by the so-called 'centres of excellence' and followed by poor and/or geographically remote, low self-esteemed institutions as a warrant for high quality innovative research, similar to known professional bodies that accredit graduate education of architects across the globe.

The intensified academic debate is currently challenged with a very demanding task to (re)define architectural innovation and to (re)search the concepts which can best describe the contemporary understanding of the nature and the mission of architectural creations. Innovation and doctoral research in architecture must always be a venture. We are all invited to define the contemporary rules, the new toolkit of a disci-

plined and accurate play within the limits of the reasonable, the acceptable, the tolerable; to undertake and accomplish a risky flight with strong and, to a certain extent, unpredictable speed and altitude constraints, sliding and swaying between the current conceptions of arrogance and banality with the former risking burning its wings and the latter risking making them wet and heavy, as the myth of Icarus taught us centuries ago.

Notes

- 1 "The field of architecture is devoted to suppressing a sense of crisis but is propelled by the very thing it represses. As the art of limits, architecture is always in a dialectic with crisis. The most crucial insights into the evolutions, complications, and responsibilities of the field can be found within the most traumatic scenes." M. Wigley.....
- 2 Peter Buchanan, 'The Big Rethink Part 9: Rethinking Architectural Education', *Architectural Review*, 28 September 2012 <http://www.architectural-review.com/home/the-big-rethink/the-big-rethink-part-9-rethinking-architectural-education/8636035.article>
- 3 As Till explains the first Myth that 'Architecture is just Architecture' mythologises and therefore mystifies architecture, marginalising it as an intangible, inexplicable and therefore self-indulging and narcissistic pursuit. Till's intriguing, seemingly linguistic or rather grammatical, associations of prepositions such as 'in', 'for' and 'through' between research and architecture connote in the case of research-in-architecture the hermetically closed world of academia as opposed to the more tacit approach on the research-through-design case of practice.
- 4 A very particular discourse based on the terminology of a well-defined and secluded area of knowledge). Wikipedia: In linguistics, a register is a variety of a language used for a particular purpose or in a particular social setting.
- 5 Das Werkzeug macht den Meister.
- 6 Grounded Theory method (GT) is a systematic methodology in the social sciences involving the discovery of theory through the analysis of data. Grounded theory method is a research method which operates almost in a reverse fashion from traditional social science research. Rather than beginning with a hypothesis, the first step is data collection, through a variety of methods. From the data collected, the key points are marked with a series of codes, which are extracted from the text. The codes are grouped into similar concepts in order to make the data more workable. From these concepts, categories are formed, which are the basis for the creation of a theory, or a reverse engineered hypothesis. This contradicts the traditional model of research, where the researcher chooses a theoretical framework, and only then applies this model to the phenomenon to be studied. Glaser, Barney G & Strauss, Anselm L., 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*, Chicago, Aldine Publishing Company
- 7 the word *ωραίων*: *oraíon* in Greek means beautiful and it comes from the word *ώρα*: *óra* which means hour-time and is associated with the word *ώριμο*: *órimo*, which means mature. In other words beautiful is what is ripe, mature and on time.
- 8 To find something incidentally, as a coincidence, unintentionally, without even looking for it, something to be chance discovery from completely different disciplines from that which the researcher is formally trained, the new idea in a domain from someone that has nothing to do with this domain transdisciplinarity and the idea of the other.

- 9 Following from J Till's essay, it would be interesting to challenge the last myth, that is 'Building a Building is Research' by asking how this cannot be reduced to 'Building *any* Building is Research'. However, it is this paraphrase (paraphrasis) that sets up the scene for a relatively recent, still controversial, phenomenon welcome by a number of institutions and left unquestioned.
- 10 Søren Kjørup, *Another Way of Knowing, the Sensuous Knowledge series 'Focus on Artistic Research and Development'*, no 1, Bergen 2006, p. 13.
- 11 Bruno Latour in his essay "Why has critique run out of steam? From Matters of Fact to Matters of Concern" argues about the slow process that academia is coping with the significant changes happening in our society.

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Remarks on the Doctoral Education of Architecture in Europe

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ENHSA Steering Committee

Names Used as Academic Titles

Naming of things and phenomena is important. How we name them, thus they will be and how they are, we will call them. The old hermeneutic circle, cut only by the first words of primary religious or mythic texts – reciting of which does establish the formal beginning: again and again.

Enuma Elish – the Babylonian genesis epic says (Annus 2005:138):

*When above the heaven was
not named
And below the earth's name
called...
When no gods had made
their coming
No names were called, no
fates cast ...*

It is quite informative to look at the names and etymology in the history of academic and professional titles within the sphere of architecture.

One of the first remarks about demanding education in architecture comes from Socrates:

But what employment do you intend to excel in, Euthedemus, that you collect so many books?" Euthedemus returning no answer, as at a loss what to say: "You perhaps intend to study physics," said Socrates; "and no small number of books will be wanting for that purpose." "Not I, upon my word." "Architecture, perhaps, then? and for this too you will find no little knowledge necessary (Xenophon 1840:583).

In the 7th century the builders from Roman tradition were called *magisterio cementariorum* – masters skilled in masonry. The builders of Lombardy were known as *magistri comacini* or *comanicus*. That was connected to the name of the lake Como, around which the well-known masters came from (Kostof 1977:69).

Pierre de Montreuil (1200-1267) the celebrated author of Sainte-Chapelle was buried in the chapel of Saint-Germain-des-Prés and on his epitaph was written: *vivens doctor lathomorum*¹.

There are hints that the Medieval master masons did not only operate as highly skilled *artefices* or *auctores* but also as "men of words" – thus academics, teachers or highly powered supervisors. The usually quoted *Par ci me le taille*, can be interpreted in a much richer way than the usually referred to arrogance of a master mason².

Alain de Lille (1116-1202) *Alanus ab Insulis*, was the theologian and poet so varied and profound in his knowledge that he was called during his lifetime *doctor universalis*. Latin word *doceo/docere* – means to teach. This stem word is also connected to commonly known words as *docent* and *doctrine*, thus meaning teacher and teaching as a fully developed system of thought.

Albertus Magnus (1193-1280) Albert the Great or Albert of Cologne was called during his lifetime *doctor universalis* as well as *doctor expertus*. Later the titles of *Magnus* and *Saint* were added to his name. Albert Magnus became also known as the *Doctor of the Church - Doctor Ecclesia*.

Doctores Ecclesia refers to the people, whose doctrines were highly important for the development of Catholic Church. It started with four *Fathers of the Church* – *Patres Veteres*, *Kirchenväter*. There were four in Latin Church – Saint Gregory the Great, Saint Ambrose, Saint Augustine and Saint Jerome. In 16th century the Catholic Church also recognized the first Orthodox Church Fathers – Saint John Chrysostom, Saint Basil and Saint Gregory Nazianzen. Later 35 persons were nominated as *Doctores Ecclesia*. Out of these three were women – Saint Teresa of Ávila, Saint Catherine of Sienna and Hildegard of Bingen.

Here we see one of the first formalized or canonized definitions of *Doctores Ecclesia*. The requisite conditions to become a *Pater Ecclesia* are enumerated as three:

1. *Eminens doctrina* - eminent learning/teaching
2. *Insignis vitae sanctitas* - a high degree of sanctity
3. *Ecclesiae declaratio* - proclamation by the Church (Wiki).

So from names we have arrived to meanings. These three principles govern the conditions of the doctor in Latin Church.

We also know the learned architects who are not called doctors.

In Reims Cathedral we can find Hugues Libergier's (1229-1267) tomb slab. In the upper part of the slab the text says: *Maistre Hves Libergier*. Erwin Panofsky believes the depiction of the architect resembles the clothing of an academic or Scholastic – *pilleus*, gloves, cape. Hugues also holds in his hands the rod (*virga*) and model of the church – the sign usually dedicated to the patrons of the building.

Philippo Brunelleschi (1377-1446) the author of cupola of Santa Maria del Fiore in Florence was named on his tombstone: *corpus magni ingenii viri*. This is translated as “very talented man” or “great ingenious man”. The last word *ingenious* arrives into late Middle English as derivation from Latin – *ingenium* - mind, intellect. The same root of which engineer arrives to English – *ingeniare* – contrive, devise.

The Latin world *genius* comes from *gignere* (“to beget”) – it is the “attendant spirit from ones birth” – similar phenomena as Socrates was referring as *daimon* - guardian spirit “replete with knowledge” (<http://www.pantheon.org>).

The Medieval masons were very often called Master or *Meister*. The mason of that level was usually the member of the particular Guild. Probably the old stem was Latin *magister* – *magis* – meaning more important. Probably connected to Proto-Indo-European word – *magyios* – related to root *meg* – great, big, - *megalos*. *Magister* thus has referred to an outstanding mastery.

The common names also for people becoming or wanting to become the Master were: *apprentice* and *journeyman*. The apprentice became a part of Masters family and worked with him until the Master considered his knowledge and skills sufficient. In masons' guilds that took approximately 5-7 years. Journeyman was sent to exchange knowledge and skills to a friendly guild abroad for two to three years. With completion of studies one was ready for master examination.

Today the term *doctor* is mostly used to denote the medical doctor which is much later development than the Doctors of the Church. It was in the 13th century in Paris, where the term *doctor* passed from theology to law and medicine, referring to the theoretical part of the profession (Carruthers 2010:35). Architecture was here a favorite example as in this profession the result had to be foreseen and contrived, before the process of executing really started.

Confusion of Meanings of Academic Titles

I have personal experience of two formalized doctoral systems: in the former Soviet Union and in the United Kingdom. Both were established long before the beginning of Bologna developments.

Firstly about the doctorate in the USSR: This was a closed and highly protected area of expertise because of its political sensitivity. All areas of knowledge were submissive to communist ideology, even if it was impossible. In the academic system of the USSR were three nominations:

- Candidate of Sciences in ...,
- Doctor of Sciences in ... and
- Academician.

The general formation of the first degree of advanced studies consisted of three Candidate exams, usually done in the first year and writing the thesis, called the dissertation of the candidature. The exams were to secure that the applicant had obtained and understood sufficient body of knowledge in the field of studies. It was also designed to force the communist ideology into the studies. The most important criterion for the dissertation was to produce original solution to a major problem or problems in the field of studies. That was the formal difference of the candidate research compared to the research in general.

The Doctor of Sciences was a much more complicated form of the academic advancement. The Doctor of Sciences had to have a substantial list of major publications and usually his/her own research school. That was meant both intellectually and institutionally. So the Doctor of Sciences in the USSR was the recognition of senior advanced researcher and also of his/her tested political loyalty to the state.

Secondly I have experience in the UK system of advanced studies. The system consisted and still consists of two academic recognitions as well as one honorary position. The academic positions are:

- Master of Philosophy (MPhil) and
- Doctor of Philosophy (PhD)³.

Everybody who enrolled into the doctoral studies was positioned in the category of Master of Philosophy. In the middle of studies the decision was to be made: either to proceed and graduate with MPhil or continue directly for the PhD. The decisive criterion that separated the two was the promise of:

the creation and interpretation of new knowledge, through original research or other advanced scholarship, of a quality to satisfy peer review, extend the forefront of the discipline, and merit publication.

Today the criteria have been worked further and they present the framework for higher education qualifications in England, Wales and Northern Ireland (FHEQ). The list of criteria include in addition to the above mentioned criterion, the following:

- *a systematic acquisition and understanding of a substantial body of knowledge which is at the forefront of an academic discipline or area of professional practice;*
- *the general ability to conceptualise, design and implement a project for the generation of new knowledge, applications or understanding at the forefront of the discipline, and to adjust the project design in the light of unforeseen problems;*
- *a detailed understanding of applicable techniques for research and advanced; academic enquiry.*

Typically, holders of the qualification will be able to:

- *make informed judgments on complex issues in specialist fields, often in the absence of complete data, and be able to communicate their ideas and conclusions clearly and effectively to specialist and non-specialist audiences;*
- *continue to undertake pure and/or applied research and development at an advanced level, contributing substantially to the development of new techniques, ideas or approaches and will have:*
- *the qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and largely autonomous initiative in complex and unpredictable situations, in professional or equivalent environments.*

So both described systems of doctoral education consist of two-tier program, but the amount and level of studies differ quite a lot and the systems are neither formally nor essentially easily comparable. So both the former soviet titles *Candidate* and *Doctor* have been transformed into or have been compared to Doctor of Philosophy.

Bologna Declaration, that aimed to clarify readable and comparable degrees, transferable credit system and student mobility, compressed the national and independent academic traditions of doctoral education into one layer – the third cycle. Bologna declaration says very little about third level education. The stages of first and second level were called Bachelor (*Baccalaureus*) and Master:

Adoption of a system essentially based on two main cycles, undergraduate and graduate. Access to the second cycle shall require successful completion of first cycle studies, lasting a minimum of three years. The degree awarded after the first cycle shall also be relevant to the European labour market as an appropriate level of qualification. The second cycle should lead to the master and/or doctorate degree as in many European countries.

Out of these recommendations PhD as a third cycle of studies was a logical development. There are two reasons that made the adoption of PhD as the outcome of the third cycle easy: Firstly, the second cycle received Master nomination in the majority

of European countries as a formal title. Secondly, the second cycle with the title as Master, was already in many cases, as principle, already considered as research-orientated educational level.

The European Higher Education Area developed the Bologna process further also from the point of view of third cycle⁴:

With a view to achieving better results we recognise the need to improve the synergy between the higher education sector and other research sectors throughout our respective countries and between the EHEA and the European Research Area.

To achieve these objectives, doctoral level qualifications need to be fully aligned with the EHEA overarching framework for qualifications using the outcomes-based approach. The core component of doctoral training is the advancement of knowledge through original research. Considering the need for structured doctoral programmes and the need for transparent supervision and assessment, we note that the normal workload of the third cycle in most countries would correspond to 3-4 years full time. We urge universities to ensure that their doctoral programmes promote interdisciplinary training and the development of transferable skills, thus meeting the needs of the wider employment market. We need to achieve an overall increase in the numbers of doctoral candidates taking up research careers within the EHEA. We consider participants in third cycle programmes both as students and as early stage researchers.

The so-called *Dublin Descriptors* were proposed first in 2002 as common criteria for Bachelors' and Masters' education. In 2004 it was revised and included also the third cycle education. The document was called *Shared 'Dublin' descriptors for Short Cycle, First Cycle, Second Cycle and Third Cycle Awards*⁵. It is rather interesting to note that here in the glossary the word research is given in a very fluid state:

*The word '**research**' is used to cover a wide variety of activities, with the context often related to a field of study; the term is used here to represent a careful study or investigation based on a systematic understanding and critical awareness of knowledge. The word is used in an inclusive way to accommodate the range of activities that support original and innovative work in the whole range of academic, professional and technological fields, including the humanities, and traditional, performing, and other creative arts. It is not used in any limited or restricted sense, or relating solely to a traditional 'scientific method'.*

Still until today in Europe several nominations of historical nature have remained in the doctoral education. The most well-known is *Habilitation*. It comes from Latin *habilis* and means "fit, proper, skillful". It is the highest qualification that a scholar can achieve in several countries in Europe, Central Asia, and the Caucasus (Wiki). Com-

pared to the three cycles of Bologna process it is earned after obtaining a research doctorate, and thus appears as the fourth cycle of academic titles. *Habilitation* requires that the candidate had to write a professorial thesis (or habilitation thesis). It has to be based on independent scholarship, reviewed by and defended before an academic committee:

However, the level of scholarship has to be considerably higher than that required for a research doctoral (PhD) thesis in terms of quality and quantity, and must be accomplished independently, in contrast with a PhD dissertation typically directed or guided by a faculty supervisor (Wiki).

The debate on *Habilitation* is still ongoing in Germany.

In Sweden and Finland an intermediate degree, comparable to MPhil of the UK, still survives. It is called respectively *licentiate* and *lisensiaati*.

In Swedish and Finnish universities, a Licentiate's degree, recognised as a pre-doctoral degree, is equal to completion of the coursework required for a doctorate and a dissertation, which is formally equivalent to half of a doctoral dissertation (Wiki).

In France the title *Docteur d'Etat* is now replaced by *Habilitation à Diriger des Recherches*. The award of the French *Habilitation* is a strict requirement for supervising PhD students and applying for Professor's position.

The process of understanding academic titles is even more complicated by the transformative process of academic positions and appointments. Here the nominations of Docent and Professor become the part of the discussion. For instance those in Germany who hold the Habilitation can become nominated Privatdozent, which means the titleholder can teach without the supervision of the Professor (Wiki).

We can conclude this section with the interpretation that the *Universum Doctoralis* is not just so simple and clear as it looks at first glance.

New Directions of Doctoral Studies

The *International Forum on Doctoral Education in Europe* of ENHSA took place in March 12-14 of 2013, in Riga. On the forum several traditional and new doctoral programs were presented and discussed. I have a feeling that in its entirety the forum described that a new paradigm is under formation in doctoral education in the field of architecture. The new paradigm itself has not been formulated but it clearly shows the loosening up of traditional methods and formation of doctoral education in architecture.

Traditional methods and formation of doctoral education in architecture I see mostly in the field of history, theory and technology of architecture. The first two – history and theory – mostly rely on historical and philosophical traditions. These are histories and philosophies of architecture. Technology of architecture mostly relies on the traditions of positivistic sciences and in some cases to the managerial traditions.

Since I remember myself being part of architectural education and its international networks the discussion of new research methods and doctoral education has been around. That is now close to fifteen years. Particularly clearly I remember the conference *The Unthinkable Doctorate* in Brussels by Sint-Lucas School of Architecture in 2005. The conference call asked:

Doctorates in the 'architectural sciences' (considered in their most general sense, including urbanism, urban design, and regional planning), in the various domains of construction, and in theory and history of architecture are currently recognized.

But a 'doctorate in architecture' which is constituted from the architect's work itself – the verb 'to architecture' is yet lacking from our vocabulary – has not yet really been explored. What is its field of application? What criteria are applicable to it? What options might be available, and what should be required of potential candidates (Belderbos, Verbeke 2005:13)?

Several “unthinkable” doctorates were presented and discussed. Halina Dunin-Woyseth concluded her presentation with general remark that described the overall situation:

On the basis of this discussion with regard to the doctorates in architecture an assumption has been made that there is now a supportive climate in Europe for developing various forms of doctorates within the broad scope of the earlier 'unthinkable' and now increasingly 'thinkable' doctorates. Such development seems to be promising for architecture both as a field of expertise and a field of inquiry (Belderbos, Verbeke 2005:99).

This development has resulted in a new type of Creative Practice Research: ADAPT-r⁶. (See: Pedersen, Verbeke, Albertsen in the present volume: *The PhD programme at Aarhus School of Architecture enters its fourth stage*).

In Scandinavia the tradition of process and design based research has been quite common for more than a decade. Expressions like “making professions” and “creative professions” are not new. In Aalto University the Doctor of Arts has been possible since 1983 and the first graduations were 1990s⁷. In Sweden the support for the research and development in arts began in 2001 and it was targeting, at the beginning, educational networks. Since 2003 the Swedish Research Council (*Vetenskapsrådet*) has awarded project grants for artistic practice-based research:

The point of departure for artistic research is found in the artistic process and works. Research, regardless of art form, is practice-based and includes intellectual reflection aimed at developing new knowledge. The results of artistic research are usually presented both as creations and in written form (<https://www.vr.se/inenglish/shortcuts/artisticresearch>).

Similar processes of supporting artistic research in visual arts can be noted in Wales, where practice-based research became widespread and was introduced for architectural research around 2002 (See: Forster, Tweed in the present volume: *New developments in doctoral research at the Welsh School of Architecture*). Here the difference between “practice-based” and “practice-led” research is made. Practice-based Research is an original investigation undertaken in order to gain new knowledge partly by means of practice and the outcomes of that practice. Claims of originality and contribution to knowledge may be demonstrated through creative outcomes. Practice-led Research is concerned with the nature of practice and leads to new knowledge that has operational significance for that practice.

These processes of shifting interests and experimentation in doctoral studies in the architectural domain during the last ten-fifteen years bring forward two interpretations:

Firstly, quite similar loosening of a paradigm happened in general architectural education in Europe (though, probably not that clearly visible) during the 1970s-1980s. Then the interest of architecture was focused from relating disciplines that composed the architectural curriculum to design itself. The design studio became the most effective teaching tool. It was recognised that architecture is a worthy intellectual subject in its own right and that architectural education itself offers a special way of learning⁸.

Secondly, the research, its methods and outcomes in architectural education, particularly in doctoral research, has reached the period where it experiments with new possibilities. That is also a certain indication of a probable paradigm change in architectural education.

Speculation of the Paradigm Change?

To provoke a debate one can go even further and speculate that the current diffusion in research within the architectural education is not a narrow paradigm change by itself, but refers to a much larger tectonic shift in architectural phenomena.

For nearly a hundred years we have heard tragic voices in the histories and theories of architecture. They are about the crisis in architecture and emerge under different headings: “loss of the centre”, “decline of the aura”, “architectural patient surviving or succumbing”, among others. There have also been a huge number of manifestos proclaiming a new start for the new architecture. The latest development of architecture can be seen on the background of many theoretical texts as an enduring crisis.

We could suspect that architecture as an existential profession; thousands of years old; emerging from the intersections of poetics and politics; concerning everyone's fundamental reflection of space and time; could be proud and arrogant in its universality and all-embracing being. This arrogance is exactly the string of character that developers, politicians, historians and many others blame architects and architecture for. Nevertheless architecture within its universality and all-embracing being still feels uncertain. In this uncertainty of permanent crisis laments for previous glory and longings for a new Messiah are felt⁹.

I would choose to be even more tragic and say: it is not just a permanent crisis intuited by historians, theoreticians and architects: we might be facing the full change of paradigm in architecture as a cultural phenomenon and as a professional education. This paradigm could be called modern, if we allow it to stretch from Renaissance to Trans-Modernism. Tafuri calls the last phase of it Hyper-Modernism (Tafuri 2006, xxvii).

One can see three major elements in this long-lasting paradigm that might be at the state of disappearing or mutating: (1) the representational system of architectural design, (2) the means of producing architecture designed and (3) the authorship of an architect designing. There are probably more changes (diffusion of public and private affairs, global panopticon, etc.) but these have caught my eye and attention, providing exciting areas of research. These three major elements within architectural phenomena are: orthogonal projections in the form of designing and working drawings, isolation of architects' profession from builders and later from engineers as well as emergence of a singular author for the architectural process. These changes took their shape in the Renaissance and have been holding up with different fluctuations until today. Even the Industrial Revolution did not change this development.

I suspect that the reason for these changes is the Technological Revolution, going on now – particularly the new stage of advancement in information and media technologies. The new technology has now been transformed from quantitative and cumulative changes into the new structure of quality. Through pan-digitalisation of every sphere of human life, we are rapidly encountered by the on-line parallelism of multitude of possible digital worlds.

Within visualisation and screening of pan-digitalised representational systems, qualities like hybridisation, arbitrary juxtaposition, simultaneity and multitasking create totally new discourses. One can believe that they bring forward a new epistemology. An ordinary web page today looks like the entry of the Chinese Encyclopaedia of Borges quoted by Foucault in *The Order of Things* (Foucault 2006: xvi).

The pan-digitalisation has suggested a new way in how we perceive the realm of physicality, the raw existentiality of thingness around us. The remote sensing, digital markers and switches, large-scale screens, led lighting, etc. have created an epistemological membrane between the existential materiality and human visual and haptic sensing. Architecture is becoming more and more screen-like or is experienced as a

screen. The traditional design projections are getting closer to the online code. The building practice is transformed through CAD/CAM technologies into 3D printing. The parametrics in the design process with online copying question the legacy of the author of the design.

In the lack of a better term I would like to call this new condition: **imagospheric**. We are constantly and primarily surrounded by images on the screens or attend to the world like screen. I keep the name *imagosphere* for the time being, to allow its synthetic and broad meanings to be fulfilled.

In some sense, we have crossed the threshold of a new era. New digital-technological systems are the foundation for this new era with several amalgamations and the format of these transformations is its interface – screen. iPhone, iPad, ITablet and MacBook are the perfect examples of this new synthesis. It is not just four separate appliances in the form of four objects. It is a digital platform interfaced with four screens of different size, dedicated to the same function in different occasions and partly interchangeable. The transformation is evident when we consider the recent reminder in *International Herald Tribune*:

At one time, preparing children for school required buying new clothes and a fresh set of pencils. These days, your child is likely to need Internet access and laptop even more than a composition notebook. For parents, the choices can be overwhelming – and expensive (Buckleitner 2013).

By the way I had to read the sentence twice to make sure that the difference between *laptop* and *notebook* is not the configuration and size but the dichotomy of analogous and digital.

The digital platform is not “mine”, it is composed of several integral parts, which I have no knowledge about, nor the command over. Firstly because it has become impossible for me as a user to know what I am exactly using. Is it a machine or is it a bundle of licences that is attached to another bundle of licences and patents. The machine has become irrelevant as I can easily transform everything on its hard disc and operative memory into another machine. Furthermore, the machine has become irrelevant as the content of my actions is not even localised – it has joined the clouds.

Secondly the digital platform has its own autonomy to update, communicate, initiate and activate software that is nothing but a string of zeros and ones, a protocol guarded by intellectual property laws around the domain of meanings that constitute my work.

Nevertheless which form the message takes, the platform of digital-technological amalgamations is finally mostly presented as an audio-visual in the format of the screen. Screen in the form of material or mental structure by itself is a relatively old

phenomenon. It comes to the basic question of every screen-like representation: how is it possible to convey on two-dimensional surface various signs and three-dimensional objects. In a more sophisticated version the screen or membrane is an imaginary epistemological device connected to seeing and viewing the world.

The screen-ness of current life-world has another metaphoric level in architectural profession today. After the WWII architect was the sole consultant of designs for buildings and planning of cities. That has gradually changed. Today the architect is but one consultant among many. The speed of change has been different in different countries and cultures, but the vector of development is quite clear.

As a broad trend of development it predicts that the profession is in the need of transforming, or worst - the profession could be extinct soon. The decisions in larger scale of space are dominated, just to count some, by:

Environmental scientists, social scientists, political scientists, geographers, human geographers, economic geographers, landscape designers, landscape architects, urbanists, urban designers, planners, etc.

It is also clear that the **smaller scale of space is more dominated** by:

Designers, furniture designers, interior designers, graphic designers, interior architects, life-style consultants, florists, professional mediators etc.

What is left for the architects?

Within this line of speculation one can wait for extremely interesting developments in architectural phenomena, architectural education and soon enough in architectural research, particularly in doctoral research.

Notes

- 1 The full text being: *Flos plenus morum vivens doctor lathomorum, Musterolo natus jacet Petrus tumulatus Quem rex caelorum perducit in alta polorum Christi milleno bis centeno duodeno cum quinquageno quarto decessit in anno* (Carruthers 2010:31).
- 2 The well known quote is: *Magistri cementariorum, virgam et cyrothecas in manibus habentes, aliis dicunt: Par ci me le taille, et nihil laborant; et tamen majorem mercedem acciunt, quod faciunt multi moderni prelati.* And the second one: *Operantur aliqui solo verbo. Nota: In istis magnis aedificiis solet esse unus magister principalis qui solum ordinat ipsa verbo, raro aut numquam apponit manum, et tamen accipit majora stipendia aliis. Sic multi sunt in Ecclesia qui habent pingua beneficia, et Deus scit quantum faciant de bono; operatur in ea solum lingua, dicentes; 'Sic debetis facere' et ipsi nihil horum faciunt* (Carruthers 2010:23).
- 3 The modern Philosophiae Doctor probably originated from University of Berlin where Wilhelm von Humboldt in 1810 advocated for holistic pursuit of knowledge. Humboldt originated PhD became adopted in the USA and the UK at the turn of the century and became a standard in many English-speaking countries (Wiki; Belderbos, Verbeke 2005:83).

4 The European Higher Education Area - Achieving the Goals. Communiqué of the Conference of European Ministers Responsible for Higher Education, Bergen, 19-20 May 2005.

5 **Qualifications that signify completion of the third cycle are awarded to students who:**

- have demonstrated a systematic understanding of a field of study and mastery of the skills and methods of research associated with that field;
- have demonstrated the ability to conceive, design, implement and adapt a substantial process of research with scholarly integrity;
- have made a contribution through original research that extends the frontier of knowledge by developing a substantial body of work, some of which merits national or international refereed publication;
- are capable of critical analysis, evaluation and synthesis of new and complex ideas;
- can communicate with their peers, the larger scholarly community and with society in general about their areas of expertise;
- can be expected to be able to promote, within academic and professional contexts, technological, social or cultural advancement in a knowledge based society (http://www.tcd.ie/teaching-learning/academic-development/assets/pdf/dublin_descriptors.pdf);

6 Since 1st January 2013 the School is also partner in the ADAPT-r (Architecture, Design and Art Practice Training-research) project (see www.adapt-r.eu). This is one of the largest undertakings in architectural research training ever. The project is funded under the 7th Framework of Research of the European Commission. Partners in this project are KU Leuven, Faculty of Architecture Sint-Lucas (who is coordinator), Aarhus School of Architecture, RMIT (Melbourne, Australia), University of Westminster (UK), Glasgow School of Arts (UK), Estonian Academy of Arts (Tallinn) and University of Ljubljana (Slovenia). The project focuses on interacting with architectural, art and design practices to develop Creative Practice Research. Training activities are scheduled on a bi-annual base in Ghent, Belgium (hosted by KU Leuven, Faculty of Architecture Sint-Lucas) and Barcelona, Spain (hosted by RMIT Europe) (Pedersen, Verbeke, Albertsen).

7 **Dissertation including art productions (in the field of art and design)**

In the field of art and design, a dissertation can also include an art production, a series of art productions meaningfully connected to each other, or a product development project. A written thesis forming a part of the dissertation has to be in a dialogic and analytic relation to the art productions or product development project, and the doctoral candidate has to present in it the targets, methods and findings of the production, series of productions or product development project. Dissertation can include artistic parts, which can be joint productions or projects, provided that the independent contribution of the doctoral candidate can be clearly indicated. The art productions may only be new works. The written thesis must be suitable for publication (<https://into.aalto.fi/display/endoctoraltaik/Dissertation+and+Graduation>).

8 In 1972 Bill Hillier, John Musgrove and Pat O'Sullivan called for changes:

A few voices crying in the wilderness that architecture contained its own fundamental disciplines could not stop the onward march of these simple and powerful ideas, and by and large they still hold the stage today (Hillier, Musgrove, O'Sullivan 1972, 29:3:2).

The "simple and powerful ideas" - they referred to concerned the understanding that architects were not fit to generate new knowledge for themselves and that this was the job of 'related' disciplines. The educational consequences of these ideas were seen by the authors in a milieu containing a rich variety of related disciplines. Students were to be well grounded in each of them. This made the education of architects "broad and shallow", the designer's field thus became "more complex and less structured".

9 Roger Scrutton reminds us of Hans Sedlmayr in 1979:

What is architecture? Why is it important? How should one build? These questions have never been more urgent, but architects and theorists now seem hesitant to answer them in a serious and systematic way. As Hans Sedlmayr wrote, in *Verlust der Mitte*, 'the new type of architect has become hopelessly uncertain of himself. He glances over his shoulder at the engineer, he fancies himself in the role of inventor and even in that of a reformer of men's lives, but he has forgotten to be an architect.' (Scrutton 1979,ix).

Today we might paraphrase Sedlmayr and say that architect glances over his shoulder at urbanists, landscapers, geographers and others. Sedlmayr's book was published 30 years before the book of Scrutton and it was full of bitter criticism on modern culture and among other phenomena, he was particularly focusing on modern architecture. Manfredo Tafuri brings Sedlmayr into the wider context of other voices:

Adopting a different kind of tragic outlook /*altra tragicita* '/, Hans Sedlmayr formulated a critique – reactionary in every sense – centering around concepts such as the "loss of the center" and the "death of light." /.../ For example, it is difficult indeed not to sense the close affinity between Sedlmayr's intuition of loss, Benjamin's concept of the "decline of the aura", and Robert Klein's reflections on the "anguish of the referent." (Tafuri 2006: xxvii-xxviii).

One could add here Alberto Perez-Gomez, whose book *Architecture and the Crisis of Modern Science*, published in 1983, looked at similar dramatic events:

When a physician talks about a crisis in the condition of a patient, he is describing a moment when it is unclear whether the patient will survive or succumb. In a true sense, this is now the condition of Western culture. In the last century and a half, man has done it utmost to define the human condition and ironically has lost the capacity to come to terms with it; he is unable to reconcile the eternal and immutable dimension of ideas with the finite and mutable dimension of everyday life (Perez-Gomez 1983, 4,6).

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Ben CAMPKIN

The 'Postmodern Mindset' or Critical Pluralism? Architectural Doctoral Research Today

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Against the backdrop of increased fees and the expectations that they bring, universities in the UK are placing renewed attention on the 'student experience' and research-based teaching for undergraduates. A comprehensive review of architectural education by the RIBA is also underway, in parallel with a review of the EU directive on the recognition of professional qualifications, and a wider public debate about the role and education of the architect. Commentators have criticised the detachment of professional architectural education from 'reality', pointing to dramatic fee increases, as the government withdraws funding in favour of a flawed student loan scheme, and arguing that the very real financial pressures on students should put pressure on schools to move on from 'dogmatic' and individualistic pedagogic strategies established in the 1960s.¹

It is therefore a timely moment to reflect on the state of research degrees in architecture and how they sit within architecture schools. Peter Buchanan, architect

and critic, was recently commissioned by the *Architectural Review* to write an essay 're-thinking architectural education' as part of a series entitled 'The Big Rethink', intended to provoke architects to re-evaluate their profession.² In this chapter I take Buchanan's commentary as a starting point to consider architectural doctorates with particular attention to their role within pluralist and cross-disciplinary pedagogical models and those that prioritise an urban understanding of architecture, setting it within the context of cities and urbanization.

Debating architectural education: pluralism and 'critical realities'

In 'Rethinking Architectural Education', Buchanan asserts that 'the more overwhelmingly urgent the looming crises provoked by systemic collapse of interdependent aspects of our global civilisation, the more frivolous the pursuits of academe'.³ These remarks fall within a wide-ranging critique of architectural education as detached from 'current critical realities'. The problems, as Buchanan sees them, are broad in scope, ranging across cultural, economic and pedagogical factors: the failures of an education focused on eliciting individual creativity or 'genius' and perpetuating the 'starchitect' system; the uses of obfuscating theory; and the conditions of neoliberalism which promote an atomized approach to teaching through design units that fetishize 'concept' over substance, and rely on the casual labour of subcontracted teachers. Legitimate as these criticisms might be, the polemic in 'Rethinking Architectural Education' is at times frustratingly general and anecdotal.

As a critic of contemporary architectural education, what is Buchanan's view of architecture doctorates? On this topic he seems surprisingly out of touch with the models architecture schools offer.⁴ He ignores the variety of practice-led, 'by design' or industry-sponsored doctoral programmes now available, focusing instead on doctoral education in the history and theory of architecture. Buchanan contends that:

"as we all know, the postmodern mindset dominates history and theory departments, home to PhDs who appoint other PhDs who, in knowing more and more about less and less, are not a natural fit with a generalist subject such as architecture. But these are the people who boost the research ratings and so the funding of schools, no matter how worthless that research to the practice of architecture. Hence some schools are staffed by disproportionate numbers of such scholars who lack the skills and experience to contribute much to the rest of architectural education. Besides, too often, studying for a PhD can ruin promising students, leaving them fit only for a career in architectural education. Hence many professors admit in private that a university is probably not the best home for an architectural school."

Buchanan's tone belies an intention to provoke a debate rather than present evidenced arguments, but as a skeptic's view on doctorates as they feature in contemporary architectural education, it is worth us addressing his concerns.

What should we make of the idea that contemporary architectural education is held back by its submission to approaches characterised as 'postmodern', or, elsewhere in the article, 'relativist' or 'pluralist'? What is meant by 'the postmodern mindset'? If postmodernism equates to pluralism, is this mindset not a contradiction in terms?⁵ In the context of the recent debates in the UK, it has been argued that pluralism in architectural education is desirable to meet the needs of a diverse market.⁶ More importantly, it surely follows that to be more engaged with today's critical realities, plural approaches are required to find innovative responses to major global challenges. In the UK, there are approximately 45 architecture schools with a lot of variation in the approaches taken. If we scan the doctoral programmes now available in architecture internationally, there is also striking diversity, but with a number of common emphases. Namely, doctoral programmes - looking across those offered by thesis or by a combination of text and studio work or a project - prioritise autonomous, original and exhaustive research; theoretical, conceptual and empirical rigour; ambition in addressing contemporary challenges; and cross- or -interdisciplinary approaches. Such programmes are marketed towards the strongest students, with the highest capacity for independent thinking, and in particular those set on a career teaching architecture. Buchanan specifically criticises 'PhDs who appoint other PhDs', but as a preparation for teaching the aims of these programmes seem in many ways well suited to the kind of architectural education he wishes to engender.

The phrase 'as we all know, the postmodern mindset' is a curious one. It assumes that Buchanan speaks for us all: an unreconstructed universal 'we'. When, earlier in his essay, Buchanan critiques the lingering 'postmodern relativism of the 1980s', he evokes some general traits associated with postmodern aesthetics. However, he underplays shifts in the understanding of space and subjectivity, or their relations with late modern political or economic conditions as examined, for example, by critical urban and architectural and cultural theorists such as Frederic Jameson or David Harvey.⁷ Indeed, the specific intellectual turns or positions that together comprised postmodernism are only vaguely invoked. Buchanan acknowledges that:

"even postmodern theory was initially useful in broadening discourse and drawing attention to the semiotic dimensions of architecture. And what has become of its excessive relativism was initiated by validating previously repressed voices, such as those of women and the colonized. The multiplicity of perspectives this alerted us to is important in breaking the grip of modernity's too narrow certainties, so facilitating epochal change. But like modernity, postmodernity has hung on too long and the benefits it brought are now outweighed by its toxic downsides."

However, there is a suggestion here that inequalities based on gender, or, in an increasingly internationalised educational system, that the repressions and oppressions enacted by colonialism, or the structures of capitalist urbanization, no longer require attention. This is presumably not what Buchanan means. Yet he implies that all those intellectual turns - feminism, post-colonialism, critical theory, ecology, and

so on - can be dismissed as the idiosyncratic interests of individuals and minorities, leading to inevitable 'pathological dissociation [...] and fragmentation into multiple silos of expertise'.⁸ The result? 'Postmodern relativism is powerless to effect fundamental change. This highlights the urgent need to devise a sustainable, trans-modern (post-postmodern) culture'. Buchanan's answers to how this might be achieved are less clear, and are propelled by his own rather particular interests in 'integral theory'. Buchanan is concerned to rethink architectural education towards 'critical realities'. Is it not the 'postmodern' scholars he alludes to who have most successfully worked to bridge across the kind of silos in architectural thought - urbanism, landscape, architectural design, environmental design - that he argues are the legacy of modernism, focused on achieving social and political change over professional self-interest?

Architectural doctoral education in context

In the UK the institutionalisation of research has featured a growth in architectural doctorates providing a structure for extended and rigorous research to take place, gradually subsuming other arenas of professional architectural history. There is not enough funding to go round. A high proportion of students are from outside of the UK. The funding that is available is highly competitive. Candidates must have a very clear idea of the subject-matter of the research, the existing academic context, the sources available, and the methods that they will use to engage with them, at the point of application. As a consequence, the more risky, speculative or intuitive the research, the more difficult applicants might find it to convince funding committees, even if individual schools and admissions tutors might be more open to non-traditional research methods. A more recent context is the UK government's increasing emphasis on the impact of research - as evidenced in the latest research assessment exercise (the Research Excellence Framework 2014). Related to this, incentivised by government funding, universities have begun to value 'knowledge transfer' and 'public engagement' - kinds of research, that is, that either extend beyond the academy or, better, involve the co-production of knowledge with other communities.

It is true that doctoral researchers have, in recent years, contributed to boosting the research ratings and funding levels of architecture schools, and that this is one reason they have been encouraged. Yet what should we make of the criticisms that PhDs result in 'knowing more and more about less and less'? Although Buchanan is for architectural education that addresses major world problems rigorously, are we to understand that he is against structured research training and extended research that aims to produce original, specialist knowledge? For Buchanan, architecture is a 'generalist' - as opposed to a pluralist - field, and PhDs, he suggests, work against this. 'PhDs who appoint other PhDs' are dismissed for producing research worthless to the practice of architecture. Such scholars - no matter their expertise, professional experience, or their own training in architecture or other related fields, or the value attributed to architectural history and theory within the professional architectural syllabus - 'lack the skills and experience to contribute much to the rest of architectural education'. The cu-

rious conclusion: a research degree which by definition prioritises the production of rigorous and original knowledge can 'ruin promising students'. Buchanan worries that architectural education is dissolving into meaningless pluralism disconnected from practice and 'real world' problems. Yet, judging by the various sources we have available - RIBA prize winning theses, course syllabi, documentation of events involving architectural doctoral candidates such as the Architectural Humanities Research Association programme - this is a false concern. As a degree structure that allows individuals the freedom to propose and define a topic - rather than following a preconceived syllabus - guided by skilled and experienced senior researchers, one might expect doctorates to be rather more closely aligned to contemporary 'critical realities' than Buchanan suggests. Are his views, then, in spite of his stated desire for change, simply nostalgic for an earlier approach to scholarship?

Architectural research in a wider field

If we once again focus on architectural history doctorates - often, it should be noted, undertaken by students who are trained architects, and/or who teach or go on to teach architecture students - other commentators, including my colleague Adrian Forty, have also highlighted the recent growth in demand for doctorates, and have emphasised the supportive context architecture schools have provided, linking this to the positive effects of hosting doctoral communities on departmental research ratings. Yet Forty's explanation of the scope of today's doctorates, written from the perspective of a professor in one of the 'elite' architecture schools Buchanan invokes, is rather different. Forty writes that:

*"There has been a sharp decline in architectural history into buildings themselves as objects of study. Much of the new research lies either in representational practices - photography, drawing, textual discourse - or in seeking out potential applications of cultural, or post-colonial theory, in which while works of architecture may serve as the vehicle, they are not themselves the primary object of study. Architectural history has changed, in response to developments in other branches of the study of culture; while it may never return to its earlier concerns with the playing out of evolutionary processes within built form or with the exercise of aesthetic intention, it seems equally unlikely that it will ever be able to avoid the role within which Hegel cast it, as a palimpsest upon which theories of culture are played out."*⁹

Displaying a narrow definition of 'architecture', Buchanan dismisses the 'postmodern mindset' exemplified by doctorate communities as incapable of prioritising, and as interested only in pursuing irrelevant theoretical avenues. Forty, in contrast, suggests that recent doctoral scholarship refuses a hierarchy in which buildings are the central object of study and architects the only or the most important actors, understanding architecture as constituted through many different forms of process and discourse, produced by multiple agents. He recognises this shift as related to

the new setting of architectural history within architecture schools, but also as a response to intellectual developments brought about by the writings of, for example, critical theorists such as Walter Benjamin and Manfredo Tafuri. Such theorists have widened the field of architectural research within the study of culture and drawn attention to the procedures through which history is written. Today, for Forty, the discipline of architectural history is a palimpsest of theoretical approaches, but this is no bad thing, and it is a continuation from earlier forms of scholarship rather than a recent break with the past.

Subject to market forces and evolutions in the division of labour, retaining the specificity of architectural practice is a continuous concern for architects and the professional bodies that represent them. Questions of specificity also pertain to architectural history. Addressing the question of the current state and future concerns of the discipline of architectural history at his closing address at the 2010 meeting of the European Architectural History Network, Antoine Picon commented that:

“Architectural history as we once knew it has evolved into a set of practices that question many dimensions that were taken for granted not so long ago.

There is a noticeable shift towards a more comprehensive history, a history that includes social, political and economic dimensions at a more advanced level than before, a history that enables us to pay attention to a greater array of actors.”¹⁰

For Picon, architectural historians have broadened the scope of the discipline, which, he suggests, is now defined in terms of its self-reflexivity - as a ‘set of practices’ that question the margins of architecture and architectural history. In contrast to Buchanan, the contemporary field of architectural history is here understood as ‘spectacular’ in its ‘diversity’ rather than muddled in its plurality. Plurality, here, does not mean relativism or an openness to everything, but rather a critical engagement with different intellectual positions and methods in a range of configurations. This resonates with the Harvard Graduate School of Design doctorate programme in Architecture, Landscape Architecture and Urban Planning, which Picon directs, where the intention is to: ‘use rigorously developed categories and concepts from other fields to open up new possible interpretations’.¹¹

One effect of the broadening of the discipline has been to question the centrality of the architect within discussions of architecture, instead placing emphasis on a range of other actors and authors in the production of the built environment. It is notable that many of the critics and historians of architecture who have opened up new ways of thinking about architectural authorship have been architects themselves.¹² However, Picon observes that architectural historians also have to address questions of the specificity of their practice in relation to the changing scope of the discipline. How, he asks, will architectural history remain distinctive as it intersects with a wide range of disciplines engaging with architecture after the ‘spatial turn’?

Debates about the plurality or diversity of subjects reflect anxieties about disciplinary and professional boundaries. In terms of their thinking on cross-disciplinarity, it is logical - and certainly evident in my own institution - that doctoral candidates are very open to such approaches, perhaps because they are less enculturated within and thus restrained by academic territories, or less aware of the gap between the rhetoric or intentions of higher education institutions and the practical barriers, or other challenges to interdisciplinarity. Where institutions are often cloudy about what is meant by interdisciplinarity, thinkers such as the feminist psychoanalytic theorist Julia Kristeva, or my own colleague, feminist historian, critic and writer on art and architecture, Jane Rendell, have been notably precise. Kristeva writes that:

“Interdisciplinarity is always a site where expressions of resistance are latent. Many academics are locked within the specificity of their field: that is a fact ... the first obstacle is often linked to individual competence, coupled with a tendency to jealously protect one’s own domain. Specialists are often too protective of their own prerogatives, do not actually work with other colleagues, and therefore do not teach their students to construct a diagonal axis in their methodology.”¹³

The territories of academia - whether they be defined spatially, epistemologically, culturally, psychologically etc. - often work against interdisciplinarity. As Rendell has written, Kristeva is here referring to problems that we experience when we are courageous enough to question the disciplines we identify with and their methods and definitions. In the school and faculty in which I am based what we do has been defined as ‘cross disciplinary’, with Rendell arguing that this embraces multi-disciplinarity, where a number of disciplines are present but maintain their own distinct identities and ways of doing things; inter-disciplinarity, working at the boundaries of disciplines and in the process questioning how they normally operate; and trans-disciplinarity, a strategy focused on understanding a problem that crosses the boundaries of more than one discipline, or, concepts and methods developed by one discipline and then used in others.¹⁴

The question of ‘pluralism’ is certainly worth considering in terms of the kinds of pressures it puts on candidates. How should they choose a subject, prioritise questions and the production of the most urgent kinds of knowledge, and then develop appropriate methods, when so many possibilities are available? How can a community of doctoral researchers studying eclectic aspects of architecture collaborate as a coherent body of scholars? Certainly, as Forty and Picon suggest, such diversity can inspire rich and precise dialogue. Yet careful pedagogical structures are required. Where in the past the methods of architectural design research and architectural historical research might have been taken for granted, in doctoral research environments that play host to varied kinds of scholarship, explicit discussion of method takes on paramount importance. There is a need to refresh infrastructures that support the most demanding modes of engaged architectural research through which doctoral students energetically connect between different academic, professional and other communities: work that is crossdisciplinary; that is produced collaborative-

ly; that crosses between theory and practice; that is developed beyond the academy through 'participatory' methods; that prioritises radical comparative approaches; and that operationalises historical scholarship within present day contexts. Furthermore, given the dearth of postdoctoral opportunities in architecture, and with the increasing casualisation of teaching and research contracts within architectural education, it is important that we consider how the work of PhD graduates, who reconfigure the boundaries of the discipline, can have a lasting impact on the shape of professional education, the profession and individual institutions. Although studio-based doctorates, or doctorates that combine a thesis and a project, are becoming more common, as debates about the impacts of research intensify, and as researchers experiment more and more with participatory methods and public collaboration, it will also be important to be open to considering new formats for the presentation and dissemination of doctoral research.

Conclusion

Doctoral programmes often provide a context for the study of architecture, broadly defined, where the artificial boundaries professional education constructs between different silos (history and theory, design and so on) are productively dissolved. They provide a structure not only for original scholarship, but for innovation in methods. They provide a framework to learn how to produce original knowledge through rigorous methods and engagements with theoretical and empirical evidence. There are, of course, big questions worth debating about the future of such programmes - who will be able to afford to study? What, if any, state support will there be, and how will higher education institutions fill the gap between the funding available and demand? How will the knowledge produced by doctoral scholars influence professional architectural education and have other impacts outside of the academy?

Cross-disciplinary innovation in doctorate communities should feed back to change how institutions work, going beyond rhetoric to actually foster new kinds of hybrid scholarship to flourish. The various forms of urban laboratory and practice-oriented teaching and research emerging world-wide provide one example - making the very direct links between theory and practice, academia and professional worlds, that critics of architectural education want to see, within an ethos of experimentation (rather than commercialisation) and public collaboration in the production of research.¹⁵ Decentring built form as the predominant object of architectural enquiry, and the architect as the pre-eminent agent of architecture, such forms of education require substantial resources and an increasingly nuanced appreciation of the power relations embodied in the production and dissemination of knowledge, as well as attention to the ethics of research, education and practice.

Notes

- 1 On the loan system see Clare Crawford and Rowena Crawford, 'Hard Evidence: Are Universities Getting More Money for Teaching', *The Conversation*, Institute for Fiscal Studies, 2014 <http://the-conversation.com/hard-evidence-are-universities-getting-more-money-for-teaching-25940>.

- On the criticism of a detachment from 'reality' Jeremy Till remarks that: 'architectural education does everything it can to disguise its autonomy and resultant stasis. Briefs are set in the "real" world on "real" sites, empirical data are collected, engineers are sometimes spoken to, and famous architects are brought in to review the work. But these activities really do nothing to disturb the artificiality of the whole process. A linear route from problem to solution is instigated, unaffected by external forces'. See Jeremy Till, *Architecture Depends*, Cambridge, MA, MIT Press, 2009, p. 14; see also Oliver Wainwright, 'Pressure builds for change in Britain's schools of architecture', *The Guardian* <http://www.theguardian.com/artanddesign/2013/jun/27/pressure-builds-change-schools-architecture?INTCMP=SRCH&guni=Article:in%20body%20link> and Alan Penn, 'Diversity is the key to success of UK architecture schools' <http://www.theguardian.com/education/2013/jun/28/diversity-success-uk-architecture-schools>
- 2 Peter Buchanan, 'The Big Rethink Part 9: Rethinking Architectural Education', *Architectural Review*, 28 September 2012 <http://www.architectural-review.com/home/the-big-rethink/the-big-rethink-part-9-rethinking-architectural-education/8636035.article>
 - 3 Ibid.
 - 4 For a commentary on the emergence of these programmes in relation to the history of architectural design research see: Jonathan Hill, 'Design Research: the First Five Hundred Years' in Murray Fraser (ed.) *Design Research in Architecture* (Chichester: Ashgate, 2013), pp. 15-34.
 - 5 With regard to Buchanan's charge of 'pluralism', it is interesting, also, to note that it echoes very closely an essay he published for *Architectural Review* in 1989 under the title 'What's wrong with architectural education?' <http://www.architectural-review.com/archive/1989-july-whats-wrong-with-architectural-education-almost-everything/8637977.article>
 - 6 Penn, 'Diversity is the Key', op. cit.
 - 7 David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change*, Oxford, Wiley-Blackwell, 1990; Fredric Jameson, *Postmodernism, or, the Cultural Logic of Late Capitalism*, Duke University Press, 1991.
 - 8 Buchanan, 'The Big Rethink', op. cit.
 - 9 Adrian Forty, 'Architectural History Research and the Universities in the UK', *Rassegna di Architettura e Urbanistica*, 139, 2013, p. 20.
 - 10 Antoine Picon, 'Some Concluding Remarks', First International Meeting of the European Architectural History Network, Guimarães, Portugal, 2010, p. 11 http://www.eahn.org/wp-content/uploads/2012/05/Supplement-to-3-10-single-pages_lowres.pdf
 - 11 <http://www.gsd.harvard.edu/#/academic-programs/doctoral-programs/phd/>
 - 12 See, for example, the work of Jeremy Till, Jonathan Hill, Jane Rendell.
 - 13 Kristeva, J. (1997). 'Institutional Interdisciplinarity in Theory and Practice: an interview', in Coles, A. and Defert, A. (eds), *The Anxiety of Interdisciplinarity, De-, Dis-, Ex-*, v2, Black Dog, London, pp3-21, pp. 5-6.
 - 14 Jane Rendell, 'Architectural Research and Disciplinarity', *Architectural Research Quarterly*, 8: 2, June 2004, pp. 141-147. See also 'The Bartlett Faculty of the Built Environment: Research Strategy' https://www.bartlett.ucl.ac.uk/research/visiting-research-fellows/Cross_Disciplinary_Research_Programme2
 - 15 See the EU Erasmus Mundus-funded 'Urban Lab+' network for examples: <http://ulab.architektur.tu-berlin.de/OLD/urban-lab-plus>



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As two Drops of Water

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Already from the first sentence of his *Magnus Opum Différence et Repetition*, Gilles Deleuze insists that we must not confuse art and science. These are two different ways of relating to and working with reality. Indeed, reality – which is a common denominator for art, science, and philosophy – is not something we know ‘in itself’. Rather, we know it through the various ways in which we relate to and manipulate it. Think of two drops of water. We can examine these drops individually, as singular entities. However, we can also examine properties that they share. Both artistic and scientific examination can enrich our understanding, but rather than neglecting the fact that they are two different ways of studying the droplets and suggesting that one approach gives a truer and more real understanding than the other, we should – by including for instance philosophy – understand what characterises the two perspectives. Both may, in fact, enrich our understanding of reality, its drops of water, and the prospects therein.

In the introduction to *Différence et Repetition*, Deleuze distinguishes sharply between, on the one hand, approaches that seek *generalizable* determinations on the basis of comparisons and juxtapositions of the particular, and on the other examinations that seek to *repeat* aspects of the distinctive and singular. As mentioned in already the first line of *Différence et Repetition*, Deleuze insists that, “repetition is not generality.”¹

We can, for instance, examine what two particular drops of water share and on that basis be interested in determinations, which could be said to apply generally, i.e. which apply to other particular drops of water: If we fix the concept of water we can distinguish the drops numerically, disregarding their individuality – one, two, three drops. Or we can pay interest to their spatio-temporal differences: I have the concept of water, but I can distinguish between different drops by their spatio-temporal location (not this drop here, but that drop over there). We can relate to their extension and movement, but also to a wide range of other complex circumstances, which may be approached given the development of mathematics and geometry as sciences. Overall, such studies will correspond to René Descartes’ (1596-1650) revolutionary and – at that time – radically new criteria for clear, distinct, and rational cognition. As Søren Kjørup writes, “The cornerstone of conceptual logic of the Enlightenment was Descartes’ distinction between ‘clear’ and ‘distinct’ concepts or ideas. (...) You have a *clear* idea about something that you can distinguish and recognize, but you have a *distinct* idea if you also know the criteria by which you make the distinction and are able to point to the marks or characteristics defining whatever you have the distinct idea about.”²

However, it is also possible to be interested in the drops of water as singularities – inherently individual and unique. The term ‘drop of water’, does then not become a stepping stone towards generalising determinations of the particular, but rather the outset for a repetition of what – as seen from the clear and distinct concept – is undetermined and unique: ‘a difference in itself.’³ If one were to employ an expression that was popular in the 1600s, since it was coupled to a dawning critique of unilateral, rationalist Cartesianism, attention would be directed at a *Je ne sais quoi* (‘I know not what’). While Cartesianism was explicit in its rejection of the epistemological validity of sensory experience, the critique of Cartesianism held the idea that sensory experience could teach us something different about reality. This critique was promoted by, among others, Gottfried Wilhelm Leibniz (1646-1716), who was an important inspiration for Deleuze. Indeed, the work of Leibniz was also important for Alexander Gottlieb Baumgarten’s (1714-1766) groundbreaking *Aesthetica* from 1750. He was interested in the kind of studies, which did not emphasise the scientific or rationally distinct and generalizable, but sense experience. I will return to Leibniz and Baumgarten, but also to Kjørup’s quote above, which by referring to exactly Leibniz and Baumgarten, seeks to actualize ‘another way of knowing’ than the Cartesian.

With the distinction between ‘*generalizing*’ and ‘*repeating*’, Deleuze seeks to denote two different ways of experiencing reality. Generalization is, on the one hand, coupled with how science treats the particular, and on the other we find what he terms repetition, which points towards the attention given by art and its works, using special means related sensation such as colour, line, or word in order to actualise singular po-

tentials in reality, which would otherwise have escaped our attention. Deleuze writes: "Pius Servien rightly distinguished two languages: the language of science, dominated by the symbol of equality, in which each term may be replaced by others; and lyrical language, in which every term is irreplaceable by others. (...) The repetition of a work of art is like a singularity without concept, and it is not by chance that a poem must be learned by heart."⁴

Although Deleuze does not consider art to be less examining or exploratory and thereby less conducive to understanding than science, it is his ambition *not* to ignore the difference between the cognitions, which stem from science and art respectively. Rather, the ambition is to create an understanding that each opens possibilities, but different possibilities, wherefore he insists that, "repetition and generality must be distinguished in several ways. Every formula which implies their confusion is regrettable: for example, when we say that two things are alike as two drops of water. (...) Repetition and resemblance are different in kind – extremely so."⁵

The determinations, which I initially emphasised in reference to Deleuze's philosophy, seem relevant to the discussion about questions, which have been increasingly challenging schools of art and architecture over the last years. Since Deleuze's ideas – which still seem controversial – we have experienced an intensification of demands that schools of art and architecture base their teaching upon research. The question, which appears in this regard, is, among other things, whether these demands would imply a total transformation of educations, which traditionally – unlike universities – have been practice oriented and built upon what in Denmark is termed 'artistic development work' or 'artistic research'. There are indications of this: *OECD's influential Frascati Manual (2002)* – "a publication of the *Organisation for Economic Co-operation and Development* dealing with 'standard practice' for surveys on research and experimental development" and which "all self-respecting research institutes, and universities in particular, now use as a guideline for their actions"⁶ – notes that "artistic 'research' of any kind" is excluded from all classifications of research.⁷

Schools for art and architecture are, therefore, challenged in this regard and since the situation has not yet been clarified, it is necessary to carefully consider and debate what is to be done. What are the options available? If we are to base our degrees upon research efforts, it is likewise necessary to grant more funding to research. If, in extension of this, and as 'all self-respecting research institutes' do, we adjust our research strategy according to the *Frascati Manual's* definitions (which would be advisable, since they are decisive in regard to acquiring external research grants), it seems to imply that we must give up completely on 'artistic research of any kind'.⁸

This solution is not tenable however. It could even be described as destructive. It would be a sham conquest of a difficult problem. At least this seems clear. The question then becomes: what is to be done? Are we to convince the *OECD* that there is no fundamental difference between artistic and scientific research? This would amount to arguing that it is an error to exclude artistic research from a, by now, universal taxonomy of research. Or should we, as does Deleuze, insist that there is a difference, but that the difference does not mean that we, by founding our programmes on research efforts, exclusively prioritise scientific research. We must also conduct artistic research,

even though it is something altogether different. In either case, it seems necessary to thoroughly discuss what is meant by 'artistic research'. It is a possibility that we prioritise researching architecture in both scientific and artistic senses, by noting that both scientific and artistic knowledge and insights are a precondition for good architecture.

My opinion is that it is this latter option that is being pursued in Denmark, and it is emphasised by retaining the term 'artistic development work' in order to denote that it may concern research, but also that this kind of research is *not* scientific - more about this later though.⁹

In connection with an extensive comment on Deleuze's *Repétition et Différence*, Michel Foucault posed the prophetic question: "Mais un jour, peut-être, le siècle sera deleuzien."¹⁰ In his day Descartes had changed the premises for cognition, and it now seemed to be Descartes' premises and his rejection of the validity of sense experience that motivated the *OECD* by excluding 'artistic research of any kind' from its conception.

Perhaps this is changing though; at least Foucault thought that Deleuze – by bringing up once again the critique of Descartes, which had been posed by Leibniz and which had inspired Baumgarten's ground-breaking *Aesthetica* – had achieved a decisive, contemporary contribution to a very different understanding of the conditions and potentials of cognition than the conception which characterised the by now universally dominant Cartesian approach.

It is not necessary to look far for qualified arguments *against* the notion that we are best served by the world of research being based solely on a scientific study of reality. For Paul Feyerabend, such a univocally scientific approach to reality should be viewed as a 'conquest of abundance', which would soon show itself as a sham conquest - an illusory victory for the forces of the abstracting intellect.¹¹

In 1981 Paul Feyerabend held a remarkable lecture titled *Wissenschaft als Kunst*. This was his inaugural lecture for his professorship in the philosophy of science at *ETH*, Zurich. The lecture was later developed into an extended essay concerning the relationship between art and science, and it has to some degree taken up themes, which are similar to those debated by Deleuze in 1968. I will seek to give an idea of how Feyerabend's considerations may be distinguished from Deleuze's work.

Feyerabend has renaissance art and its invention and interpretation of perspective as a fix point for his reflections. In reference to Giorgio Vasari (1571-74 – perhaps the world's first art historian) and his *Lives of the Most Excellent Painters, Sculptors and Architects* (1550), Feyerabend points out that perspective in painting confirmed contemporary notions that the histories of art and science were stories of univocal progress. The invention of perspective, in other words, confirmed what was already understood to be the case about the nature of reality – even as it existed independently of mankind and its cognitions. Feyerabend writes that: "According to this interpretation people are placed in a well ordered world, they live in a *cosmos*. They do not see this immediately and even if they slowly begin to realize the characteristics of the world, of course, they often lack the means to correctly express their understanding. But people learn. Slowly their situation improves. Errors and roughness disappear, they are replaced

by a more natural and more objective form of representation. Thus art as well as science proceed from an imperfect understanding and representation of the world to an ever better one.¹² This is, Feyerabend points out, the idea, which supports Vasari's history of art and his notion that the invention of perspective is an expression of artistic as well as scientific progress. For Vasari, progress is univocal, since perspective makes it possible for mankind to perceive and thereby understand the cosmos, which is mankind's home. The consequence of this conception of history – and Vasari is quite consistent here – is that the works from other, earlier epochs are viewed as somehow primitive and erroneous.

In reference to Alois Riegel's groundbreaking analyses of early Christian art from around 1900 – that do not confirm Vasari's idea about progress in art, since according to Riegel art in its own right is a way of exploring and creating reality – Feyerabend points to what was already the case in the work of Alberti: what we often accept as reality is the reality of science. "So, let us admit that to hint at reality can only be to point at "works of man" and then ask ourselves: which "works of man", either already existing or still to be created, introduce the reality that serves as a standard to artists? Artists of the Renaissance, like Alberti, but also many other artists, philosophers, scientists who came after, give the following answer to this question: reality is what scientists present as reality."¹³

In other words: if we accept that perspective (art) concerns itself with a special (scientific) conception of reality and therefore does not grant access to reality *per se*, then we must accept that – to the extent that perspective prevents other approaches to reality – perspective becomes a sham conquest of abundance rather than progress. Or with a more eloquent expression by Dalibor Vesely, which was given in his treatment of perspective in art: "The apparent objectivity of the picture is guaranteed not by reference to the represented reality, but only by the objectivity of the representation."¹⁴

Let me in passing note that Vesely viewed the invention of perspective as a precondition of Descartes' later invention of the coordinate system, through which it becomes possible to determine the relative positions of two drops of water. Both perspective and the coordinate system are helpful spaces that make it possible to order our perceptions. They are preconditions for many studies of reality – and its drops of water – that are not helped if we doubt the validity of these preconceived spaces. Later and in extension of this line of reasoning, Immanuel Kant (1724-1804) explained that 'space' – as a preconceived intuition – helps us order our perceptions. According to Kant 'space' should be understood as an *a priori* intuition through which we always shape what we experience in order to attain a clear and distinct understanding of things.

However, according to Vesely, perspective was also a precondition for the critics of Descartes, namely Leibniz and his 'perspectivism', which pointed out that we always experience the world as situated, fragmented and, as such, limited. By focusing upon the singular – the individual drop of water – we will be able to identify ever-new aspects, which are only limited by our ability and senses. This second line of thought does not understand space as a precondition for perception, but is rather concerned with how space – various spaces – are created, wherefore it enters into a dialogue with post-perspectivist art and architecture. Vesely notes that: "The emergence of the frag-

ment as a significant phenomenon can be traced back to the origins of perspective. (...) The close relationship between the new mode of representation demonstrates that the fragment cannot be seen as an isolated thing or object, but can be seen only in relation to the experiencing person: in other words, the fragment always has a situational structure.”¹⁵

Feyerabend does not follow up on Leibniz though. He is primarily interested in the critique of Cartesianism, insofar that it can confound us into thinking that we are able to attain universal and valid understanding of the world, which is superior to all previous knowledge, using only rational cognition and research. In reference to Riegl, Feyerabend therefore, and in opposition to Vasari's concept of progress, points out that early Christian art is in no way primitive in comparison with renaissance art. It is merely different. Earlier art is a fully fledged expression of a different worldview than what is found in the soulless, hard headed, and rational perspective, which we seem to be moving towards in the invention of perspective and through Cartesianism. Feyerabend therefore writes: “Considerations like these [Riegls] have led to a conception of the development of art that is fundamentally different from Vasari's. In art there is no progress and no decline. But there are different forms of style. Each style (*Stilform*) is in itself perfect and obeys its own rules.”¹⁶ Later it becomes clear that the validity of ‘Riegl's relativism’ is for Feyerabend not limited to art: “Riegl's relativism is not restricted. It spreads to science. Many overlappings (...) show that arts and sciences are not divided by the problem of reality but are brought more closely together to one another.”¹⁷

The question is whether Feyerabend, in his determination to show that science, like art, generates reality – that science is like art and art like science – is sufficiently aware that what is being developed through a conception of art – a concept which first came into being after the renaissance – is different from what is thematised by this late developed concept in epochs before the renaissance? In order to avoid the concept of progress, Feyerabend seems to end up in anachronisms in viewing ‘art as science’, or ‘science as art’ in epochs that did not conceive their activities in this manner. Feyerabend's relativism therefore seems on the verge of arguing for comprehensive worldviews, and thereby comes to reject the possibilities that arise from differentiating between the understandings of reality that art and science grant us respectively, and which do not become apparent till the post-renaissance concepts of art and of science. Perhaps Feyerabend comes to mix ‘repetition and generality’ and thereby claims that two historical epochs are “alike as two drops of water”?

I have implied that Deleuze offers a different solution: by insisting that science and art grant us different insights into a reality, which we do not know in itself, Deleuze does not suggest that the two ‘tools’: science and art, should be kept separate. Quite the contrary; the two tools are both useful and important in for instance the creation of good architecture. But they are not identical and cannot replace each other. It is therefore not possible to explore architecture and the spaces it gives rise to – including its artistic features – using only scientific means, without losing decisive features. Architecture seems to be characterised by granting us ever new, singular spaces, which cannot be conceived using a generalised *a priori* concept of space. There is a difference between the engineer's approach to space in buildings and the architectur-

al approach to space. While the architect seeks to explore new possibilities for spaces, the engineer calculates – using pertinent laws and rules such as gravity – whether the new opportunities for space are ‘possible’.

Søren Kjørup, who was Professor at the University of Roskilde and Adjunct Professor at the Bergen National Academy of the Arts, takes up the origin of the concept of art in the text mentioned above: *Another Way of Knowing*. Here he notes that: “What the ancients understood by ‘art’, did only partly overlap with our modern concept, a fact that is often hidden in translations of ancient texts. When we read in Plato’s *The Republic* about the important differences in value between the carpenter’s ‘craft’ (making a bed) and the painters ‘art’ (making a picture of the bed), the terminological distinction between craft and art has been made by the translator. Plato used exactly the same word for the efforts of the carpenter and the painter, i.e. *tekné* (obviously the word we have kept in ‘technique’). Carpentry and painting were both examples of ‘technical skill’. (...) And also the Romans and Europeans of the Middle Ages had a concept of art very different from ours, and even around the year 1700 the modern concept of art was only slowly in the making.”¹⁸

Here Kjørup seeks to give an understanding of which challenges arose with the ‘creation’ of the concept of art in the 17th and 18th centuries. Kjørup does this in the introduction to the seminar series *Sensuous Knowledge – Focus on Artistic Research and Development*, which has been held for a number of years at the *Bergen National Academy of the Arts*, and which was a part of the ambition for the *Bergen Academy* to become accredited as an institute of higher learning on equal footing with universities – not on the basis of scientific, but artistic research. In Norway this is termed ‘artistic development work’. There are of course many variables at play in order to attain such accreditation, most decisive of which was the Norwegian government – in spite of the *Frascati Manual* explicitly excluding ‘artistic research of any kind’ from the taxonomy of sciences – accepting that ‘artistic development work’ was to be viewed as on par, although not identical, with scientific research.

Kjørup refers to Leibniz and his insistence that “the Cartesians have been very wrong in considering ideas of which you are not conscious as nothing.”¹⁹ In extension of this, Leibniz seeks to expand the conception of what knowledge is and is not in two different ways. He partly wants to show that clear, distinct, and rational insight is always a limited cognition, which can give rise to ever new insights into reality, but especially if it is aware of its limitations and does not claim to have conquered reality. As the quote points out, Leibniz is interested in sense perceptions of which we do not have a clear and distinct understanding, but rather an unclear idea. This is because they are, as Leibniz terms it *des petites perceptions* (minute ideas). Kjørup notes for instance that: “An unclear or *obscure* idea is what you have about some flower or animal that you have once seen, if you are unable now to recognize it if you should see it again (or unable to distinguish it from some similar flower or animal). Or it may be the idea you have about the sound of each little wave if you are standing on the beach, listening to the roar of the sea; you know that the roar must consist of the fusion of the tiny sounds of all the tiny waves, but you are not able to distinguish the single waves in the roar, so you only have a confused idea of each one. The ‘I know not

what', although being closely related to this 'unconscious' level of cognition, must be found just across the borderline into the clear ideas (because you recognize it when you meet it)."²⁰

Rather than overcoming the surplus of sensory phenomena, art can help manage it, bring it to expression, give it a singular space and allow light to work in exactly this way, here. Kjølrup draws a direct line from Leibniz's attention to *des petites perceptions* to Baumgarten's *Aesthetica*: "In his short treatise on the art of poetry Baumgarten cuts straight through the aesthetic paradox and creates a new paradigm for the discussion and understanding of poetry and in extension of this, of art in general. The stroke of genius is actually a very simple step: to give the so far negatively defined indistinct or confused ideas a positive name of their own: sensuous ideas."²¹

Kjølrup draws a line to Baumgarten, and I have already attempted to show that the line can be extended to Deleuze and the question, which is currently challenging institutions of art in requiring them to found their programmes on research and – paradoxically – upon a conception of research, which does *not* recognize that knowledge the programmes (also) concern. This is the issue, which motivates Kjølrup's text.²²

It therefore seems very important that we do not answer the challenges found in the *Frascati Manual* by requiring that 'artistic research' be subsumed requirements form scientific research, but rather by insisting that there are other kinds of research based cognitions than those found in the sciences, and that these insights must be strengthened. We should not, I think, fall for the argument that science and art share being experimental approaches, since scientific experiments will require demands of being reproducible and generalizable, while the artist and the architect is not concerned with proving what is generalizable and with what others could attain under equal circumstances, but with what is singular and special.²³ And yet, it is clear that there will be both scientific knowledge and artistic understanding involved in creating architecture. These are merely alternate frames of attention, which under no account exclude each other.

Deleuze's insistence on the difference between science and art and thereby on two alternating, and yet mutually useful approaches to generating understanding about and in reality, bring me to think of Le Corbusier and the crab shell roof of the *Ronchamp Chapel*.

Le Corbusier has explained how a crab shell, which he found when walking on a *Long Island* beach, inspired the shape of the roof. He collected these and was – to some degree inspired by Paul Valery's *Eupalinos – ou l'architecte* (1921)²⁴ – fascinated by how the forces of the sea contribute to the formation of an infinite variety of shapes, which look alike on the face of things, but which upon closer inspection turn out to be different, singular, and unique. Le Corbusier wanted to *repeat* a crab shell and create a unique shape. However, the construction was heavy and it was therefore impossible for Le Corbusier, in architectural terms, to focus solely on the unique and singular - thereby ignoring the quantifiable and calculable challenges. It was necessary for him to be interested in the science of constructing, which brought him to ground breaking and *generalizable* insights inspired by aeronautical engineering and its dialogue with the forces of nature. The roof of the Ronchamp-chapel is the result

of both artistic as well as scientific studies. Indeed, its unique expression would not have been possible if the concrete roof's apparently massive crab shape had not been lightly constructed as the wing of a plane.

Perhaps this century will be Deleuzian after all.

Notes

- 1 Gilles Deleuze, *Difference and Repetition*, New York 1994, p.1.
- 2 Søren Kjørup, *Another Way of Knowing, the Sensuous Knowledge series 'Focus on Artistic Research and Development'*, no 1, Bergen 2006, p. 13.
- 3 First chapter in Deleuze's *Différence et Répétition* is titled 'Difference in itself'.
- 4 *Ibid.* p. 2.
- 5 *Ibid.* p. 1.
- 6 Henk Borgdorff, *Artistic Research within the Fields of Science, the Sensuous Knowledge series 'Focus on Artistic Research and Development'*, no 6, Bergen 2009, p. 6.
- 7 Cf. *Organisation for Economic Co-operation and Development: Frascati Manual – Proposed Standard Practice for Surveys on Research and Experimental Development*, Paris 2002, p. 67.
- 8 In 2009, The Ministry of Culture, Denmark published 'A Research Strategy for the Field of Responsibility of the Ministry of Culture', which also applied to the schools of architecture. Here it was recommended that "the institutions, in their strategic planning of research efforts orient themselves towards a universal concept of research rather than towards concepts of research that were specific to institutions or disciplines, in order to enter into competition for research grants on equal footing with other research environments." *Forskningsstrategi for Kulturministeriets Område*, København 2009, p. 11.
- 9 In 2012 The Ministry of Culture Denmark published a report on 'artistic research': *Artistic Development Work – an Analysis of the Knowledge Basis at Institutions of Further and Higher Education*. Following the report from 2009 (see footnote 8 above), which had recommended that the institutions 'direct themselves according to a universal concept of research', the Ministry seems to have become aware that the recommendation cannot pertain to the 'artistic research', which the institutions are required to take up by law, certainly if the 'universal concept of research' is taken to mean that of OECD and the *Frascati Manual*. This seems to be the reason why the Ministry in yet another report encourages the institutions to define how to ensure the quality of artistic research as such, i.e. with other means than those found in scientific research. The institutions have now taken up this challenge involved; the present article, which is written by a head of research at a school of architecture in Denmark, may be viewed as an element in that process.
- 10 Michel Foucault, 'Theatrum philosophicum', *Critique novembre 1970*, Paris, p. 885.
- 11 In 2001 a number of Feyerabend's essays were published posthumously with the title: *Conquest of Abundance: A tale of Abstraction versus the Richness of Being*.
- 12 Paul Feyerabend, *Wissenschaft als Kunst*, Frankfurt a.M, 1984, p. 24.
- 13 *Ibid.* p. 45.
- 14 Dalibor Vesely, *Architecture in the age of divided representation: the question of creativity in the shadow of production*, London 2004, p. 320.
- 15 *Ibid.*
- 16 Feyerabend, *op. cit.*, p. 29.

- 17 *Ibid.* p. 48.
- 18 Kjørup, *op. cit.*, p. 9.
- 19 *Ibid.* p. 13.
- 20 *Ibid.*
- 21 *Ibid.* p. 16.
- 22 It is clear that many branches of art research are interested in related issues these years. The German *Bildwissenschaft* seeks to show that knowledge about images cannot merely be rational and Cartesian. Gottfried Boehm writes for instance: "What is striking about Cézanne's paintings, especially his later works, is that they refuse a swift recognizing of reality and its objects. (...) One prerequisite, considered for the most part self-evident from Descartes through to today's common sense, is negated – namely, that the world consists of a corset of stable objects on whose surfaces variable characteristics can be observed: the sensuousness of colour, light and shadow, with all of their mutations. It is not necessary to personally argue for this ontology of material substances, which has become ingrained as a convention of perception. However, Cézanne discovered that it did not withstand the thorough analysis of his concentrated visual work *sur le motif*, and from this he drew painterly consequences by assigning the texture of the colour-shapes not to objects, but rather to structural logic. Colour is not attributed to the objects, but to that primary quantity itself, whose facticity renders the spectacle of nature visible." Later in the essay, Boehm refers to Leibniz: "One is reminded of the famous passage in Leibniz' *Essai sur l'entendement humain*, in which he illustrates the 'petites perceptions'. (...) This is the first instance in the history of ideas in which indeterminacy is not simply outlined, but also analysed as cognitive perfection". And Boehm refers to Deleuze's demonstration that "in the sensation, an exciting merging occurs of *what* we see with *how* we see. It refuses to be *alternatively* and clearly relegated either to the world of objects or to that of the subjects, and in the refusal it explodes a fundamental cognitive-theoretical differentiation." Gottfried Boehm's essay, "Unbestimmtheit. Zur Logik des Bildes" in *Wie Bilder Sinn Erzeugen*, Frankfurt a.M., 2007, is quoted from the English translation, "Indeterminacy. On the Logic of the Image" in Huppauß/Wulf (ed.), *Dynamics and Performativity of Imagination*, New York 2009, pp. 220-21, 225 and 222.
- 23 For more on the difference between scientific experimentation and design processes see, Sabine Ammon, "Wie Architektur entsteht. Entwerfen als epistemische Praxis", in *Wissenschaft Entwerfen*, Sabine Ammon, Eva Maria Froschauer (ed), Basel, 2013.
- 24 See Niklas Maak, *Der Architekt am Strand. Le Corbusier und das Geheimnis der Seeschnecke*. München 2010.



Lara SCHRIJVER

Research in Architecture: Hard Science or Tacit Knowledge?

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Architecture research is getting a bad rap. It is a relatively young field, situated at the crossroads of various disciplinary approaches and methodologies. Additionally, its products include drawings, models and buildings, as well as scholarly texts. In its fluid engagement with different media, it is regularly attacked for its inadequacies in adhering to scholarly standards. Depending on the context, it may be argued that the research lacks solid scientific criteria, preferably quantifiable, while at times it is considered too instrumental, thus running the risk of streamlining the evidence to suit a particular solution. Academic research is criticized for its self-enclosed discourse, disconnected from tangible societal and professional issues, while design research aimed at immediate concerns in practice is considered to offer a simplistic rendering of broader topics, thus not moving beyond the simple affirmation of the status quo.¹ In the meantime, our ambitions for architecture's impact has grown, in a suggestive hope that architecture may affect any

number of issues, whether that concerns improving lives or simplifying tasks, improving urban renewal or reorganizing our educational system by reorganizing their spaces.

In this essay, I will separate out a series of institutional and disciplinary concerns. By institutional in this case I mean the kind of structural issues one faces within the institutions of our increasingly professionalized academic existence; by disciplinary concerns, I refer to those issues that are typical of architecture as a field. Finally, I will try to mark out a few paths forward, related to what I would see as fundamental conditions of our discipline, informed by the transforming requirements of society and academia.

Architectural knowledge now: its process and its objects

In recent years, there has been increasing attention for the knowledge production of architecture. The discipline as a whole is navigating central questions of knowledge production, while it is also clear that we have seen a steady professionalization of research in architecture over the past decades. Additionally, there has also been an increase in the questions put to the discipline as a whole: what kind of research constitutes 'proper' research in architecture and urban disciplines; and is such work to be situated within the domains and criteria of natural sciences, humanities, history, philosophy or the social sciences?² Alternatively, how can architecture research contribute to trans-disciplinary practices, so important in the current state of socio-cultural, political and economic complexity? Should architecture retreat from the academy to maintain its freedom of practice, should it reflect on practice-bound disciplines such as medicine and law, or instead remain allied to the art schools? Should it hope that by being positioned in the technical schools and the traditions of engineering – common in European Schools of Architecture – it will gain a scientific credibility that seems to be currently desired?

In addition, what are the proper 'matters of concern' that we should be occupied with? This takes up the distinction that Bruno Latour made from 'matters of fact' in 2004, where 'matters of concern' take into account an additional, sociocultural, phenomenological and experiential dimension not typically accounted for in the more quantifiable and scientifically verified matters of fact.³ Are these matters of concern simply an issue of shelter and adequate infrastructure, still lacking in most parts of the world? Is it an issue of cultural heritage, so present throughout European cities? Or should we instead be attending to the most adequate technical and spatial requirements for emotional wellbeing, and if so, how far does the study of these requirements reach? In the 2008 Architecture Biennale of Rotterdam, the introduction made note of the problem of data that has no object, raising the question of what the research we do in the abstract actually does when applied in architecture or in our cities (Fig.1).

Moreover, there are transformations in the institutional landscape at large. In The Netherlands, the federal funding structure has recently grouped architecture into the so-called 'creative industries', along with computer programming and gaming, fashion, and graphic design.⁴ What this will mean in the coming years for funding proposals

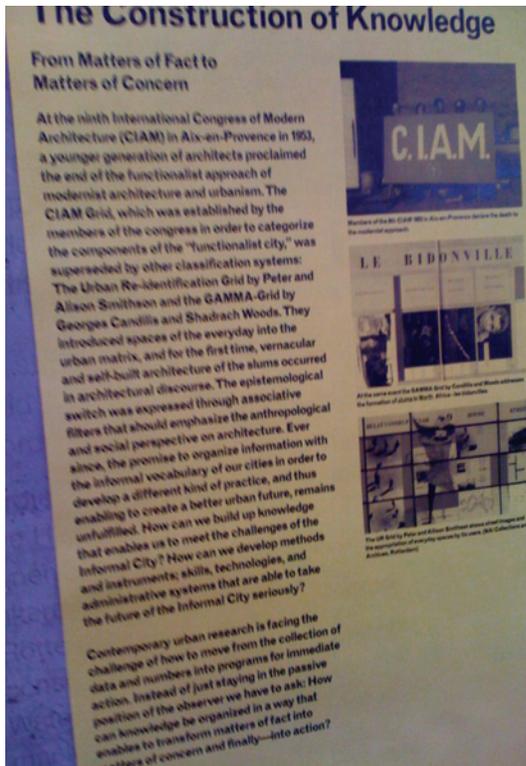


Fig. 1
 Introduction panel, Architecture Biennale Rotterdam 2008, Netherlands Architecture Institute. Text quotes Latour's title 'From Matters of Fact to Matters of Concern' (2004).

remains yet to be seen. The ongoing global economic crisis has had unparalleled effects in the building industry, causing the closure of firms and people to step out of this particular 'creative industry'. The alternate route of scientific research may sometimes be seen as a temporary escape from the economic difficulties and exigencies of practice, leading to an increase in the numbers of individuals seeking advanced degrees at the same time that research funding has decreased. As the universities find not only their research funding but also their overall budgets rapidly dwindling, it has become more difficult to sustain extended educational programs, not to mention provide for paid research positions. All in all, the fundamental principles of the postwar welfare state in Europe are straining under economic duress, with a clear impact on the domains of education and research.

These various societal, political and economic conditions, together with the internal disciplinary and academic issues, lead to a fundamental question: what is the goal, and the *raison d'être* of doctoral research in architecture today? Should research remain sealed tight in the academy, disregarding issues of practice? Or, alternatively, should it engage with these professional battlefields, taking the position of what Michel Foucault has referred to as the 'universal (or public) intellectual' against that of

the 'specific intellectual'?⁵ In architecture, various debates have centered on the relation and mutual roles of theory and practice, with so far inconclusive results.

Institutional concerns

While the disciplinary concerns pose very particular challenges to architectural research, I would like to begin with laying out a number of institutional concerns first. As these have everything to do with a general professionalization of the culture of academic research, they offer a context within which architectural research will have to operate. In other words, the institutional concerns are broader than the purely disciplinary issues, forming the constraints current research must take into account. While some fields have an institutional academic tradition that reaches as far back as the first universities founded in Europe in the 11th and 12th centuries, the tradition of the architectural doctorate is relatively young (about 100 years, as noted in the introduction to this conference). At the same time, one might argue that academically informed reflections on architecture, its motivations and its primary directives are significantly older: if we take Vitruvius as the starting point for the self-reflective architect, we may speak of a tradition more than 2000 years old.

Within the domain of institutionalized research, the two primary issues facing architecture as an academic discipline concern valorization and credibility, which are related, but still identifiably distinct.

Valorization concerns funding foremost – for if research is deemed worthy of investment, it has proven that it is (seen as) valuable. At the same time, societal impact can be counted among the concerns of valorization. In essence, we may consider valorization as a mode of gathering evidence that more generally proves credibility. The various modes of valorization, from demonstrating relevance to stakeholders, or public interest, to the acquisition of funding from research councils or external research commissions, all serve to provide a tangible definition of the value of the research being done.

Traditionally in academia, we treat money as a trivial concern, yet it is also a determining factor for research these days. Questions of impact now guide funding acquisition. This should not be surprising in an age when economics has become a driving force in general. On the institutional level, and in the wake of the crisis, possibilities for funding research are rapidly dwindling, and in architecture perhaps more so than in some other fields. As we compete for these limited resources, we are increasingly hard-pressed to convey the relevance and impact of architecture, when competing with, for example, cancer research. All is not lost, however. There are many researchers in the field, and many assessors, who are equally attuned to the importance of the humanities and the arts – if not in curing illness or eradicating poverty, then at least as one of the primary human drives towards transcending everyday concerns. In fact, facing a world where disease is cured but art has disappeared is inconceivable to most (notwithstanding some populist voices complaining

of the subsidy-ridden art world). The resilience of artistic expression in the face of political pressure should at least offer a signal of the importance of culture to human existence. Whether we turn back to the European examples of *entartete Kunst* during the Nazi regime, or to writers and musicians denounced in the Stalin era, or indeed today reflect on the arrests of Ai Weiwei in China, it becomes clear that economic concerns and direct applicability are not the only reasons driving cultural production.

However, the growing necessity for funding acquisition has given rise to a series of concerns not previously prominent in architecture research, such as the explication of impact and relevance. There are critical thoughts one may have about this, such as the desire for (bureaucratized) clear criteria, quantifiable and identifiable evidence, and the limitation of aberrations. Many funding institutions appear to avoid risky ventures. While this is not in itself an aim of the institutions, the importance of transparency and accountability, particularly in the distribution of public funding, have procedural impacts. These preconditions typically give preference to clearly defined, well-situated research that has a reasonable idea of results to be achieved.

Yet more fundamentally, the issue of funding acquisition is also related to credibility: for if the research is not credible, it will not seem a wise investment. And it is this I believe that forms one of the central questions we face today.

How should we view the credibility of architecture research?

If Vitruvius was confident in identifying architecture as the Mother of the Arts, why is it that contemporary institutions treat architecture as the stepchild of the sciences? I will argue that this is in part due to the complex nature of the architectural object, which is not easily assessed, but also (and this is our own responsibility as a community of practitioners and academics) a refusal to disclose and to aid in revealing what it is that architects do. Here, the organization of architecture as a profession does not help: in the fierce competition for architecture commissions, it is advantageous to convince a potential client that what you do is unique, rather than building upon a body of knowledge that others may have equal proficiency in.⁶ However, it should be clear that the typical habits of the profession should not be transferred directly to the academy. Architects who take the work of academic research seriously, also take on the responsibility of examining, disseminating, and communicating the particular characteristics and values they understand to be immanent to their field.

Another contributing factor to the steady demise of some forms of architectural research is the attempt, in the 1960s, to dissect the process of design, in the hope that a precise understanding of methods would lead to better design artifacts. While this holds true to some extent – these studies have more accurately identified crucial features and their relation to reception – they do not paint the whole

picture. In fact, because they have directed attention to process rather than artifact, they have contributed to the undermining of object-based evaluations. They are built upon the assumption that if the process is precisely and adequately organized to the explicit criteria of design, the resulting artifact will meet the expectations brought to bear on it. This has spawned a domain of academic research that focuses on process-oriented studies, which contribute significantly to understanding the role of constraints and compromises, as well as understanding also various forms of creativity within the design process. However, this domain of research is unable to address the resulting object in terms of its aesthetics, values, spatial qualities or performance.

Disciplinary concerns: what is the core?

This is where it gets interesting. We can approach architecture as a science or as an art, as a formal science or an empirical one, as a loosely defined field of research or as a well-structured traditional discipline. It seems that most of the perceived problems with architecture’s relevance and scientific quality has everything to do with a recent history of focusing on design process, in the hope of producing better design by a better structured design process. This I must contest, as it fails to acknowledge the limitations of our design process modeling. However, if we take as one of the central issues to raising credibility, a better understanding and dissemination of what it is that architects do...? Then this, needless to say, revolves around precisely defining that ‘core of architecture’ that has been referred to earlier today (Fig. 2).

The need for defining, or perhaps circumscribing, and discussing the core of architecture has gained increasing attention in recent years. In part this is due to a failure of recent theory, and of recent architecture discourse in general, to address the pressing issues of our time – and in the case of theory, indeed, even to address the object of architecture itself.



Fig. 2
Harvard Design Magazine no. 35, What is Architecture’s Core? (as part of a three-issue series investigating the core of urbanism, architecture and landscape architecture).

This tide is rapidly turning however. From the early voicing of the limitations of critique by Bruno Latour in 2004, to the 2008 publication of Sennett on the values of craftsmanship, to the 'material turn' in the humanities, I would like to argue that there is an increasing attention for the knowledge lodged within the material world, and that this is an opportunity for architecture to reclaim a central position in the domains of research. At its core, architecture has multiple modes of knowledge production and communication, from texts to drawings to buildings. It employs various methods of exploration and is a profession as well as an academic discipline. All these traits are brought together in the built environment. As such, the scientific dimension of architecture lies within a precise and systematic approach and its value is manifest in the materialized result.

There are scholarly works that examine architecture, or indeed other fields of design, as a synthesis of component parts and distinct methods. We may for example turn to Herbert Simon for his overarching view that identified architecture as a 'science of the artificial', in which the object of study (the built environment) is also an object of manipulation (namely a new, proposed project).⁷ This approach requires a different approach than the analytic science that attempts to dissect an existing condition. Nigel Cross, following along these lines, has articulated what is characteristic of 'designerly' ways of knowing, including the engagement with weakly defined problems, contradictory demands, design ability and creative cognition.

Beyond the horizon

So what might all this mean for doctoral research in architecture?

As an inventory of directions in architecture research, I co-edited a volume of Footprint devoted to doctoral research in architecture.⁸ The issue was meant to offer an overview of the field, yet the selection process resulted in particular emphases. A number of papers share certain interests that point in a direction of the multiplicity of design thinking. They show lines that correlate with new directions in architecture, whether it concerns the inevitable question of sustainability, or a strong focus on design objects and techniques as a materialization of ideas. The constant interweaving, in many of the contributions, of literary, visual and material references requires the reader to engage on multiple levels of reception.

Underlying the articles one senses the balancing act being performed, between the demands of professionalized research and traditional habits of scientific inquiry on the one hand, and a search for knowledge that may be situated slightly out of traditional bounds. The issue is framed by concerns that may be voiced within any academic discipline, from the opening appeal by Andrew Leach to leave room for fundamental, non-operational research, to the closing piece by William de Bruijn, which is an ode to unexpected insights and intuitive leaps that may be part of doctoral research. Yet what remains apparent throughout is the lack of a shared vocabulary. This in itself is not necessarily reason for concern, as there are many fields that contain severe ideological disagreements, yet are still capable of reaching a consensus on what constitutes

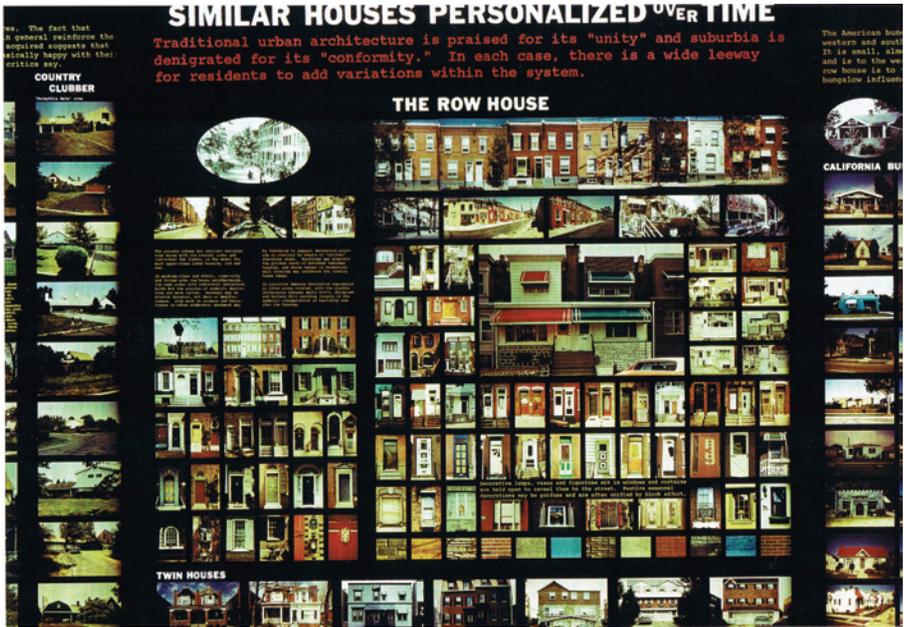


Fig. 3
 Venturi and Scott Brown. Study of front doors in Philadelphia row housing, 1972 [ck!]. The panels demonstrate a visual categorization of particular architectural features, illuminating similarities and distinctions.

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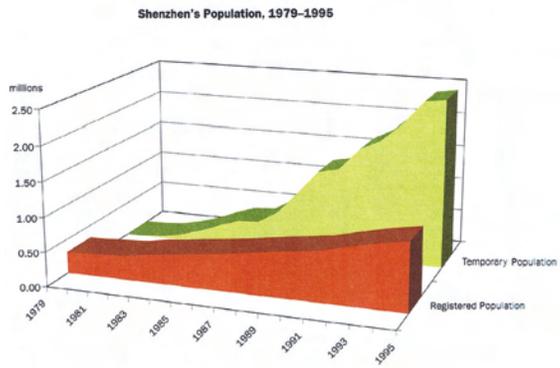
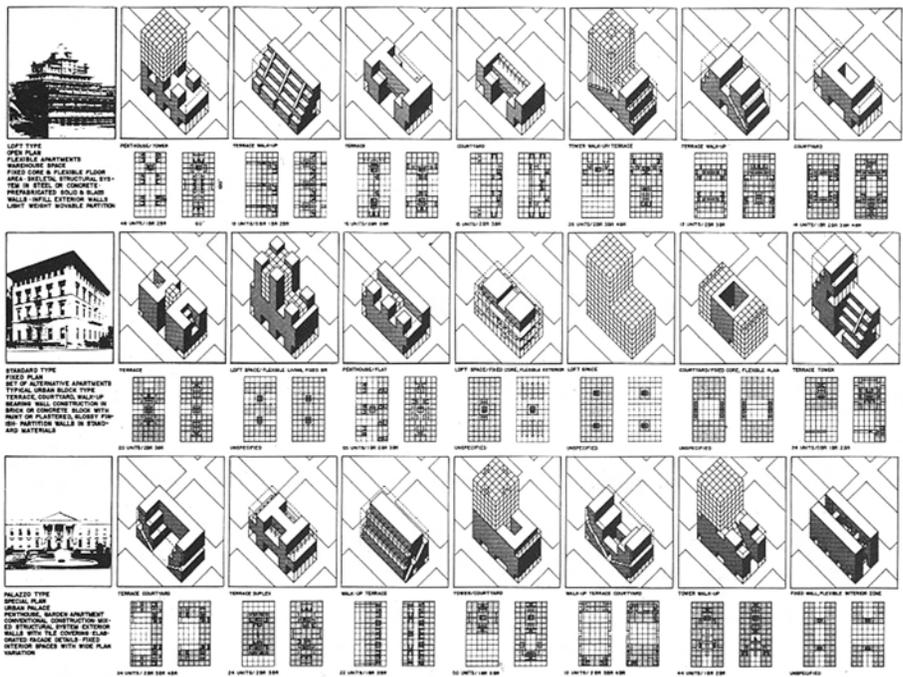


Fig. 4
 Office for Metropolitan Architecture, Graph of migrant population in Shenzhen, 1979-1995. Representing a specific social condition of the city through visual means.

248 ARCHITECTURE : FLOATING®



Spektrum der Wohnblockvarianten unterschiedlicher Bautypen

Fig. 5
Oswald Mathias Ungers, housing block variations, based on distinctive building types. (Submission Roosevelt Island housing competition, 1975).

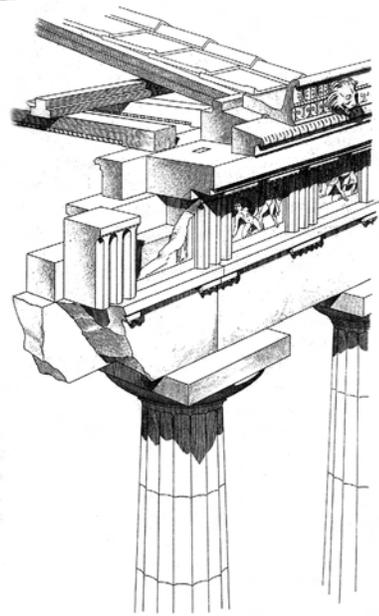


Fig. 6
Viollet-le-Duc, detailed drawing to show structural diagram of temple.

excellence within, for example, a research proposal.⁹ The dispersion in architecture seems somewhat stronger than in other contested fields, in part because it is hard to find agreement on even what should be regarded as pressing issues. As such, doctoral research in architecture is often highly subject to contextual conditions, deriving its legitimation and its approaches from a particular school, place, topic or interest.

There are, however, some opportunities we might explore, particularly in the European context. As schools are relatively close together here, research networks have already been initiated that encourage our doctoral students to travel over the borders and engage in debate with colleagues from elsewhere. Indeed, the Villard d'Honnecourt network was initiated more than ten years ago precisely to incorporate alternate insights and make use of the opportunities within European institutions. We might also consider initiating research laboratories, which begin to build more on a communal position, with various doctoral students taking on subcomponents of larger problems. This model, common in medicine and natural sciences, may do some justice to the complexity of architecture as a discipline. An alternate model again is to delve further into the solitude of art historical research. Slow, extended reflection on a single topic may sometimes offer insights that might otherwise remain hidden beneath the surface. Finally, we might also conceive of doctoral research as a training in academic skills that do not necessarily lead to an academic profession. In other words, might we conceive of our doctoral programs as offering a foundation in what is commonly called 'transferable' skills (project organization for example), but then focused on the kind of transferable research skills that our government planning and architecture agencies could put to good use?

If architecture and the design fields can indeed lay claim to a unique form of academic knowledge, it is time for the universities to construct an environment that emphasizes its specificity, communicates its value and supports its development. If there is something to be explored in the modes of knowledge specific to architecture, the university may play a role in facilitating this. The profession remains more closely dependent on clients, urban policy, cultural habits and competing visions. The university may still claim a central position in fostering knowledge beyond the immediate horizon. If we can find a way to collectively utilize this privileged position, then we may indeed find a way for architecture to mature as a domain of disciplinary and tacit knowledge, configured by the state of the art and current scientific insights, yet also founded on longstanding historical and cultural particularities. Only in this way can we begin to conceive of doctoral research as part of the continuing practices of this collective culture of practitioners, critics, public and academics.

Notes

- 1 Jeremy Till, 'What is Architectural Research? Architectural Research: Three Myths and a Model.' RIBA Research and Development Committee, 2007. available online at: https://jeremytill.s3.amazonaws.com/uploads/post/attachment/34/2007_Three_Myths_and_One_Model.pdf [last accessed January 28, 2014]

- 2 Jane Rendell, 'Architectural Research and Disciplinarity', (2004), *ARQ*, v. 8, n. 4, pp. 141-147; Jean Louis Cohen, 'The Emergence of Architectural Research in France', *Journal of Architectural Education*, Vol. 40, No. 2, Jubilee Issue (Winter, 1987), pp. 10-11; Barend van der Meulen, Floortje Daemen, Leonie van Drooge, Stefan de Jong, Jack Spaapen, Frank Wamelink, Peter van den Besselaar, *Pilot Study at the Faculty of Architecture TU Delft, Final Report – confidential*. Project 'Evaluating Research in Context' (The Hague, Rathenau Institute, 2010), online at <http://repository.tudelft.nl/view/ir/uuid%3Af0a713f1-1564-4b79-be66-4f5299ebba2c/> [accessed: 17 December 2012], pp.19-24.
- 3 Bruno Latour, 'Why has Critique run out of Steam?', *Critical Inquiry*, Winter 2004.
- 4 Report on the Creative Industry, available online in Dutch at: <http://www.rijksoverheid.nl/onderwerpen/ondernemersklimaat-en-innovatie/documenten-en-publicaties/rapporten/2011/06/17/creatieve-industrie-in-topvorm.html>
- 5 Michel Foucault, 'Truth And Power', in Gordon, Colin, ed., *Power/Knowledge: Selected Interviews and Other Writings 1972-1977: Michel Foucault*, Sussex: The Harvester Press (Essex: Longman edition), 1980, pp. 109 - 133
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- 7 Herbert Simon, *The Sciences of the Artificial*, Cambridge, Mass: MIT Press, 1969.
- 8 Deborah Hauptmann, Lara Schrijver, eds. 'Architecture Culture and the Question of Knowledge: Doctoral Research Today' *Footprint* 10/11, Winter 2012.
- 9 Michèle Lamont, *How Professors Think: Inside the curious world of academic judgement*. Cambridge, Mass: Harvard University Press, 2009.



KU Leuven

Doctoral Education at KU Leuven

**Herman
NEUCKERMANS**

KU Leuven

Belgium

Doctoral research and doctoral education are the recto and verso of the same coin, both will be discussed in this case study about KU Leuven - Belgium.

KU Leuven was founded in 1425 and developed into a complete and general university with, currently, almost 600 year of research tradition. Within universities there is no need to argue why research is important. Knowledge production, critical understanding of the world, of man and society is evident and since centuries part of their mission statement in these temples of research.

Societal relevance of arch research still has to be conquered and recognition within the classic and well-established research funds is not, or not yet, acquired.

The lack of recognition and valorization of the various contributions to the discipline of architecture other than via publications in existing refereed journals still is a serious bottleneck in the competition for funding.

For too long architecture has been, often deliberately, absent in scientific reflec-

tion about its meaning and role for man and society. But since the focus of this book is on doctoral education, the forefront fights for international recognition of architecture as a discipline that needs research (cfr. Jeremy Till/RIBA– What is architectural research?; EAAE - Research Charter) is not part of this paper. Subsequently we are looking at the present situation in doctoral education, visions for the future and the profile of the researcher.

Present education

At KU Leuven the education in architecture started in the mid-eighties of the nineteenth century and developed into a degree of engineer-architect from 1929 on, in what was called the special schools for civil engineers (as opposed to military engineers). These schools became a full-fledged faculty of engineering in 1961. Education in architecture was organized as a five-year course within the department of construction until 1981, when the department of architecture, urban design and planning (ASRO) was created. Before 1967 the education was merely oriented towards building construction and technology, and almost exclusively rooted in physical sciences. From 1967, a five-year architecture curriculum was offered, with a substantial shift into architectural theory, history and architectural design. The start in 1980 of the post-graduate center for Human Settlements, focusing on cities in development worldwide, and the transfer, also in 1980, of the Centre for the Conservation of Historic Towns and Buildings from the College of Europe in Bruges to ASRO, has boosted the number of PhD students.

The creation of the department ASRO in 1981 was the start of the development of 4 research groups, elaborating mostly external (third party) funded research projects and producing doctorates in engineering: architecture, according to the academic rigor of the faculty of engineering and the university.

These academic standards constitute the criteria for the evaluation of PhD texts:

- *formal elements*: readability of the text and the quality of written language, logic and consistency of the structure, quality of presentation and layout.
- *contents*: sharpness of problem definition, knowledge of all relevant bibliographic references, verifiability and reproducibility of the findings, originality of the work, capability for independent work, competence and depth of the work.
- *relevance and impact and valorization of the doctoral work*: number of international peer reviewed journal papers and publications in scientific conference proceedings, quality of the forums in which parts of the doctoral work or work in progress has been presented, proofs of the quality of the scientific work.

All researchers at KU Leuven have to follow a three-hour lecture on academic integrity and ethics, quoting and correct use/interpretation of statistics.

PhD researchers find all relevant information about regulations, procedures, on the portal site ¹.

Research at the department of architecture

To date ASRO has granted 101 PhD diplomas and 79 students are currently preparing a PhD, 12 to 13 present their thesis yearly. As a rule it takes 4 years to produce a PhD, although 3 years -in line with Bologna- is the minimum. Almost all PhD students (99%) study with a scholarship from the University, the Flemish Science Foundation, ministerial, governmental, European projects and others. Within the Faculty of Engineering each academic on the payroll of KU Leuven, in average generated 5.5 researchers on third party funding in 2012².

A prerequisite to start a PhD is having obtained a master degree with distinction. In the seventies ASRO developed two major research strands/units: building physics and architectural and design methods (including CAAD) and theories. PhDs from that period show the human sciences interest in/influence from psychology, ecology, anthropology, ethnography, philosophy (structuralism), linguistics and semiotics and for design methods, which at that time was dominated by the problem solving paradigm.

Mid-eighties the building physics research group left the department ASRO for the department of civil engineering, where it does well and has built an excellent international reputation.

The department of architecture is actually structured in four research divisions which as a rule determine/propose the thesis topics. PhD thesis can be consulted with permission of supervisor and graduate from two years after public defense.

They are filed in the campus Arenberg University library (<http://bib.kuleuven.be/cba>) and can be consulted via the online library system Lirias³.

1. Architecture and society

"The division 'Architecture and Society' stands at the crossroads between engineering and the architectural sciences on the one hand, and the humanities and social sciences on the other. It uses a broad variety of relevant methodologies from these fields in an interdisciplinary perspective. Its research ranges from theory to practice and experimentation, across all spatial scales from the building element to the territorial, and through time from the past (history) to the future (planning). Its main areas of interest are: architectural history and conservation; architectural theory; planning and development.

Architecture and society is articulated in three research groups.

- The research group *Planning and Development* carries out multidisciplinary, policy-oriented as well as fundamental research in the field of planning theory and methodology and local and regional development, with a special focus on the strategic and institutional aspects of planning, creativity in/and planning, social innovation in territorial development, issues of diversity, and user and stakeholder involvement in planning processes.
- The research group *Architectural History and Conservation* is interested in all aspects of the design process, construction, afterlife, archives, documentation, con-

ervation, and restoration of the built environment in the broadest sense of the term, and combines different methodologies from the fields of art history, history, building archaeology, construction history, and digital recording and documentation in an interdisciplinary way.

- The research group *Architectural Theory* deals with notions such as modernity, power, ethnicity and gender in their relation with the built environment and interrogates the interaction between architecture as a discipline, the built environment as a construct and the experience of people inhabiting and using this environment.”⁴

2. Architecture and design

“The aim of the Division Architecture and Design at the Department of Architecture is to understand and foster design as a way of knowing and means of knowledge production, within the context of scientific research, university education, and the professional practice of architecture and urbanism. Our research comprises a dialectic process of analytical investigation and operational synthesis, with a focus on creativity as a catalyst for innovation and foresight.

The division consists of a multidisciplinary team that all study, teach and/or practice design and/or use it as a way to undertake scientific research, with members of different backgrounds who join forces on a variety of design-related topics, such as research by design, research on design (design science), design didactics, design tools (computational design) and people who design (designing). The application domains of this division range from urban design and architectural design, over inclusive design (e.g. architectural design & disability) to interaction design (e.g. human-computer interaction). Architecture and design counts three research groups:

- Practice-Based Research
- Research group Urban Planning and Architecture (OSA)
- Research x Design (RxD)”

Source: <http://www.asro.kuleuven.be/onderzoek/design/?lang=en> (May12, 2014)

3. Architectural engineering

“The Division of Architectural Engineering aims for innovation in building design by adopting an engineering approach to architecture. The focus is on the technical aspects of architecture such as structural systems, building physics, MEP, acoustics, and lighting. These elements are tackled in a multidisciplinary setting in order to assess and improve the overall performance and sustainability of buildings and the built environment.

The division follows a twofold strategy to establish this goal. First, we attempt to advance the academic state of the art by means of fundamental research in areas such as computational modeling, performance based design, life cycle assessment and costing, and robust design optimization. This research is conducted in close collaboration with the Department of Civil Engineering. Second, we try to bridge the gap between

academia and construction practice: we study building materials and systems in their applications, we publish design guides for practicing architects and engineers, and we assist engineering offices by the development of design tools tailored for their needs.”

4. St-Lucas

“The Doctorate in Architecture (PhD) falls under the authority of the Faculty of Architecture, KU Leuven, and is situated within the Arenberg Doctoral School (ADS) of the Science, Engineering and Technology Group. The Faculty of Architecture aims at an important collaboration with Leuven University College of Arts (LUCA) – Faculty of Arts.

All candidates for the Doctorate in Architecture have to follow the General Regulations–ADS. The doctoral training in Architecture follows these regulations and expects from the candidates for the Doctorate in Architecture to follow the Research Training Sessions (RTS) as part of their doctoral formation. The ambition of the RTS program is to actively help architects, designers and artists develop research, which will be related to their own creative practice. RTS is a unique proposition in the context of the current design research postgraduate courses which exist internationally. It focuses on defining and developing knowledge which emerges from exploration of the space between art and science, practice and theory, the exploratory and the explanatory in the fields of design. The RTS tutors are an international group of experts in the fields of design research, cybernetics, knowledge processes and communication from all over the world (Belgium, the Netherlands, Turkey, UK, Germany, Australia, USA, Sweden and Norway).

More information is available on the RTwebsite”

Source: <https://arch.kuleuven.be/onderzoek/doctoraat-architectuur> (May12, 2014)

Arenberg Doctoral School

Doctoral education/training is formally organized by the Arenberg Doctoral School (ADS) of science, engineering and technology.

The aim of doctoral training is to train doctoral researchers both **as** future scientists and **as** scientifically trained professionals who will valorize their doctoral expertise and competences in a non-academic context. This dual objective requires a versatile training program that addresses both academic expertise and personal skills. Doctoral education is primarily a *research-based training*. PhD researchers also follow more *formal training* via seminars, workshops, summer schools and other course components in order to acquire the necessary skills and competences he/she has to develop, to successfully complete his/her PhD or for later use in his/her professional career inside or outside academia. The ADS has developed a competence matrix as a tool for this *self-assessment* by the PhD student.

Doctoral education

The doctoral training comprises a set of milestones with a *truncus communis* and *personalized doctoral training*. “PhD researchers have to register these in his/her electronic *doctoral training diary*.”

a. *Truncus communis*:

1. The PhD researcher is main author of at *least one international publication* or has produced an equivalent international scientific output, i.e. a peer-reviewed contribution (journal article, contribution to a book, conference proceedings, patent, design) about his/her own research, written in the language of the discipline and aimed at an international readership.
2. The PhD research has presented *at least two seminars* at KU Leuven or at a forum in which KU Leuven participates, either on his/her own doctoral research or on a more general theme
3. The PhD researcher has participated actively (oral presentation or poster presentation) in *at least one international conference* abroad.
4. The PhD research **has contributed actively to education** on bachelor or master level. This contribution may include final project supervision, organization of exercises or practical tests, leading exercise sessions, participating in teaching, science communication or other education-related activities.
5. The PhD researcher *reports yearly* about the progress of his/her PhD.

b. *Personalised formal training*:

PhD researchers need to follow *an equivalent of 6 ECTS credits* of formal training. Each PhD researcher can make his/her own personal doctoral training proposal. The department of architecture is actually offering a 6 credits *seminar on research methodologies*.

Students also can enroll for additional training, even for a part of the teacher training offered by the university in agreement with the supervisor. ADS also offers thematic training activities like advanced courses, invited lectures, journal clubs, summer schools and doctoral seminars.”⁵

Formal guidelines for doctorates

As a rule, a PhD researcher has most regularly/daily contacts with his/her supervisor(s) and reports regularly to the supervisory committee consisting of a promoter(s) and, at least, two assessors. Doctoral students submit yearly a progress report to the Faculty Doctoral Committee checking the doctoral diary. ADS has elaborated formal guidelines for the PhD text in terms of presentation and consistency. A doctoral dissertation is written in English or in Dutch; in agreement with the supervisory committee also another language can be accepted. For architecture, size and presentation of the text can deviate from the standard size.

Each doctorate has the following contents:

“Preface- Acknowledgements: The preface should summarize the general aim of the work. People, offices, companies and agencies who have awarded a doctoral scholarship (e.g. FWO, IWT) should be thanked for their support. However, the names of these

people, offices, companies and agencies may only be mentioned with their explicit consent and after consultation with the supervisor.

Abstract or summary in Dutch and in English: The abstract should present the most important aims and conclusions of the dissertation in a brief text of maximum two pages, written both in Dutch and in English.

List of abbreviations and list of symbols: These are lists of the most important abbreviations and symbols used in the work, mentioning indices, meaning and measures used.

Table of contents: The table of contents should be arranged neatly and must refer to the pages of the different sections (maximum three levels). Preceding chapter one, Roman numerals (I, II,) should be used for the page numbering. From chapter one onwards, Western Arabic numerals (1, 2,) should be used.

A thorough introduction outlining the research in a larger context: Starting from a description of the state of the art in the domain, additionally, the research aims of the PhD are formulated. Furthermore, this includes the global approach and research methods.

Report and discussion of the research: The chapters dealing with the results of the research performed by the doctoral candidate can take the following forms:

- an accepted or submitted publication. This chapter can be a copy of the publication (given the publisher's permission if required) or can be adapted as to form or content. In this case of *doctorate by publications* the whole text has to be consistent in presentation, symbols, abbreviations, quotations.
- an original text which has not been published.

An extensive conclusion, including a global discussion of the research results, a discussion of the implications of the PhD research and future perspectives in regards to follow-up research.

Appendices: The appendices should include parts of the research which are essential for the work, but which may hamper the readability of the text, e.g. because of their length (mathematical deductions, experimental data, examples, figures, etc.)

Curriculum vitae (optional)

List of publications:(optional): The list of scientific publications by the doctoral researcher should be arranged according to the guidelines generally accepted in the relevant research domain."

Recently doctoral students also have to make a poster about their thesis work.

Source: https://set.kuleuven.be/intranet-associatie/ADS/guidelines_PhDthesis.htm
(May 12, 2014)

The following two grades can be awarded:

- obtained the doctorate
- obtained the doctorate with a distinction granted from the Examination Board.

A distinction granted from the Examination Board is only awarded in exceptional circumstances and granted for, at most 5%, of doctorates.

The work itself must be of the highest international scientific level, which must be evident from publications in good international journals and from the impact of the work. Moreover, the presentation and defense must be exceptional; all members have to be present at the public defense and the Examination Board must be unanimous.

KU Leuven doctorates have a KU Leuven supervisor. *Joint doctorates* have a co-supervisor who is not a staff member of KU Leuven.

Future of doctoral education

Until 2013 Higher Institutions were not entitled to grant a PhD. After the Bologna Declaration, KU Leuven has created the KU Leuven Association with several high schools in 2003, boosting the number of students up to 102.000⁶.

In this context the St-Lucas school, based in Brussels and in Gent, has become a Faculty of Architecture of KU Leuven as per October 1, 2013. In doing so, KU Leuven now has two faculties where architecture is taught, spread over three campuses: Leuven within the Faculty of Engineering, Brussels and Gent within the faculty of Architecture. The research activities of both faculties are organized in one department of architecture. PhD students from Leuven get the '*Doctorate in Engineering: Architecture*' independent from the PhD subject. St-Lucas will be granting the *Doctorate in Architecture* autonomously from October 1, 2014. One can expect that practice-based doctorate, doctorate-by-design, will be more prominent in the doctorates from St-Lucas. A doctorate by design still needs to be 50% text. Both doctorates comply with the university standards mentioned above.

Expected profile of the researcher

On the one hand, doctorates are still primarily a prerequisite for an academic career, and dozens of ASROs graduates are tenured professors all over the world, from Harvard to Taipei.

Holding a PhD is almost a condition *sine qua non* to compete successfully for research funding nationally and at European level. For the architect-practitioner a doctorate is a luxury satisfying his/her intellectual ego and beneficial for his/her societal position, without being a necessity. It is a proof by excellence of being able to perform research. Since there is not a 'Research habilitation' in Belgium, PhD holders are entitled to supervise research straightaway, at KU Leuven after two years of university research (and teaching).

On the other hand doctorates are the means by excellence to build and deepen architecture as a discipline. This, in turn, will upgrade the education of an architect, improve his/her competences and thus better the architect's position in society.

In terms of competences and skills doctoral research leads to the highest achievements in relational skills, intellectual skills, self-management, leadership and change management, academic and technical skills⁷.

The competence and skills' details made up by KU Leuven are added as an appendix⁸.

Notes

- 1 <http://eng.kuleuven.be/english/research/phdportal>
- 2 <https://eng.kuleuven.be/kuleuveningenieur150jaar/tijdlijn-liggend-eng.pdf>
- 3 <https://lirias.kuleuven.be>
- 4 Source: <http://www.asro.kuleuven.be/onderzoek/society/?lang=en> (May 12, 2014)
- 5 Source: <http://set.kuleuven.be/phd/training.htm> (May 12, 2014)
- 6 <http://associatie.kuleuven.be/eng>
- 7 [https://webwsp.aps.kuleuven.be/sap\(bD1ubCZjPTIwMA==\)/public/bsphttp/sap/z_comprouf/competentieprofiel.htm?taal=E](https://webwsp.aps.kuleuven.be/sap(bD1ubCZjPTIwMA==)/public/bsphttp/sap/z_comprouf/competentieprofiel.htm?taal=E).
- 8 <https://admin.kuleuven.be/personeel/competentieprofiel/en/skills.htm>

Appendix

The competence matrix

Relational skills

Intellectual skills

Self-management skills

Leadership & change management

Academic & technical skills



Relational skills

Interpersonal skills/ communication

The ability to clearly formulate information and ideas and to communicate them, taking into consideration the reactions and convictions of others and inviting them to share their ideas and opinions.

Teamwork/ working together

The ability to co-operate in reaching a common goal, as opposed to working individually or in competition with each other.

Diplomatic skills

The ability to assess the agendas and perspectives of others and to adequately make use of this information while pursuing personal interests and needs.

Networking

The ability to build and retain formal and informal relationships, thus creating a network of contacts with people who are (or could be) interesting or useful for achieving one's goals.

Presentations/speaking in public

The ability to pass on ideas and opinions to diverse audiences in a clear language. Being able to prepare and give clear and fluent presentations in a confident manner.

Confidence & assertiveness

The courage to express and argue one's own opinion, also when it contradicts the opinions or interests of others.

Intellectual skills

Conceptual thinking

The ability to apply creative, conceptual and inductive reasoning to identify patterns and correlations which are not self-evident and to deduce from them specific suggestions and original and practicable solutions.

Analytical thinking

The ability to understand problems/situations by gradually analysing them and by systematically studying their constituent parts, while sticking to the facts.

Synthetic skills

The ability to smoothly combine data and to integrate a complex multitude of data into a coherent whole. Being able to present alternatives and to develop them into a convincing conclusion.

Critical thinking

The ability to evaluate the value of a statement or a fact and to question matters. Being able to actively and creatively look for room for improvement.

Interdisciplinary thinking/ broadmindedness

The ability to formulate, from different angles and disciplines, an integrated proposal, which may already present some alternatives. The willingness to look beyond one's personal specialisation and to look for complementarity and synergy.

Learning capability & interest

The ability to actively look for opportunities to learn and to develop oneself. Continuously looking for feedback and adjusting one's own behaviour in the light of this feedback.

Self-management skills

Autonomy

The ability to take a number of decisions and actions, and the willingness to take responsibility for one's own actions and accomplishments, to correct failures and to improve achievements.

Goal-directedness/Result-driven approach

The ability to achieve personal and team results and successes, to close cases. The drive to perform excellently.

Perseverance

The ability to persevere in spite of obstacles or opposition. Being able to undertake action benefitting the outcome without being asked. Being able to prevent problems and to create new opportunities.

Coping with stress

The ability to remain calm in stressful work situations and to perform well in spite of pressure. Being able to react result-driven in frustrating situations or when faced with obstacles and opposition.

Planning, organising and prioritising

The ability to adequately estimate the available time, means and guidelines, and to use that information to make an adequate, effective and realistic planning to achieve the goals set out.

Acting and thinking pragmatically

The ability to make decisions and to proceed to implementation, taking into account the urgency of the situation as well as the quality demanded of the results.

Problem-solving skills

The ability to collect and to interpret the correct data and to analyse a problem precisely. Being able to develop systematic solutions and to follow-up on situations.

Leadership & change management

Leadership and motivation skills

The ability to unambiguously formulate goals and priorities and thus to direct a group towards the desired end-result. Being able to instill in others enthusiasm and the dedication to perform excellently.

Strategic thinking

The ability to translate long-term outlooks and strategies to the daily work situation. Being able to trace out ways to reaching a goal, taking into account internal and external factors and market information.

Creativity and innovation

The ability to propose novel ideas and to integrate different perspectives in a creative way. Being able to recognise the need for renewal and to go beyond the status quo.

Taking initiative & entrepreneurship

Being action-driven and pro-active (instead of reactive). Noticing and anticipating opportunities and threats.

Flexibility

The ability to adjust one's own behaviour and thinking according to the context so as to attain the desired goal. The ability to adapt oneself and to function efficiently under changing circumstances and with different groups or people.

International focus

The ability to expand and maintain international networks to achieve optimal results. The willingness to be internationally mobile when it benefits one's personal development and/or the organisation.

Academic & technical skills

Research setup

The ability to formulate and check research hypotheses on the basis of an appropriate research design.

Methodological skills & statistical analyses

The ability to use adequate research methodologies, data collection and statistical analysis techniques as a function of the research goal.

Data interpretation skills

The ability to understand and explain data on the basis of existing insights and theories. Being able to recognise new patterns and relationships and in doing so achieve new theoretical insights.

Reporting skills

The ability to present the results and conclusions in an intelligible way to a (non) expert audience.

Project and budget management

The ability to develop an adequate project plan, in which the division of labour is planned in different stages and assigned to all those involved within the proposed timing and budget. Being able to actually implement this planning and to follow it up continuously.

Fund raising

The ability to identify potential sources of funding and to approach them in such a way that the funds will be allocated, taking into account the institutions' guidelines in force.

Pedagogical skills

The ability to pass on one's own knowledge and skills to others so that they can integrate them with their own insights and thus achieve new, creative and integrated solutions.

Language skills

The ability to express oneself easily both orally and in writing in a foreign language, both within one's own field of specialisation and within daily communication.

Knowledge of the research field

Acquired expertise, know-how & specialisation.



University of Cyprus

On the Pathology of Ph.D. Studies in Architecture

Interdisciplinary Research at the University of Cyprus

Marios C. PHOCAS

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Cyprus

Architecture entails knowledge derived from natural sciences, social sciences, humanities and artistic endeavor. Any related transferred knowledge within the nonlinear architectural design process may be based on epistemological explanation, as well as social, cultural and technological contexts that influence the nature of knowledge in transformative ways. The significance given to architectural design in academic institutions as the main activity for creative exploration, interaction and assimilation remains a common characteristic in architectural education for the provision of professional skills. At the same time, contemporary design approaches acknowledge the fact that architecture encompasses through design a number of disciplines, bringing together a number of distinct modes of research and types of knowledge. Research into architecture in the context of the 'third cycle of higher architectural education' is becoming conscious of these interactions and of the particular need for architectural knowledge and practice to be further nonlinear and integrative across

disciplinary boundaries. Design provides possibilities for interdisciplinary research, through an integrative approach to education and practice, while also crossing traditional research areas. More recent advances in society, disciplines, specialization, materials, system science and digital data driven computation, have brought a radical change in the contextual frameworks in which architectural design and production for example are normally placed. Such advances have been paving the way to achieve 'integrated multi-, inter-, or even transdisciplinary design', in all cases a type of practice that covers a mindset of collaboration and crossdisciplinary communication and experimentation, visualization and research at different stages and in different aspects of the design process. A respective thematic integration through research activities may refer at first place to the design process per se, as well as the fields of development within architecture following in all cases integrated interdisciplinary modes and platforms of operation. Along these lines, the syntax of design and any implicated interdisciplinary developments are of major significance. Especially this comes into fore by considering the future of education and research in architecture and the profession as interactive processes that are already initiated in the present. Consequently doctoral students in architecture should be given the opportunity to participate in design and research, in multidisciplinary academic environments of respective faculties, research institutions, the industry and the profession.

Considering research by design in interdisciplinary environments as the vehicle for architecture research, respective directions are further discussed from the point of view of architecture profiting herefrom, rather than the doctoral student, possibly already in possession of a professional architectural degree in a traditional sense. In this frame, interdisciplinary research teams of different educational backgrounds, which follow integrated nonlinear processes of analysis and developments in research, are considered substantial. The Ph.D. program of studies at the Department of Architecture of the University of Cyprus is briefly presented with regard to its regulatory framework that supports an integrated interdisciplinarity in research as herewith proposed. Possible perspectives for pursuing research in architecture are based on the students' own backgrounds and interdisciplinary advisors teams. The concluding section on cultivation of research environments in academia and practice underlines the necessity for an integrated interdisciplinary research network that would carry academic and social mandates in other disciplines as well with regard to research practice.

Ph.D. Studies in Architecture at the University of Cyprus

The Department of Architecture of the University of Cyprus as one of the four Departments of the Faculty of Engineering, accepted its first undergraduate students in Fall 2005 and its first doctoral students in Spring 2007. Ph.D. studies in architecture at the University of Cyprus have a strong interdisciplinary character with regard to the students' educational backgrounds and research activities, as well as the advisors' areas of specialization. The mission of the Ph.D. program of studies in architecture as stated in the respective official documents of the Department, is to promote scholarly research leading to learning and innovation according to international standards of excellence,

in the broader discipline of architecture and within multidisciplinary and interdisciplinary fields. The Ph.D. degree is research oriented, as a way for identifying relevant international architectural issues while promoting opportunities for local architectural development. Ph.D. research focuses on the fields of architectural theory and history, digital communication media, technology and urban design. At the same time architectural design is considered to derive directly from these individual fields, rather than comprising, in essence, any autonomous thematic entity.

Applicants for the Ph.D. program of studies must possess the equivalent of a 5-year Diploma in architecture or a Masters degree (M.A. or M.Sc.) in an area of philosophy, social sciences, fine arts, applied arts, civil engineering, environmental engineering, electrical engineering, mechanical engineering, informatics, administration or economic sciences, from an accredited University. Applicants are selected according to the quality of their background in breadth and depth, and past performance in their undergraduate and graduate studies, indications of ability for original and innovative research in the proposed area of study, relevance of the proposed field of research to the interests of the faculty of the Department, the University and the society and the necessary infrastructure and resources at University level to support the proposed doctoral work. Excellent knowledge of the English language is required for admission to the doctoral program. Upon selection in the graduate program of studies, students identify the permanent dissertation advisor, who assumes the role of academic advisor and with whom a suitable dissertation topic is further developed. The schedule of advising ensures that students are well advised and actively engaged in research at the early stages of their program. While all faculty members of the Department of Architecture hold a Ph.D. degree, supervision of doctoral students is encouraged across all academic non-tenured and tenured positions.

The program of studies at the University of Cyprus is based on the European Credit Transfer and Accumulation System, ECTS. The course of studies leading to the Ph.D. degree in architecture requires the completion of at least 80 ECTS units in graduate courses related to the Ph.D. Thesis, while holders of a Diploma in architecture are credited up to 24 ECTS and holders of a Masters degree, with up to 56 ECTS units, and the completion of 160 ECTS units from graduate research. Up to two graduate courses may be selected from other Departments of the University.

Admission to candidacy for the Ph.D. program is granted when the student has satisfactorily passed a qualifying examination, written and oral, intended to measure fundamental ability and knowledge in architecture, especially in depth knowledge and understanding of the intended research field. The qualifying examination must be taken no later than six semesters after the student has enrolled in the graduate program. The contents of the qualifying examination cover three relevant subject fields within architecture defined by the respective three-member dissertation committee. The latter consists of two faculty members and one other member from inside or outside the University. Outside members can be faculty members from other accredited institutions, or other qualified experts holding a Ph.D. degree or equivalent. The committee members are selected according to their abilities to assist in the students'

interdisciplinary dissertation research from relatively early stages of the program. The qualifying examination is considered to be successful, if the student succeeds in both examination parts and in all fields separately. In case of failure, the student is allowed to repeat the entire qualifying examination once more.

Following success in the qualifying examination, the doctoral candidate prepares a written proposal of the intended doctoral research and makes a comprehensive oral presentation on the proposed work that demonstrates a sound understanding of the dissertation topic, the relevant literature, the methodology to be employed, the issues to be addressed and the work done on the topic by the student to date. Both the written proposal and oral presentation are presented to the dissertation committee and a representative from the departmental graduate committee. If there are concerns about either the substance of the proposal or the students understanding of the topic, then the student will have one month to prepare a second presentation that focuses on the areas of concern. In all cases, the students can continue their research only if the proposal is approved.

At the final stage, each doctoral candidate is required to defend the research during an oral dissertation defense that is administered by an examining committee. The defence is open to public participation and includes two concluding closed sessions of the examining committee with the candidate and for making a decision on the doctoral work. The examining committee consists of three faculty members, a member from the faculty of another Department of the University, who has relevant knowledge of the Ph.D. research topic, and a member from another University or research institute. Three of the members comprise the dissertation committee. Chair of the examining committee is a member of the Department of Architecture, but not the thesis advisor. The examining committee determines the acceptability of the candidates dissertation and oral performance, and proposes modifications to the written dissertation if appropriate, as well as a time plan for the candidate to address such changes, in mutual agreement with the advisor. If the dissertation is rejected, the candidate is entitled to request a repetition of the defense once more. In principle, the doctoral dissertation must address current theoretical, scientific and/or technical issues primarily by fundamental research, leading to the creation of new specific knowledge in the area. Applied research and development aspects, leading to a prototype or an application of this basic research, may also be included as additional component of the dissertation. The fundamental research aspects must be novel and original, and of the highest scholarly standards. On average, two to three original publications in international academic journals are expected to result from the Ph.D. research before the Senate of the University of Cyprus grants the doctoral title at the final stage.

In Fall 2013, with nine faculty members and approximately 150 undergraduate students, 19 students were enrolled in the Ph.D. program of studies. The first Ph.D. degree from the Department was successfully completed in the field of architectural technology in September 2012. The ongoing research conducted by the doctoral students at the Department could be categorized as follows: 26% of the cases deal with processes of design, 32%, architectural theory and history, 10%, digital communication media, 10%, technology and 21%, urban design. By this point of time, 16% of the doctoral

students have passed the qualifying examination stage. 21% of the doctoral students have other educational backgrounds than architecture. In the passed semesters, four students, not included in the aforementioned statistics, have terminated their graduate studies without success, in all cases, before the qualifying examination stage.

In general, the Ph.D. program of studies follows a strict regulated framework with regard to the time management and procedure required throughout the stages of introduction and overall assessment of the respective research field, focus on intended research concentration and workout of the research proposal. At the same time, this framework offers a high degree of freedom in the definition of possible research directions to be followed by the students and the faculty members assuming the advisors role. In broader context, research is pursued by the faculty members based on the common practice of academic autonomy supported by the University. In this point, one has to have in mind that the faculty members themselves at the University of Cyprus are not evaluated for promotion on a competitive basis, but according to their research achievements and potential on the direction of individual research activities and interests, whereas cross-fertilization in teaching and research between other faculties of the University is strongly encouraged. Horizontal component of the Ph.D. research constitutes “the broader discipline of architecture and within multidisciplinary and interdisciplinary fields” as stated in the respective documentation. This, in essence, is initially due to the small size of the Department within a research oriented University leading to intense cross-disciplinary, interdepartmental research activities of the faculty members. This is furthermore reflected by the fact that doctoral students with different educational backgrounds are considered to be only enriching the program and the research teams.

Having stated the above, “the broader discipline of architecture” is perceived by the faculty to be primarily characterized by design. Therefore, research by design is considered to be a horizontal component that also interrelates the expertise fields and activities of the faculty members. In this context, design and interdisciplinary research projects developed, deal with one of the following:

- Research by design processes analysis.
- Design projects and activities review in broader architectural, social, historical and technological interdisciplinary context.
- Design, manufacturing processes and prototypes development in various interdisciplinary environments.

In further clarifying this argumentation, the interrelation of research by design and interdisciplinary research is briefly juxtaposed in the following sections.

Research by Design

Several recent works suggest that we are nowadays in the process of defining and refining the idea of architectural research as a mode of scholarship and inquiry that is

special to architecture and is not adequately described in terms of the 'scientific' method. In the last years the European Association for Architectural Education developed a framework stating, "Architectural research is original investigation undertaken in order to generate knowledge, insights and understanding based on competencies, methods or tools proper to the discipline of architecture. It has its own particular knowledge base, mode, scope, tactics and strategies. Any kind of inquiry in which design is a substantial part 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 that may include realized projects, proposals, possible realities, or alternatives" (EAAE, 2011).

The design process itself is no longer viewed as a linear problem-solving activity, whereas sequential activities are carried out in a linear order, as for example problem definition, analysis, synthesis and evaluation, as there is no direct flow from one activity to another (Alexander, 1964, Archer, 1984 and Jones, 1984). An alternative to a linear, predictive design methodology is what has been termed as "reflective conversation", whereas variables of solutions are generated, tested, abandoned or optimized, in pursuit of design versions and adaptation (Schön, 1987). In this context, an open structure in the synthetic process that forms the core of the design process has been proposed, in which phases are grouped in a circular arrangement, yet the process itself does not develop in a linear manner (Moggridge, 2007). Each phase of this process "employs any information, knowledge, theory or technique from other disciplines, which the designer may select as being relevant to the task on hand" (Cunningham 2007). In terms of the design process, the acquisition of given knowledge, is not viewed as an educational end in itself, but rather as the learning process itself. Knowledge is employed from research and new knowledge is generated throughout the design process that develops new hypotheses and visions.

In all cases, architectural design lays emphasis on an iterative transfer of thematic research, to establish research by design in its different scales. Throughout the process of research by design, 'integration' may be applied at different levels: Integration of knowledge, skills and attitudes by emphasizing learning competencies, as opposed to their quantified and fragmented use; integration of analysis (analytical thinking) and synthesis (creative thinking), perceived as parallel processes possibly interrogated within the design process; integration of learning and valuation with emphasis on the learning process instead of the learning result; integration of architecture as cultural phenomenon (aesthetic) and as a technical phenomenon through designing; integration of research, investigating and designing by implementing platforms of technology with knowledge management and valuation systems. Such educational objectives tend to increase the knowledge about architecture and implement it into processes of research by design. Collaborations among faculty, doctoral students and corporate partners often aim at exploring the potential for genuine cross-functional communication and cooperation, while highlighting strategies fundamental to the success of the integration approach (Malecha, 2008).

Along these lines, recent developments prove that architectural preoccupations may be shifted beyond mono variables, to the integration with multiple aspects of the built environment in favour of performance. Nonlinear design processes based on interdisciplinary performance optimization criteria are considered to be crucial for the future of architecture. Also in practice, given the escalating complexity of design criteria and tools to manage any implicated multivariable design criteria, new interdisciplinary and collaborative design research practices of architects and specialists consultants have become increasingly essential (Mistur, 2007). Any intermediate research requirements derived by design, or research results obtained from other disciplines from outside the design field, support the aforementioned integrated context of design. Research by design offers indeed a promising perspective for the field, requiring an instrumental and rigorous integrative approach in the supporting and driving modes of the design process. In this sense, research by design also requires an overarching theoretical framework to ground the experimentation and to give it purpose and direction in relation to the production of a relevant architectural discourse and equally relevant improvements in practice and, by extension, the development of the built environment in terms of a performative architecture.

Interdisciplinary Research

Common backbone for skills acquisition and related research processes to be achieved by doctoral students in architecture, as driven by academic expectations with regard to the advancement of the field is the argument by Rendell (2004) that “architecture encompasses several disciplines and uniquely brings together modes of research that are often kept apart and so provides possibilities for multi- and interdisciplinary research.” Research into architecture thus has to be conscious of these interactions across traditionally separate intellectual fields, which according to Lawson (2005) can be divided into three stages: architectural processes, architectural products and architectural performance. The advantage of this proposal is that it avoids the science/art and quantitative/qualitative splits, allowing thematic approaches to emerge as well as interdisciplinary research into any of the three stages (Till, 2005).

The interdisciplinary aspect in research by design activities constitutes in broader sense an academic and professional field of growing complexity, responding to the rapidly evolving needs of contemporary society. The following distinctions of discipline interrelations are considered in the present argumentation, as proposed by Jantsch (1970):

- *Multidisciplinarity*: A variety of disciplines occurring simultaneously without making explicit possible relationships or cooperation between them.
- *Pluridisciplinarity*: Various disciplines grouped in such a way as to enhance the cooperative relationships between them.
- *Crossdisciplinarity*: Various disciplines where the concepts or goals of one are imposed upon other disciplines, thereby creating a rigid control from one disciplinary goal.

- *Interdisciplinarity*: A group of related disciplines having a set of common purposes and coordinated from a higher purposive level.
- *Transdisciplinarity*: The coordination of disciplines and interdisciplines with a set of common goals towards a common system purpose.

In essence, despite designers recognising the holistic nature of the issues they deal with, crossdisciplinarity remains at the interdisciplinary and multidisciplinary levels. In such cases the design aims remain always within the framework of the discipline (Nicolescu, 1997), that is, the autonomy of each discipline usually remains intact. Directly related to this point of reference is the distinction between 'hard' and 'soft' disciplines and the division between 'pure' and 'applied' research modes that serves primarily an investigation on the social construction of knowledge and the interpretation of knowledge arising from interaction (Becher, 1987). In 'soft' disciplinary fields complexity is acknowledged as an integral part of research, whereas related methodological processes of investigation preserve a degree of interconnectedness while maintaining validity and reliability. Knowledge construction in this case is typically a social, negotiated and iterative process, which may be directly related to the professional practice of design. A similar perspective on the construction of knowledge is expressed in terms of explorations of interdisciplinarity as the common epistemology of convergence (Klein, 1990). In this context especially useful is the distinction between Mode 1 and Mode 2 knowledge as introduced in Gibbons, et al (1994). Mode 1 knowledge is generated within a disciplinary, primarily cognitive context, while Mode 2 knowledge is created in broader transdisciplinary social and economic contexts. The latter may be interpreted as the knowledge transferred by architects in the design process and which is crucial for the development of the field. By virtue of such a multidimensional approach, a higher sensitivity to the impact of research is conceived from the outset.

Given the particular characteristics of architecture as an explorative and transformative knowledge field that inherently relates to the humanities, empirical, interdisciplinary, applied and formal sciences, it may be argued that architecture is intrinsically transdisciplinary and to an extent multireferential and multidimensional (Hensel, 2012). In this context the requirement for reintegration of various types of knowledge, as stated in articles 3 and 5 of the 'Charter of Transdisciplinarity' (2013), is of particular significance. Articles 3 and 5 of the 'Charter of Transdisciplinarity' state: "Transdisciplinarity complements disciplinary approaches. It occasions the emergence of new data and new interactions from out of the encounter between disciplines. It offers us a new vision of nature and reality. Transdisciplinarity does not strive for mastery of several disciplines but aims to open all disciplines to that which they share and to that which lies beyond them." and "The transdisciplinary vision is resolutely open insofar as it goes beyond the field of the exact sciences and demands their dialogue and their reconciliation with the humanities and the social sciences, as well as with art, literature, poetry and spiritual experience." Indeed, this reminds us of the fact that contextualization of research fosters a more "socially robust" knowledge that transgresses disciplinary and institutional boundaries (Nicolescu, 1997).

In architectural technology for example, transdisciplinary platforms of operation may support interdisciplinary design processes on the basis of latest advancements in digital design technology through the introduction of computing facilities and numerical methods of analysis. Digital design enables the designers to collaborate, visualize, research and modify building performance with relatively high accuracy. In performance-based design processes any development may be reevaluated within a performative context in a nonlinear way, i.e. by moving from 'synthesis' to 'evaluation', to the detailed design phase and vice versa. Such iterative analysis steps of design verification and optimization shift the focus of the design teams to developing processes, from which specific results then come about through the definition of and emphasis on influencing values and parameters. In this frame architecture is effectively bridged with respective performance disciplines concerned; designing thereby becomes interdisciplinary towards a form-generating process. Thus an aptitude for open-loop developments in multivariable systems may be achieved from early conceptual design stages through a collective 'bottom-up' approach. At the same time, such mode of operation requires designers to rethink alternative strategies in order to establish a robust connective link between disciplines and specializations (Gibson, 2012). In support of such processes, are the complex problem analysis and solution mechanisms within research by design, whereas the design domain depends on the culture of collaboration. Teams may be continually formed and reformed and new technologies employed to assemble the expertise and perspectives arising from the members and disciplines. Collective intelligence supports actions of sharing, cycling and innovation, as well as the interpretation of design into intermediate research results. Underlying such interdisciplinary mode of operation is a sense of 'disciplined architectural specific interactions' among the diverse teams. In broader context of observation, the success of the methodology rests on an integrative approach to research in architecture, which may be examining not only the social, behavioral and cultural relationships, but also the increased complexity and quality of building systems in producing sustainable forms in physical context. In this frame, integration succeeds in a double way: integrating knowledge in the design process and integrating architectural design in learning disciplinary knowledge.

Cultivation of Research Environments in Academia and Practice

In following an interdisciplinary mode of operation in research, it is essential for architecture to preserve and enhance integration of the disciplines involved throughout the design process. The development of an infrastructure in support of design-driven interdisciplinary research activities may only be achieved at collective level, between doctoral students, advisors and institutions in academia and practice. Horizontal component for any collaborations and advances achieved herein is the integrative component of the interdisciplinary research activities arising from the nature of the synthetic activity "that may include realized projects, proposals, possible realities, or alternatives" (EAAE, 2011). Therefore, a respective network of emergent architectural research, including also other collaborators and lab facilities from outside of the Department and the University, is considered to be essential, which would coordinate

overarching research directions pursued within an integrated interdisciplinary framework. Such a research network would act as the organizing umbrella for any specific ongoing and future research projects. The success of the network depends on the individual participants and the collaborating research institutions that need to be identified according to their respective research themes and infrastructures. In the long run, it is the entire interdisciplinary research teams with a respect for design driven research activities, and the utilization of their individual interests, engagement, areas of expertise and infrastructures in research, which will breath meaning into any research activity within the “broader discipline of architecture”. Let us not forget that the European environment is primarily characterized with plurality in environmental, historical and cultural aspects on the one hand and a certain degree of uniformity with regard to the materials, building systems, production and technology transfer on the other. Cross national and international collaborations serving as actively involved alliances are to be selected, so as to benefit individually the research participants, or as a whole the doctoral students, the advisors and the Universities. Finally, it needs to be mentioned, that the overall mission of research activities should be managed at departmental level under a separate budget with support of the University, research institutions and professional bodies. Therefore, respect needs to be gained from the society with regard to the meaning of design processes and related advances in influencing the staging of human life with regard to the built environment through integration of the disciplines concerned.

In particular the role of the researcher in architecture as part of a broader interdisciplinary team can only benefit from a close interrelation of research and application through introduction of common components between the research institutions and the societies, the industry and the profession. In the search for successful models of integrated interdisciplinary design, architecture benefits indeed from the possibility that collaboration will trigger the ability to envision, investigate, create and discover through research. Progressive performance-based research practices for example, go beyond incremental improvements to standard responses, but instead work on fundamental questions throughout the architectural design fields and scales, identify the forces to innovate and achieve compelling solutions. Future research in architecture will still be multi-referential with regard to historical, cultural, environmental and technological aspects, originating through integration of various disciplines involved by redesigning the past, the present and the future. As the complexity and sophistication of our built environment grows, influencing multiple criteria and technology developed should increasingly commit to realizing an integration of considerations, coupling science, design and imagination to advance the field of architecture towards iteratively more compelling next generations.

Conclusions

Research in architecture implies that different types of knowledge need to be an inherent part of any related integrated context of cross-disciplinary collaborations. Integrated interdisciplinary design processes are undoubtedly acknowledged in edu-

cation, research and practice, due to the potential to apply a heterogeneous set of discourses, types of knowledge and disciplines, through cyclical and comprehensive processes of development in the area. In addition they enable further advancements in terms of advanced performance-based research or technology and its transfer within architecture. The approach in terms of both, the design results and the new transdisciplinary knowledge gained by the interdisciplinary team members may well be furthermore acknowledged as original and significant for the advancement of the area. In this frame of considerations, the Department of Architecture of the University of Cyprus offers a Ph.D. program of studies with a research orientation and strong interdisciplinary character. Relevant aspects of efficient resources management and expected research accomplishments with regard to cross-disciplinary collaborations and inter-institutional infrastructures primarily aim at integrated developments within the “broader discipline of architecture”. Further cultivation of research environments in the area may be achieved from an integrated interdisciplinary thinking and acting perspective between academia, the industry and the profession.

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Czech Technical University

General Description of the Doctoral Study Programme (DSP) of the Faculty of Architecture of the Czech Technical University in Prague (FA CTU)

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Which are the forms and reforms of Doctoral education in your school of School

We are the largest of eight faculties of architecture in the Czech Republic, seven of which are public. In 2013 there were 143 PhD students, 873 bachelor and 526 master students studying in our Architecture and Urbanism programmes, and 116 bachelor and 37 master students studying in our Industrial Design programme. Each year we accept 20-40 new students into both our Czech and English DSPs. The applicants have to hold a master's degree in the same field or related field. For the admitted master study graduates there are four branches to choose from: Architecture - Theory and Design, Urban Design and Spatial Planning, History of Architecture and Monument Conservation, Architecture, Building and Technology.

The aim of the DSP and the preparation of a Doctoral Thesis is to train a researcher, who can make an independent contribution to the development and growth of

scientific and/or artistic knowledge. The DSP is carried out through full-time or combined form of study. Both full-time and part-time studies at CTU generally take 4 years, scheduled into 8 semesters including the Doctoral Thesis submission. But many of the doctoral candidates submit their thesis later, up to a 7 year maximum from the start of their studies. Quite a large percentage of the accepted applicants never make it to a successful submission or defence.

Each doctoral candidate is supervised by a tutor who prepares for him/her an Individual Study Plan with the courses to be accomplished in the first two years of the DSP. The tutor is an associate professor or professor, approved by the Scientific Board of the FA CTU. There are four requisite courses for all branches, two requisite-optional courses, and a wide choice of optional courses available according to the specialization and theme of the Doctoral Thesis. The so-called Study Block is accomplished by passing a Discourse over the Research Theme Project and takes place usually after two years of studying.

During the first two years of the DSP each candidate also passes two control workshops and during the whole length of his studies he submits his self-evaluation report every year. Successful completion of the final State Doctoral Examination is pre-requisite for the presentation and defence of the Doctoral Thesis. The Thesis can be submitted in the form of a work that has been published (or is being prepared for publication), or as a collection of publications. A single resubmission is allowed in case of an unsuccessful final examination or unsuccessful presentation and defence of the Doctoral Thesis.

Which are the main plans and expectations for the future of doctoral education in your school of Architecture?

In 2009 Professor Zdeněk Zavřel, the dean of the faculty at that time, initiated an internal audit of the PhD study programme leading to a Report of The Doctoral Study Programme at the Faculty of Architecture CTU. The audit identified that there were doctoral candidates overrunning the maximum 7-year study length given by the law, many inactive students that were engaging too much in fulltime employment, there was weak communication among students, a high student drop out ratio and very low scholarships, even for the best students. The Report proposed that monitoring the quality of students work should improve, the strategic objectives of the DSP should be clearer, an effective system for knowledge sharing should be implemented and a research centre should be formed in order to take care of all these problems.

Since then many things have been achieved, and the audit of the state accreditation committee that took place in 2011 confirmed the growing quality of our DSP. We monitor the productivity of PhD students, the university system for communication between students and the university staff has been modernised, regular control workshops and critiques became a standard, a Research Week with exhibitions of cca 50 student posters takes place every year. Students' research work is annually evalu-

ated and this evaluation has impact on students' scholarship. Annual research conferences between Prague – Brno – Bratislava have been founded and are approaching their fourth anniversary, apart from many thematic conferences, in which the doctoral candidates take part along professional researchers.

In 2013 a Research Centre of Faculty of Architecture was established. Its main objective is to develop the research topics and common strategies and apply for research grants. Shortly after the Horizon 2020 and the new EU structural funds started changing the research strategy of the whole university (CTU). Larger projects, investments and grants should be available in the near future and our architectural and urbanism research is starting to be more influenced by a more coordinated CTU policy. As FA CTU is the only faculty where not only science but also art is presented, developed, reflected and researched, we are in a research outsider situation trying to point out the specific situation in which architecture and urbanism exists.

One of the main problems is the total lack of Czech impacted journals in the field of architecture and urbanism. Other important problem is the holistic character of many of architecture real life problems, our research themes are often not specified as precisely as other technical faculties have them. Many research topics are of local character and meaning and their international discussion is not easy to achieve but still is required. More interdisciplinary research topics are gradually developing international cooperation but up to now it is still insufficient. Last but not least we lack financing of postdoctoral students and lose even some of our best PhD graduates as a consequence. We have to try to tackle these problems in the next years to ameliorate our quality and performance.

Which are the main characteristics of the research's profile that your school wants to generate?

In the last years many improvements have been achieved in our research profile and we hope to continue in this trend. Research topics that reflect real needs of our society are becoming more common, so not only basic research or academic research leading to pedagogical goals, but applied research leading to real life results is being developed. More long term research groups are formed and can give systematic backing and support to new doctoral candidates. We have achieved excellent quality of some of our research groups, such as e.g. the research group of the Air House that won the 3rd prize in the 2013 Solar Decathlon competition, or the Research Centre for Industrial Heritage is becoming one of the best European centres of excellence for questions of re-use of industrial heritage sites. Or the historic preservation research unit, which profits from the extraordinary Czech tradition of heritage protection.

A newly formed Centre for Housing Quality focuses on the quality of housing especially in large scale housing developments (estates) of former communist countries. Very successful are also urbanism and urban planning research groups that cooperate with

many Czech towns and villages and lately focus of revising the methodology of development of urban plans of large cities. Our 3D Mathematical Modelling research group is very well connected to university research in other European cities e.g. Aachen, Eindhoven, Dresden, Zurich, Graz or Vienna. All of these groups disseminate their research knowledge regularly but also enrich their research with new and practical up-to-date problems. We would like our research to develop in these fields where we feel we have a word to say even on an international level.



Aarhus School of Architecture

The PhD Programme at Aarhus School of Architecture Enters its Fourth Stage

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The Aarhus School of Architecture, an educational institution under the Danish Ministry of Science, Innovation and Higher Education, has approximately 750 students and employs a staff of about 175. The school offers an international Master in architecture as a supplement to Bachelor and Master's degree programmes taught in Danish. See www.aarch.dk. The PhD programme was introduced in 1988. Since then 50 PhD students and 4 licentiates have finished their degree in the School.

The Aarhus School of Architecture was established in 1965 and has since then educated approx. 5000 Masters in architecture. The school has been instrumental in creating Aarhus' reputation as an international city of design and architecture. With 142 architectural practices (employing 1000+ employees) Aarhus is the city in the world with the highest density of design and architecture companies. Most of these companies, many of which have achieved international success, have their roots in the school. The School is amongst the top Schools of Architecture in Europe (Domus, 2013, Martins, 2014).

PhDs graduated per year

1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	0	0	0	1	2/1	0	4	2	4	2	4	3	1	3	7	4	4	4	2	6	3	7*
1	1	0	3	1	1	1	3	1	6	1	4	9	5	9	6	2	8	3	1	2	7	?

Licentiates/PhDs *expected

The School’s mission statement endorses “to carry out research and artistic development work at the highest level with the aim of continually qualifying the education, the practice of the discipline, and the interdisciplinary integration of architecture”. It is important to note that the link to the practice of the discipline is explicitly mentioned. This is in line with the profile of the School and its staff. Normal activities in the School also include plenty of lectures by prominent architects and designers. The School offers design studios with individual working tables for all students and extensive workshop facilities (wood, metal and concrete casting workshops, waterjet cutter, industrial robot, 5 axis CNC mill, laser cutters etc.) that support manual as well as digital production of models and prototypes. Hence it is no surprise that the School has strong competencies in making and designing.

In the Scandinavian context architectural research has been criticised for taking over theories and methods from other disciplines without valuing the specific qualities of working in the architectural field. (Lundeqvist, 1999:7). This split has also been present in Aarhus, even though there has been a strong focus on design-based research from the very outset of the research education programme. More recently, the School has opted to invest in a research by design approach.

Reflecting on the past experiences we identify 3 different stages and judge the School to have moved into a new fourth stage. The account of the 3 first stages of development is to a large extent based on a paper written in 2008 by Niels Albertsen as a contribution to the study *Design scholarship ‘the doctorate way’: Some micro-studies of the recent past and the near future conducted by professor Halina Dunin-Woyseth and professor Liv Merete Nielsen at the Oslo School of Architecture and Design (Albertsen 2008)*. In what follows we characterise each of the previous stages and finish by introducing the vision for the coming years.

Stage 1: The first steps (1988-1994)

The Aarhus School of Architecture introduced a research education programme in 1988. Research students, at that time, enrolled as licentiates. The very first student, Anne-Mette Sonnichsen, enrolled in the programme to do a research project on designing laser equipment for skin treatment. The project built upon the diploma work of Sonnichsen and incorporated designing a laser in collaboration with a manufacturer as well as the writing of a dissertation. The dissertation was based on a theoretical

as well as empirical reflection on design processes focusing particularly on the design of the “man-machine” interface. As such the Aarhus School of Architecture can claim to have been involved in ‘research-by-design’ from the very first steps of its research education.

However, even though the research education was partly based on a continuation of experiences and skills developed through the education, it was a challenging task to establish research education at an institution with no former experience of research education and consequently no research elements in the Master education. A three-person supervision team was set up consisting of a practicing designer, an associate professor in the field of design and an associate professor with a background in the social sciences (professor Niels Albertsen). This was done in order to ensure that the competencies of practice, theories and methods of the design profession and questions of scientific standards were all covered. Internationalisation played an important role and Sonnichsen took part in national and international conferences and courses, as well as a long-term study at the design department at Stanford University. The dissertation was successfully completed in 1991 (Sonnichsen, 1991).

The same year a research department was established at Aarhus School of Architecture. The purpose was to strengthen the school’s research by improving communication between the school’s researchers, create a forum for discussing research policies as well as methodological and theoretical issues, disseminate the research, streamline the research management and improve the research program. Eventually the department focused on research fellows and assistant professors.

During the period 1989-1993 an additional 5 fellows were enrolled. Not all of these fellows carried their research projects through to successful conclusions. In retrospect this may relate to an undeveloped research infrastructure that was not able to clarify and qualify the research ambitions of the students. But possibly also to unclear selection criteria during the enrolment process that seems to have prioritised highly skilled designers rather than focus on research potentials. Inexperienced supervisors may also have added to the insecurities.

The first phase of research education was open and seeking. It was characterised by the challenge of establishing a basic understanding of what research training in architecture might be about and how to establish qualitative criteria. It was perhaps also characterised by an identity crisis introduced by the presence of research. There was a strong doubt in the school about whether the architect should take on the role as an academic researcher or align herself with the traditionally strong relation to the profession and practice of architecture, or if the two positions could even be compatible. It was a period with much frustration, but also a lot of enthusiasm about establishing a new research field.

Stage 2: A more structured approach (1994-1998)

The introduction of a PhD curriculum in 1994 placed new demands on formal research education courses. At that time the department was staffed with 3 associate professors. In the beginning of 1995 the school employed a fulltime associate pro-

fessor within the theories and methods of architectural research thereby prioritising the research training activity significantly higher than before. Research courses were initially loosely structured with a focus on two areas: partly on architecture theoretical texts and partly on theories of science, design theory, logic and reasoning. Overall this approach was better adapted to the students' qualifications, but there were some difficulties in maintaining a continuity of activities. It was also occasionally a challenge to focus on research problems rather than (theoretically informed) architectural problems.

During this period the first joint Nordic research training activities were initiated in order to gather the small national research education programmes. Three week-long Nordic research training courses were carried out in 1993, 1994 and 1996 on the foundational challenges relating to architectural research. The first one in Bergen treated the similarities and differences between architects' practices and architects' research, the second one in Aarhus compared architects' research approaches to the approaches of other disciplines investigating the field of architecture, and the third one in Helsinki compared architects' research to architecture as a form of art. The Nordic Academy (NORFA) funded the courses.

The second phase was characterized by a more structured research-training programme. The ambitions, preconditions and expectations of supervisors and fellows were better balanced. The identity problem, however, still was present.

Stage 3: Consolidation (1999-2012)

In 1999 Jørgen Dehs took over as head of the PhD school. He was supported by assistant professors Anders V. Munch from 2003-2006 and Carsten Friberg from 2007-2011. They organised and formalised a basic research education course covering half of the 30 ECTS credits required by a Danish PhD. The course mainly focused on three areas: philosophy and aesthetics, epistemology and methodology, and current issues in architecture and design. This new structure meant that there was no longer a need for Nordic research training courses within these relatively broad subjects. The basic research education course was quite popular and attracted PhD students from a quite wide range of related institutions. Despite the popularity there was also some debate about the content of the course. Some PhDs found it emphasised the humanities too much and that the course needed a stronger focus on theories and methodologies of architectural and design research. This critique did not lead to substantial changes, but over time the course was gradually modified to better implement these areas.

In 2006 DKAD (The Danish Doctoral Schools of Architecture and Design) was established by a grant from The Danish Agency for Science, Technology and Innovation (FIST). DKAD was a consortium of the Royal Danish Academy of Fine Arts School of Architecture, the Aarhus School of Architecture, Danmarks Designskole and Designskolen Kolding. Its aims were to contribute to the development and qualification of the research training schools of the institutions. The grant made it possible to undertake a number of research training activities and bring in a number of international profiles for courses, master classes and symposia. The long-term goals were to strengthen the

relations between the research training schools in order to coordinate the courses of each institution more closely. This should help avoid redundancy of content and create a wider range of specialised research training courses for the PhD students. This however proved to be difficult. Maybe institutional interests did not line up. Maybe the huge efforts invested in building up local research training programmes were still present and made the perspective of new reorganisations less attractive. Whatever the reason it can hardly be claimed that the DKAD consortium succeeded in creating a more unified research-training programme within the Danish architecture and design schools despite organising a number of successful events.

The third phase consolidated the research-training at the Aarhus School of Architecture. The former identity crisis was mostly resolved. It was no longer an anomaly to be a researching architect after 20 years of research-training programmes. There were examples to follow. Designing and researching were no longer seen as opposites, even though the discussions around the content of the basic course showed that oppositions were not completely resolved. The former identity crisis was now substituted by different positions on how to conduct architectural research involving notions of 'traditional' research, research by design and artistic research.

Stage 4: A new direction

The Aarhus School of Architecture was reorganized in 2011. The reorganisation was intended to increase the focus on collaborative projects, innovation and practice-related skills under the heading 'Engaging through Architecture'. The change had important implications for the research education as well. It implied a stronger emphasis on the relation between research and practice, focusing – once more – on how to value design thinking and design methodology as research. The previous consolidation of the research education was, as discussed, at least partly based on a strengthening of research methodologies and theories found in the humanities and to some degree the social sciences as well. This development had by and large been successful, but one consequence was that the research education was not up to date with the recent rapid international developments in the field of design-based research.

The reorganisation of the school coincided with the retirement of the former leader of the PhD school, associate professor Jørgen Dehs. This allowed for the school to create a new professorial chair in research by design that would also lead the PhD programme. The call led to the appointment of the first non-Danish leader of the PhD school in the form of professor Johan Verbeke in 2013. As former dean and professor of Sint Lucas (which has now become the new faculty of architecture of KU Leuven) in Belgium Verbeke has brought an international network to the School of Architecture. He was also the main person steering the research developments at Sint-Lucas.

It has been necessary to re-establish the research training courses as the faculty members previously responsible for the programme are no longer employed at the school in Aarhus. This has allowed professor Verbeke to set up a new direction based on his previous experiences with a stronger emphasis on research by design. Since October 2013, the PhD School has set up a series of monthly meetings under the di-

rection of professor Verbeke for an equivalent of 15 ECTS credits. It is scheduled that international experts will contribute to these seminars. Moreover, twice a year, the School organises a VIVA during which PhD students present their work and a peer-review panel critically comments the results and process. This clearly contributes to the quality of the research work. The course focuses on developing research skills and a critical attitude amongst the PhD students. It includes discussions on meta-level developments in the field through reading important chapters from recently published books on research developments as well as research methods (action research, case studies, ...). Seven new PhDs were enrolled in the autumn of 2013 and have been grouped together in shared office spaces. Across quite different themes they all incorporate research by design elements into their project. The new courses and the shared framework has reinvigorated the PhD programme and recreated a sense of enthusiasm.

Since 1st January 2013 the School is also partner of the ADAPT-r (Architecture, Design and Art Practice Training-research) project (see www.adapt-r.eu). This is one of the largest undertakings in architectural research training ever. The project is funded under the 7th Framework of Research of the European Commission. Partners in this project are KU Leuven, Faculty of Architecture Sint-Lucas (who is coordinator), Aarhus School of Architecture, RMIT (Melbourne, Australia), University of Westminster (UK), Glasgow School of Arts (UK), Estonian Academy of Arts (Tallinn) and University of Ljubljana (Slovenia). The project focuses on interacting with architectural, art and design practices to develop Creative Practice Research. Training activities are scheduled on a bi-annual base in Ghent, Belgium (hosted by KU Leuven, Faculty of Architecture Sint-Lucas) and Barcelona, Spain (hosted by RMIT Europe).

Conclusion

The PhD programme at the Aarhus School of Architecture is currently in a very positive and optimistic phase. There is a lot of enthusiasm. New initiatives have been introduced and there is a strong sense of community among the newly enrolled PhD students. The structure and content of the PhD programme is still developing and not all have found its form yet, but the energy of taking part in establishing something new overshadows the frustrations of occasional problems.

Obviously this does not mean that there are no challenges. It continues to be difficult to run a quite small PhD programme (currently 17 PhDs). With the limited number of students it takes a long time to develop the skills and experience of supervisors even though the situation gradually improves as more and more of the senior staff now has obtained PhD degrees. Organised supervisor training actively remedies this situation too. There are also plans of setting up regular meetings between the supervising staff in order to exchange and learn from individual experiences. The limited size of the programme also makes it highly dependent on a very few individuals which means that it is quite vulnerable to personnel issues. The yearly recruitment of PhDs equivalent to 1-4% of the graduates from the master programme makes it quite difficult to establish the PhD programme as a natural third cycle alongside bachelor and master programmes. It is unlikely that the internal PhD funding will increase sub-

stantially; therefore an increase of volume will have to happen through other means. One option is obviously to look for more external funding, particularly through European sources, which has so far not been explored thoroughly. Another is to increase the number of practice-based PhD where research is conducted on the basis of successful and exploratory practices. Industrial PhDs (PhD projects where PhD candidates spent 50% of the time in industry (architectural offices) and 50% in academia) is currently another underutilised option.

Internationalisation is another challenge. The historical account shows that there has been awareness of the importance of internationalisation from the very beginning of research education at the school. Yet it has been difficult to incorporate the desired level of internationalisation in all cases. It has been uneven at best. Part of this has probably to do with a general lack of international networks among many supervisors. This has made it more difficult for PhD students to find a relevant institution and get accepted for research exchange. Another reason has probably been that quite a few PhD candidates have some years of professional experience prior to their enrolment, which is on the one hand a quality, but on the other hand means that they have often started families and are less willing to move away for longer periods. Many PhDs have previously been writing in Danish so language barriers may also have limited the exchange. However, the reorganised PhD programme has initiated a stronger international profile. PhDs are strongly encouraged to write in English. There is currently a policy to stimulate PhD students to attend international conferences in the early stages of their PhD in order to begin publishing in English as soon as possible and build international networks and (re-)establish Nordic networks.

The role of artistic research in the PhD programme is yet another challenge. Artistic research is not well developed or established in a Danish context. The brief history is that the Ministry of Culture (under which the Aarhus School of Architecture was placed until 2011 when it was moved to the Ministry of Higher Education and Science) made a report on research in 2009. The report described a general research strategy for the institutions under the Ministry and emphasised the need for common research criteria. As a consequence the report excluded artistic research or artistic development work ('künstlerisk udviklingsvirksomhed' as it is called in Danish). A new commission was established to clarify the concept further. The resulting report was presented in 2012. It opted for a fairly open-ended definition of the term artistic development work inviting further definitions by relevant institutions in relation to the traditions and contexts they were operating in. The report did not offer any institutional framework to support artistic development work such as a third cycle education equivalent to a PhD, thus leaving artistic development work in an institutional limbo marginalised out of research yet without any specific support structure. The Aarhus School of Architecture already has a number of PhD dissertations that successfully include elements of design-based and artistic research, proving that the straightforward division between scientific and artistic research is far from simple. It will be important to develop and challenge the notions of research and artistic development work in the coming years to make it possible to adhere to Danish research policies within the field

while at the same time developing frameworks that can qualify the more artistically inclined researchers.

We hope that the above information and reflections will be of use to the reader but also for others in furtherance of the development and establishment of architectural research. As has been described in the different phases, the Aarhus School of Architecture evolved from initial efforts to develop research education towards a School where the PhD School is active through many activities for PhD students, hence, developing a fertile climate for PhD education.

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Doctoral Training in the Oulu School of Architecture, Finland

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Finland

The Oulu School of Architecture (OSA) is the Faculty of Architecture at the University of Oulu, Finland¹. The University of Oulu is an international research university which creates knowledge, innovation for the future, and well-being through multidisciplinary research and education. The University of Oulu studies people and culture in a changing living environment, as well as opportunities that new technology provides for improving the well-being of people in the environment. The University of Oulu has a multidisciplinary expertise in Northernness.

Founded in 1958, the research and education community of the University of Oulu consists of 16 000 students and 3000 employees, and it is one of the biggest and the most multidisciplinary universities in Finland. The nine faculties, the departments and the specialized research units of the University of Oulu create a solid foundation for multidisciplinary research, innovation and the training of experts for demanding professional tasks.

This article presents the doctoral education offered by the Oulu School of Architecture in the context of the University

of Oulu, and its vision for the future of doctoral education. We focus primarily on the aims of doctoral education and research at the OSA, but discuss our researchers' profiles and the impact of their work as well.

The Present State of Doctoral Education at the OSA

The World's northernmost school of architecture, the Oulu School of Architecture (OSA), the Faculty of Architecture of the University of Oulu, was founded in 1959. With its 300 undergraduate students, the OSA is one of the three Finnish university level architecture schools, and a vital and dynamic unit within one of Finland's largest universities. The yearly intake of undergraduate students is 40, with an added 5–10 international Master's degree students and around 20 international exchange students. The yearly aim is to produce 30 graduating Master's level students and three doctoral dissertations. A special feature in Finnish architectural education is that both architectural design and urban design and planning are included in the Bachelor's and Masters' degree syllabi in architecture.

The Oulu School of Architecture is a part of the University of Oulu, and all the administrative actions of the whole university concerning doctoral education are centralized to the University of Oulu Graduate School (UniOGS). The main goal of UniOGS is to provide the framework and conditions for high-quality, research-driven doctoral education for all students of the University of Oulu. By promoting the development of effective student-supervisor relationships, founded on both motivation and commitment, UniOGS aims to create a favourable environment for the planning, execution and timely completion of doctoral education tailored to each student. Within UniOGS, students acquire a proficiency to work at doctoral level tasks (UniOGS, 2013).

The duration of the doctoral training corresponds to four years of full-time study, but it can be completed in a longer time in the case of part-time work. The doctoral degree includes research work for the thesis, peer-review processes, the publication and the public defense of the thesis, and, in case of discipline of architecture, 40 ECTS credits of structured studies and/or other research-related activities². The goal of the studies is to deepen the graduate student's knowledge of his/her own field, and to develop his/her general knowledge and skills necessary for a successful career (UniOGS, 2013).

The doctoral dissertations in architecture have so far been presented in the form of monographs. This has been the case not only in the Oulu School of Architecture (OSA), but also at other schools of architecture in Finland (Aalto University and Tampere University of Technology). The doctoral dissertations have been conducted in graduate schools, or even more typically, alone without the support of a research group. The postgraduate students are encouraged to write doctoral dissertations based on articles in order to start publishing in an early phase during their doctoral studies. Today, there are several (3–5) doctoral dissertations underway that are based on peer reviewed articles, and conducted in research groups.

All doctoral students must have a principal supervisor, who is responsible for guiding the student throughout the doctoral training. The principal supervisor must be a professor, a docent, or a person with equivalent competence, as evaluated by an ex-

ternal review process. Students can have one or two co-supervisors if needed. Co-supervisors may be post-doctoral researchers, or of a higher merit. At least one of the supervisors must work at the University of Oulu, or be a docent at the University of Oulu (UniOGS_supervision, 2013.)

The supervisors must reserve sufficient time for each of his/her doctoral students, ensuring that each of them receives the necessary help and support, both for the planning, and for the implementation of their studies and research, and when writing the doctoral thesis. The supervisor(s) and the student must be committed to the completion of the degree within a time equivalent to four years of full-time study. The principal supervisor is responsible for ensuring that the student submits and presents his/her full doctoral training plan within one year following admission to UniOGS, and that the planned schedule is implemented (UniOGS_supervision, 2013).

At the moment, the Oulu School of Architecture (OSA) has a Doctoral Programme (2014–2017) in Architecture called *Sustainable Built Environment*, led by professor Anna-Maija Ylimaula. Doctoral programmes or graduate schools, as they were called earlier, usually offer both doctoral training and funding for doctoral studies. Previously, the OSA has been a part of either national or multidisciplinary graduate schools: *Modern Wooden Town—National Graduate School of Timber Construction and Design* (2003–2012, multidisciplinary) led by professor Jouni Koiso-Kanttila (OSA); *National Graduate School of Architecture* (1995–2002) led by professor Kaisa Broner-Bauer (OSA) *Future Home graduate school* (1999–2002, multidisciplinary) coordinated by UIAD / professor Ylimaula and *Graduate School in Milieu Construction* (1994–1996, multidisciplinary) led by professor Ylimaula. Doctoral student positions in architecture have been mainly funded by the Academy of Finland or the Finnish Funding Agency for Technology and Innovation (Tekes).

In addition to the doctoral training programme offered by the doctoral programmes or graduate schools there is an established annual course Research and Theory 2–10 cr, led by professor Anna-Maija Ylimaula. The course Basics of Research Design 2–10 cr, led by Dr. Aulikki Herneoja, was piloted in autumn 2013. The main emphasis in the course was on inter- and transdisciplinary research related to architectural design and urban planning. Also the University of Oulu Graduate School (UniOGS) offers general doctoral studies (UniOGS_courses, 2013) such as *Introduction to UniOGS, Research ethics, Basics of university pedagogy for doctoral students, Research plan & seminar, Information skills for doctoral students, Communicating science to the media, general public and decision makers and Using QSR NVivo 10 in qualitative research and Scientific Communication*.

There are several (3–5) doctoral students employed currently by the OSA in the Oulu School of Architecture. These doctoral students are required to take part in teaching bachelor's and master's level students. These duties cover 450 hours of a total of 1600 hours of the doctoral student's working hours per year, and the amount of teaching work varies during the semesters. By comparison, the doctoral students funded by the Academy of Finland are allowed to teach only 5% of their total working hours.

At the OSA there are also 2–4-year-long research-projects in which doctoral students are employed. These projects are usually funded by the Academy of Finland or the Finnish Funding Agency for Technology and Innovation (Tekes), for instance

KLIKK—User and business based renovation concept for suburbs (2012–2014), DILACOMI—Different Land Use Activities and Local Communities in Mining Projects (2011–2013), INURDECO—Integrated Urban Development Concept (2013–2014), PUDAS—Participatory Urban Design Support with Advanced Information Technology Environment (2009–2011), AUL—Adaptive Urban Lighting. Algorithm aided lighting design (2011–2013), SparkSpace—Adaptive lighting control with multi-channel ambient sensing (2011–2014) and UbiMetrics—Multidisciplinary Framework for Evaluating Ubicomp Systems in Real-World Urban Settings (2011–2014). Even though the themes of research projects vary, the common feature is that all of them are more or less dealing with research by design or at least studying design and/or planning as a very central part of the research. Doctoral students also have the possibility to apply for funding from private foundations that offer three year long grants, such as the Finnish Cultural Foundation, Jenny and Antti Wihuri Foundation, Alfred Kordelin Foundation, Emil Aaltonen foundation and Kone Foundation.

The Development Trajectories of Doctoral Studies in the OSA

The University of Oulu has established a university-wide graduate school (University of Oulu Graduate School, UniOGS), which was launched on 1 Aug 2011. The main goal of UniOGS is to provide a framework for high quality education for all doctoral students at the University of Oulu. This implies the adoption of some standardized practices for doctoral education at the University of Oulu, which are expected to lead to changes in the application process for the admission of students, the study requirements, the supervision, the follow-up processes, and the processes related to the doctoral dissertation. (UniOGS_admission.)

Before UniOGS, doctoral training and its administrative management were mainly conducted by each discipline or department itself. It was commonplace in the OSA that the doctoral students came up with a research topic on their own, and the supervisor's role was to help them to conduct research to be appropriate for the research question at hand. Nowadays it is becoming ever more common that professors and/or postdoctoral researchers build research project applications, and the doctoral students are recruited to the project once the funding is confirmed. Research projects are also being conducted based on the expertise of the doctoral students. In these cases the doctoral students also take part in the funding application process.

The increase in the amount of research projects has also had an impact on the strategic guidance of research in the OSA. The research topics used to be fairly disjointed while doctoral students formed the research questions based merely on their personal interests. Now the research projects are more strategically planned. However, this more individualistic approach is still accepted, and research groups may suggest new projects to the Academy of Finland for funding.

The Bologna process has influenced doctoral training indirectly, especially the length of the doctoral studies and the age of the doctorate students. Earlier on, doctoral students were older and they studied longer. Now the trend is that doctoral students are younger, and their aim is to finish doctoral studies in the determined four

years period of time. The PhD is considered to be more a start of the researcher's career rather than the end of it.

The Bologna process has also raised discussion concerning research skills in Bachelor's and Master's level studies and how these skills are recognized and taught. At the Oulu School of Architecture we are now more aware of the skills required in academic research work, and how they are intertwined with the design-oriented basic studies of architecture.

Otherwise UniOGS and the OSA follow the EU's seven principles based on the Salzburg principles. These seven criteria are: Research Excellence, Attractive Institutional Environment, Interdisciplinary Research Options, Exposure to industry and other relevant employment sectors, International networking, Transferable skills training and Quality Assurance (UniOGS_seven principles, 2013).

Doctoral Education in Relation to Architectural Practice and Society in the OSA

In Finland, universities have three basic tasks: to promote free research and academic and artistic education, to provide higher education based on research, and to educate students to serve their country and humanity. In carrying out this mission, the universities must promote lifelong learning, interact with society at large and promote the impact of research findings and artistic activities on the society (Universities Act). In terms of these basic tasks of the university, the doctoral dissertations and research in the Oulu School of Architecture relate to architectural thinking and creating.

Applied research based on or using design and planning interacts with the current trajectories occurring in the architectural and urban design and planning practices. In studying the design processes, the experience of the architectural research and design profession will provide invaluable knowledge; after all, in architecture, "design is the essential feature" (EAAE 2012). The term *research-by-design* means any inquiry in which design is the substantial constituent of the research process. In research by design, the architectural design process forms the 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. (EAAE, 2012.) In the OSA, EAAE's approach is approved, but also more traditional way of conducting academic doctoral thesis and research is accepted. The basic research approach is also valued as a consolidating factor for the grounds of architectural research and discipline more generally.

Being aware of the changes in architectural practice, the role of research by design is to create novel insights and develop renewed approaches for designing and planning. Most of the teachers at the OSA have a background in working in the field of either architectural design or urban planning. Also many of the doctoral students have work experience in architectural practice. As such, a practice based research approach is quite natural. The recent trend seems to be to direct towards research themes that are intertwined with questions closely related to design and planning work. The research conducted in the OSA offers practitioners new applicable ways of dealing with

complex questions at hand. In fact, some doctoral dissertations have aimed towards forming a novel theory of design and planning, e.g., on integrative urban redevelopment work or the design of winter cities or adaptive lighting solutions. Now, the question is not merely how research can benefit practice; but how architectural design and urban planning practice benefit the research and the researchers who graduate from the OSA.

New architectural design and planning methods are beneficial in both educating new professionals, expediting the research of design and planning itself, and helping the surrounding society to develop. The latter impact is gained through choosing research topics that affiliate with architectural designing and planning in our northern built environment for wellbeing. In addition, several research projects are being carried out in collaboration with nearby city organizations and local enterprises. The current basic university mission has also placed emphasis on the importance of cross-disciplinary research. New participatory design methods, different methods of action research, co-creative and co-design methods, applied ethnographic methods such as cultural probes, and mixed methods are applied and developed in the research conducted in the interdisciplinary and transdisciplinary research projects and doctoral dissertations conducted at the OSA.

As an example of the recent interdisciplinary research projects is DILACOMI—*Different Land-Uses and Local Communities in Mining Projects* (DILACOMI 2011–2013) led by professor Helka-Liisa Hentilä. The project DILACOMI was an interdisciplinary research project funded by Tekes, the Finnish Funding Agency for Innovation. Tekes is the most important publicly funded expert organisation for financing research, development and innovation in Finland with almost 600 public research projects funded each year. The project was part of the Green Mining Programme. Co-financers of the project were several mining companies and municipalities. The research partners were University of Lapland (environmental law, social science), University of Oulu (architecture and urban planning, cultural anthropology) and Finnish Forest Research Institute Metla. The project employed three doctoral students: one from the discipline of architecture and urban planning, one from environmental law and one from social sciences. In addition, post doctoral researchers and master level students were involved.

The aim was to research how mining affects local land use and communities, and how regulation and best practices can be used to steer mining toward social sustainability. In Finland the exploration and mining activity is currently high, and many global companies are in the haunt of raw materials like nickel, gold and platinum. This has caused some tensions on the local level although new industries and ways of livelihood are needed, too.

The project produced not only academic output like theses, but also a handbook meant for the stakeholders in different mining projects. In order to get relevant results, the project needed to be in continuous contact with surrounding society and stakeholders. The project consortium had, therefore, a common steering group with expert participants from private companies (mining, law), municipalities, state agencies, regional authorities and NGOs. Totally seven seminars throughout the three-year long project were organized where doctoral students and other researchers presented research results of their work and got feedback from the experts. The steering group

was very active, supportive and gave valuable comments. They did not get any financial support from the project. Despite of active interaction with stakeholders, the project results and publications follow academic standards and requirements. The backbone was a well-defined research plan where various WP:s and activities were formulated. With that in mind, it was easy to declare the roles of different parties.

In addition, couple of interdisciplinary research seminars for the research partners were organized. The aim of them was to give a chance for the doctoral students to get feedback from the professors and senior researchers from different disciplines. Also one open seminar with master level students as an audience was organized in order to give the doctoral students a chance to act as lecturers and to intervene with younger students. This aided also in recruiting new doctoral students.

The Architecture School of the University of Oulu arranged also a pilot program in the fall of 2012, where students focused on interactive planning of a village with planned mining communities in immediate vicinity of the village (Hentiä & Soudunsaari 2013).

Another example of a research project that is interdisciplinary by its nature is AUL—Adaptive Urban Lighting. Algorithm aided lighting design (2011–2013) led by Dr. Aulikki Herneoja, funded mainly by the Academy of Finland. Even though all the researchers are architects their roles differ from each other drastically. Architect Henriikka Pihlajaniemi is architect and lighting designer, who is finishing her doctoral thesis about adaptive lighting and Toni Österlund is architect and doctoral student who is specialized on algorithm aided design, nowadays also studying programming. In the project also students of architecture Tuulikki Tanska and Anniina Valjus have been working as research assistants. Especially Tanska's skills in programming has been very valuable.

In the AUL research project the process of designing and realizing the temporary lighting installations was used as a research setting to develop design methods and tools (VirtuAUL; example of an innovation, explained later in this chapter) for designing adaptive lighting in urban space, and to understand the multifaceted experience of adaptive and interactive urban lighting. During the years 2011–2013 there have been carried out three real world lighting demos (LightStories, Urban Echoes, Snow-Light), which explore interaction with lighting in different urban contexts and with different thematic approaches.

In the LightStories case project (<http://www.valotarina.fi/en/>), lighting was approached as a participatory, interactive, and communicative element of public urban space. The main concept of LightStories was to introduce a part of existing public street lighting as a forum for personal narratives, messages and greetings. The LightStories project was designed and realized during autumn and winter 2011–2012. User participation in lighting design was enabled through an easy-to-use web interface which was designed and built in the project.

Urban Echoes (<http://www.kaupunkikaikuja.fi/>) was a temporary park lighting installation, which provided urban information expressed in the form of dynamic lighting for the users of the park. Through mobile devices, people could make inquiries about current events and the real-time activity levels of different districts of the city centre, and receive the answer in a visualised form, as lights playing on the surfaces of

the paths and the surrounding trees. The same information was readable as graphical and textual representations on their mobile devices through QR-codes and web links. Besides this device-based interaction with lighting, also interaction between the park users and the lighting was created by applying a network of movement sensors. The demo was running 2–4/2013, and it was evaluated with the help of online and printed questionnaires, and with interviews on site and in remote locations.

The SnowLight demo (<http://www.adaptiveurbanlighting.fi>) was a part of “Snow-world”-playable installation – a construction made of snow and ice – on a market place of Oulu. Our light installation was controllable by visitors by the public touch screen situated on the market place, which allows the users to choose colours for the RGB-lights in the installation. In addition, the lighting interacts as animation patterns with people climbing up the wall and sliding down the snow hills. The demo was running during 2–4/2013.

The AUL project contents have so far been published in 12 publications of which six are refereed international publications. The research project has been communicated also for the professional audience, architects and lighting designers, in two articles in *Valo* magazine (Pihlajaniemi et. al. *Valo* 1/2011; Pihlajaniemi et. al. *Valo* 1/2012). And there are still two articles in peer-reviewing process and four in writing process.

Future innovation is about seeking, utilizing and applying new knowledge. Innovations or insights are developed in interaction with the surrounding society and various stakeholders in practice. In the architectural discipline, we prefer to seek for new insights into architectural design and planning rather than innovations, because pure innovations to be patented occur quite seldomly in the discipline of architecture. Thus, innovativeness is based on need for new solution, more precisely, on need for new approaches and problem settings.

One example closest to an innovation accomplished in OSA though, is the VirtuAUL, an adaptive lighting design tool, a program that allows the design and simulation of adaptive processes in a graphical two-dimensional environment. VirtuAUL implements an adaptation process that is based on the design and control of network-based agents. Using the tool, the designer can define the network topology, where lights and sensors act as nodes. Sensor nodes emit agents that operate within the network and the lights react to their energy and color. The design tool allows for the mouse-based manipulation of the agent parameters as well as various environmental factors (such as the time of day and time speed, temperature, sky luminance, surface luminance, etc.). The VirtuAUL was created, has been tested and used in all the real world demos in the Adaptive Urban Lighting research project (2011–2013). At the moment the VirtuAUL has also been used in designing and controlling lighting in a real world retail environment lighting pilot project in the Tekes-funded SparkSpace research project (VTT together with OSA).

New Collaborative Structures Relating to Doctoral Education in the OSA

The Research Assessment Exercise (RAE2013) was carried out at the University of Oulu by UniOGS in 2013. For RAE2013, new interdisciplinary and transdisciplinary research communities (RC) consisting of research groups (RG) were established. Two research

groups from the OSA attended the multidisciplinary *LUMINOUS—Sustainable Northern Communities: Integrating smart systems, structures and change* RC led by Eva Pongracz from the Thule Institute (Thule Institute). The LUMINOUS RC consisted of 11 research groups led by private investigators (PI), altogether 120 researchers by the common aim to investigate sustainability of northern communities through multidisciplinary and interdisciplinary research. This requires dealing with sustainability, equality, equity, safety and well-being in the changing North, both for individuals and communities. In the light of these challenges, LUMINOUS will bridge the gaps between the life cycle of the Northern built environment and human well-being, and develop smart systems, structures and solutions that respect the diversity of the North and use a participative and integrative approach (LUMINOUS).

The two research groups participating in the multidisciplinary LUMINOUS RC were *Smart City* and *Smart Architecture*. The Smart City RG coordinated by professor Helka-Liisa Hentilä provides expertise on integrative, ICT supported participatory planning practices and processes. The research group is experienced in planning for physical activity and citizens' well-being, as well as in regional and rural development and policy, and the use of GIS in regional research. The Smart Architecture RG coordinated by Dr Aulikki Herneoja focuses on adaptive lighting, techno-spatial relations and ethnographic studies, and it will provide information on the integration of different objectives within the architectural design concept, computerized manufacture that benefits the building design and construction process automation.

On a daily basis, working together in the same space promotes academic discussions and true interdisciplinary and transdisciplinary research. For instance, at the moment, a multidisciplinary workspace called The Urban Life Lab (ULL, since 2012) exists at the Oulu School of Architecture, where doctoral students and post-doctoral researchers of architecture, cultural anthropology and computer science are working within their own research projects, but sharing common research interests and publishing articles together. In September 2013, ULL generated the first research application to the Academy of Finland call under the title *Piercing the City. Building transdisciplinary theory and methodology for digitally augmented public urban places through reflexive co-design processes*, led by Dr. Aulikki Herneoja.

Another example of a transdisciplinary collaboration is *The Digital Design & Research community* (DDR, since 2009, leading figure architect Toni Österlund) founded by doctoral students in architecture, architects and students of architecture who share an interest in the new possibilities that algorithmic design methods and aspects that parametric modeling offer for architectural design. Since 2012, the DDR community has been collaborating with Mathematical Sciences and Mechanical Engineering (structural engineering and construction technology) by arranging interdisciplinary workshops for Master's level students. In September 2013, architects, structural engineers and mathematicians produced the first joint research application to the Academy of Finland call under the title *Biomimetic Architectural Structures. Interdisciplinary approach to building design processes for performative and sustainable structures through biologically inspired systems and algorithm-aided design methods* led by professor Mikko Malaska, Structural Engineering and Construction Technology, Department of Mechanical Engineering, University of Oulu.

In addition, the OSA takes part in national collaboration schemes. There are three architectural schools in Finland: the Oulu School of Architecture at the University of Oulu, the School of Architecture at the Tampere University of Technology, and the Department of Architecture at the Aalto University School of Arts, Design and Architecture. Every year, one of the schools of architecture hosts the Annual Symposium of Architectural Research, either as a national event or a Nordic/international conference. In addition to the three architectural schools, other organizers of the symposium include the Department of Real Estate, Planning and Geoinformatics/YTK, Aalto University School of Engineering, Espoo and the Finnish Association of Architects SAFA. In some years the Nordic Association of Architectural Research (NAAR) has collaborated in organizing the Symposium as well. These symposia have been arranged since 2009 on an annual basis. So far it has not been possible to arrange The Annual Symposium of Architectural Research within the universities' regular budget funding, instead symposium needs external financing, typically a scholarship applied by a workgroup from the organizing school.

The aim for the Annual Symposium of Architectural Research is to establish research as part of the architectural discourse. It is exceptional that national universities together are able to arrange this kind of a high quality annual research event. The symposium is an arena for researchers to disseminate and discuss current issues with researching and practicing colleagues. For doctoral students, it is a place to join in the discussion, practice their presentation and networking skills and to get peer-reviewed articles published for their doctoral theses.

The aim is to regularly publish a volume of proceedings of each Symposium to establish it as a viable research event. The full papers (peer-reviewed and non-reviewed; the status of each paper is mentioned in the publication) will be from now on published in electronic format via an architectural research periodical using the Federation of Finnish Learned Societies' Open Journal Systems (OJS) -publishing platform (TSV_OJS, 2013) and/or The Nordic Journal of Architectural Research. The aim of the publication is to fulfill the criteria of the Finnish Publication Forum Project (JUFO, 2013) to receive recognition at the basic Level 1, which is the first level that fulfills the scientific criteria.

The Strategic Significance of Publishing

Publications are a significant part of communicating the results of research inquiry. However, the strategic role of publishing the research work will be emphasized ever more because of the Universities Act. Nowadays, OSA depends on academic publications as one of the bases of monetary funding for providing education of future architects. These publications need to match the criteria (JUFO, 2013) of the Ministry of Education and Culture (MEC), since it is responsible for allocating government funding for universities. The MEC provides formula-based core funding to universities for the performance of the duties laid down in the Act, but at the same time, it takes into account the extent, quality and effectiveness of the operations and research policy objectives. The MEC may also grant performance-based funding to universities on the basis of good performance. The universities must provide the MEC with the data

necessary for the evaluation and steering in a manner determined by the Ministry (Amendment 954/2011).

When striving to fulfill the criteria of the MEC, especially post-doctoral research and publishing will be highlighted, but research conducted by doctoral students will complement the strategic palette of research at the OSA. This will probably lead to specialization; there will be a few research groups focusing on certain research themes. In OSA, this expertise will mostly concentrate on researching and publishing different aspects of architectural design and planning work. Doctoral dissertations have to fulfill the standard of passing through a peer-review process, as stated by University of Oulu Graduate School (UniOGS). So far the dissertations have adapted to the traditional academic publication format. The research topics, such as innovative insights into architectural design and planning work and the methods of design and urban planning research, are now challenging the traditional publication format.

The Oulu School of Architecture has also conducted preliminary work for creating a table form depiction of how various sorts of scientific and artistic publications could be comparable to each other in the sense of valuing them equally. In this regard, artistic publications, such as winning entries in international open competitions, peer-review exhibitions and pieces of architectural design published in the distinguished journals, would gain a clear standing in the academic world. But the comparison proposal of scientific and artistic publications has remained a proposal. Instead, the quality of both types of publications will be systematically ranked and compared within their own category.

The Future Expectations for Doctoral Training and Research in the OSA

The Oulu School of Architecture will fulfill the Seven Principles of Innovative Doctoral Training by EU as mentioned earlier. First of all, we need to increase the critical mass of research-active postdoctoral architects in order to be able to produce a new academic generation of creative, critical and autonomous intellectual risk takers, who will push the boundaries of pioneering research. The doctoral students in architecture should have good transferable skills in order to enable subject-related skills, such as designing and/or planning skills, and research-related skills to be applied and developed effectively together. Our aim is to stress the importance of an open research environment and culture for the doctoral students to ensure that any appropriate opportunities for cross-fertilisation between disciplines can foster necessary breadth of scope and interdisciplinary approach. The doctoral students should see interdisciplinary and transdisciplinary approaches as viable means when encountering versatile challenges of research dealing with or conducted in real world surroundings.

Research in architecture schools is often equaled to doctoral studies or a doctoral dissertation. For a researcher, the doctoral dissertation is the beginning of an academic career. In the future it is very important to establish and strengthen the habit of working in themed research groups where a doctoral student can work together with post-doctoral researchers and research assistants (students about to complete their Master's studies). Furthermore, making research visits to international high quality universities in different phases of the research career is an important part of research

life. In this way we can offer peer support to the doctoral education and most importantly, will strengthen research processes integrated to architectural schools and their teaching.

The interdisciplinary research environments are mainly built based on the funded research projects. Without exception the funding for these projects is competed, to be applied for example from the Academy of Finland, Tekes (together with funding from enterprises) or the EU. Especially at national level the amount of funding available is decreasing and the amount of applications is increasing. The main challenge in keeping up the interdisciplinary research environments is to ensure the continuity of the funding. The financiers do not usually grant funding for continuing existing projects but for projects that seek new perspectives or angles of incidence.

Having graduated, a doctor will work in a research group as a senior researcher and will begin by either taking a leading position in the group or creating her/his own research group by applying for funding for new projects. One possibility for the future career of a post-doc is a *tenure track* position, a well-supported academic career path leading, after a trial period, usually to professorship. At the moment we do not have any tenure track positions at the OSA. The traditional way is to directly apply to professorships and other leading positions in a university in Finland or abroad.

The doctoral dissertation, coupled with research experience, also qualifies a student for directing research outside the universities, at research institutes or in the area of research and development in the industry. But conducting a doctoral thesis may also only be a period of time in one's professional life. The research skills gained in the process are applicable also in architectural practice in handling and structuring knowledge in the processes of architectural design and urban planning.

In the future, researchers and practitioners should be ever more cognizant of the rich array of professionals in architectural design, urban planning and development work. Especially the roles of developers—beyond the developer-contractors or designers developing products—would be worth examining in more detail as intertwining the gaps between professionals and their work. A prerequisite for educating a wider set of expert profiles for doctors is the true interdisciplinary and transdisciplinary collaboration with more extensive amount of disciplines related to the sphere of architectural design and urban planning.

Conclusion

The strength and the weakness of the Oulu School of Architecture (OSA) lies on its size, and its position of being part of the science University of Oulu. On the other hand the multidisciplinary University of Oulu sets high standards for the OSA in doctor production and in producing high quality research assessed by the amount of international scientific refereed articles. At the same time the University of Oulu Graduate School (UniOGS) offers framework for doctoral education and sets high quality standards for doctoral study requirements, pre-examination and public defense processes of a doctoral thesis. Though, the challenge is to maintain the distinctive character of doctoral thesis conducted in the field of architectural design and urban planning. Despite this, we see the great benefit of networking with neighboring disciplines in

cross-disciplinary research projects dealing with aspects of design research. As a small unit the OSA has only few dozen doctoral students registered and the active ones are even less. The strength of the OSA is in knowing its doctoral students well and being able to support them with their doctoral studies and doctoral thesis in face-to-face and group guidance sessions. In the long-run the OSA needs to increase the critical mass of doctoral students in order to reach the standards set by UniOGS.

Notes

- 1 On the January 1st 2014 the Department of Architecture, formerly part of the Faculty of Technology became its own faculty. In this article the new name, the Oulu School of Architecture (OSA), is applied throughout the whole text.
- 2 The research-related activities may include: post-graduate or advanced courses; articles approved for an academic conference (peer-reviewed), which the student will present at the conference (the article may have multiple authors; supervisors will estimate the division of responsibilities), a reviewed journal article (peer-reviewed journal), or a refereed article in an academically compiled work (mentioned on the Publication Forum) that has been peer-reviewed. If the article is included in an article-style dissertation then it is not given any credits. Also participating to academic meetings, research visit or arranging conference credit doctoral student, but then a report of the event is required.

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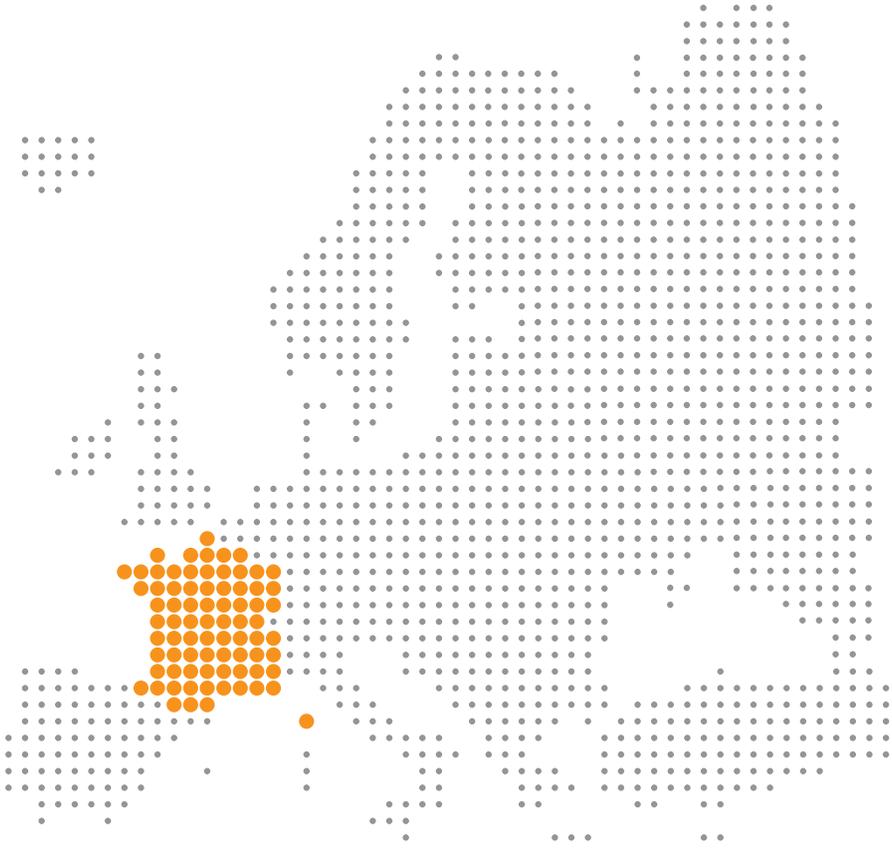
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FRANCE



School of Architecture, Lyon

We Began, we Progress and we are not alone

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ENSA Lyon

We shall here attempt to explain our positioning on two plans. At first, we shall clarify briefly the implementation of doctorates in architecture at the ENSA Lyon, and then describe the various modalities of the doctoral education which our PhD students carry out.

The doctorate of architecture in France is a very recent creation, as the Universities National Council (CNU) recognized the discipline structure as an academic discipline only since 2005. This recognition was translated into a text, which reformed the studies of architecture in France, having dedicated the implementation of the DML (Doctorate, Master, License) system, stemming from the process of Bologna, for 20 superior national schools of architecture in France.

On this occasion, the discipline “architecture (its theories and its practices)” was placed within the section 18 “ART”, with other already present disciplines: decorative arts, plastic arts, performing

arts, epistemology of the art educations, aesthetics, musicology, music, sciences of art.

Lyon took part in the group of twelve schools that set up the doctoral level in their program today. Every school made it differently. Indeed, French ENSAs are managed by the Ministry of Culture and not integrated into the university system. Doctorates are only delivered by the University. Every school of architecture had to determine with a present university on its site whom to and how to be attached and to set up the co-delivery of doctorates in architecture.

These associations were made through the Doctoral Schools (ED), which were organized by universities in 2006 and which aim exactly at gathering universities around several disciplinary large sets.

Lyon School of Architecture asked to join Lyon 2 University, within a multidisciplinary doctoral school that puts together different schools. Nowadays, the Social Sciences Doctoral School numbers 483 (ED 483) and they:

- Gather several schools, accommodating the scientific teams capable of framing the PhD students: Lyon 2 university (carrying the doctoral school), Lyon 3 University, Jean Monnet University, Superior teachers' training college (ENS), Applied Sciences National Institute of Lyon (INSA > these school are co-accredited) and the ENSAL > we are only associated, because we are not part of the ministry of research and superior teaching.
- Manage eight disciplines: history, geography, urban and landscape development, town planning, archaeology, political sciences, sociology, anthropology.
- Carry seven doctorates: history / languages, history and civilizations of the former worlds / sociology-anthropology / geography - urban and landscape development - town planning / political sciences / demography / architecture.

This type of grouping is typical: the majority of the other ENSA (écoles nationales supérieures d'architecture), asked and obtained their connection with an ED directed "social sciences", including generally geography, planning and history.

Table 1 is a board counting associations between ENSA and University showing the strategies of every school.

In our doctoral school, we try to make clear to the students, that the doctorate is not only a thesis. It is indeed the central object, but in its duration, they professionalise themselves, with a degree of high expertise.

This philosophy, when applied with our students on the entire doctoral project, contains three modalities of formation:

The thesis that is typically the formation in research by research.

The compulsory doctoral formations are ensured by the university, in two different ways: In their three years, they have to attend forty hours of what we call «professionalisation», to choose from a catalogue of formations offered by the University of Lyon. Moreover, they have to attend eighty hours of formation, to choose in different sequence (general duration of 20 hours) from the catalogue offered by the doctoral school.

Table 1

School of architecture	ENSA Lyon	ENSA Grenoble	ENSA Marseille
Attached University	Université Lyon 2	Université de Grenoble	Université Aix-Marseille
Linked Doctoral school (ED number and name)	ED 483 Sciences Sociales	ED 484 Sciences de l'Homme, du Politique et du Territoire	ED 355 "Espaces, Cultures, Sociétés"

Universities National Council disciplines - Groups and sections

Droit, économie et gestion

GROUPE 1

section 01 - Droit privé et sciences criminelles			
section 02 - Droit public			
section 03 - Histoire du droit et des institutions			
section 04 - Science politique	Science politique	Science politique	

GROUPE 2

section 05 - Sciences économiques			
section 06 - Sciences de gestion			

Lettres et sciences humaines

GROUPE 3

section 07 - Sciences du langage : linguistique et phonétique générales			
section 08 - Langues et littératures anciennes			Langues et littératures anciennes
section 09 - Langue et littérature françaises			
section 10 - Littératures comparées			
section 11 - Langues et littératures anglaises et anglo-saxonnes			
section 12 - Langues et littératures germaniques et scandinaves			
section 13 - Langues et littératures slaves			
section 14 - Langues et littératures romanes : espagnol, italien, portugais, autres langues romanes			
section 15 - Langues et littératures arabes, chinoises, japonaises, hébraïque, d'autres domaines linguistiques			

ENSA Montpellier	ENSA Versailles	ENSAP Lille	ENSA Toulouse	ENSA Nancy	ENSA Paris-Malaquais ENSA Paris-Belleville ENSA Paris-La-Villette
Université Montpellier 3	Université de Versailles-Saint-Quentin-en-Yveline	Université Lille Nord de France	Université Toulouse	Université de Lorraine	PRES PARIS EST
ED 58 Langues, littérature, cultures et civilisations	ED 538 Cultures, Régulations, Institutions et Territoires	ED 473 Sciences de l'homme et de la société	ED 327 Temps, Espaces, Sociétés, Cultures	ED 411 (Fernand Braudel) Perspectives Interculturelles, Ecrits, Médias, Espaces, Sociétés	ED 528 Ville Transports et Territoire

	Science politique				
	Economie Gestion		Economie		Economie
Sciences du langage		Sciences du langage / Linguistique / Traductologie		Linguistique textuelle / Didactique du français langue maternelle	
	Lettre et civilisations	Langue et littérature anciennes		Langue, littérature et civilisation latines / Langue, littérature et civilisation grecques	
	Lettre et civilisations	Langue et littérature française		Langue et littérature française	
Littérature française comparée	Lettre et civilisations	Littératures comparées		Littérature générale comparée	
		Langues et littérature anglo-saxonnes		Langues, littératures et civilisations anglophones	
		Langues et littérature germaniques		Langues, littératures et civilisations germaniques	
		Langues et littérature slaves			
		Langues et littératures arabes et hébraïques			

Table 1 (continued)

School of architecture	ENSA Lyon	ENSA Grenoble	ENSA Marseille
Attached University	Université Lyon 2	Université de Grenoble	Université Aix-Marseille
Linked Doctoral school (ED number and name)	ED 483 Sciences Sociales	ED 484 Sciences de l'Homme, du Politique et du Territoire	ED 355 "Espaces, Cultures, Sociétés"
Universities National Council disciplines - Groups and sections			
Lettres et sciences humaines			
GROUPE 4			
section 16 - Psychologie, psychologie clinique, psychologie sociale		Psychologie sociale et expérimentale / psychologie clinique et pathologique	
section 17 - Philosophie			
section 18 - Architecture (ses théories et ses pratiques), arts appliqués, arts plastiques, arts du spectacle, épistémologie des enseignements artistiques, esthétique, musicologie, musique, sciences de l'art	Architecture	Architecture	Histoire de l'art
section 19 - Sociologie, démographie	Démographie	Sociologie / Sociologie industrielle	Sociologie
section 20 - Ethnologie, préhistoire, anthropologie biologique	Sociologie anthropologie		Préhistoire / Anthropologie
section 21 - Histoire, civilisations, archéologie et art des mondes anciens et médiévaux	Langue, histoire et civilisation des mondes anciens	Histoire	Archéologie / Etudes romanes / Mondes arabe, musulman et sémitique

ENSA Montpellier	ENSA Versailles	ENSAP Lille	ENSA Toulouse	ENSA Nancy	ENSA Paris-Malaquais ENSA Paris-Belleville ENSA Paris-La-Villette
Université Montpellier 3	Université de Versailles-Saint-Quentin-en-Yveline	Université Lille Nord de France	Université Toulouse	Université de Lorraine	PRES PARIS EST
ED 58 Langues, littérature, cultures et civilisations	ED 538 Cultures, Régulations, Institutions et Territoires	ED 473 Sciences de l'homme et de la société	ED 327 Temps, Espaces, Sociétés, Cultures	ED 411 (Fernand Braudel) Perspectives Interculturelles, Ecrits, Médias, Espaces, Sociétés	ED 528 Ville Transports et Territoire

Orange header bar					
Yellow header bar					
		Psychologie			
		Philosophie			
Architecture "Spécialité histoire de l'art"	Architecture	Architecture / Histoire de l'art / Art / Musicologie	Architecture / Histoire de l'Art	Arts plastiques / Arts du spectacle / Musique, musicologie / Esthétique et sciences de l'art	Architecture
	Sociologie		Sociologie Etudes rurales en sociologie, géographie environnement, sciences économiques, sciences de gestion, sciences du développement / Etudes sur l'Amérique Latine		Sociologie
	Anthropologie	Préhistoire	Anthropologie sociale et historique / Préhistoire		
Histoire	Histoire	Archéologie et mondes anciens / Histoire médiévale / Histoire ancienne	Sciences de l'antiquité	Histoire et archéologie des mondes anciens et des mondes médiévaux / Histoire de l'art ancien et médiéval	

Table 1 (continued)

School of architecture	ENSA Lyon	ENSA Grenoble	ENSA Marseille
Attached University	Université Lyon 2	Université de Grenoble	Université Aix-Marseille
Linked Doctoral school (ED number and name)	ED 483 Sciences Sociales	ED 484 Sciences de l'Homme, du Politique et du Territoire	ED 355 "Espaces, Cultures, Sociétés"

Universities National Council disciplines - Groups and sections

Lettres et sciences humaines			
GROUPE 4			
section 22 - Histoire et civilisations : histoire des mondes modernes, histoire du monde contemporain ; de l'art ; de la musique	Histoire		Histoire
section 23 - Géographie physique, humaine, économique et régionale	Géographie, aménagement et urbanisme	Géographie	Géographie
section 24 - Aménagement de l'espace, urbanisme	Géographie, aménagement et urbanisme	Urbanisme	Urbanisme et aménagement du territoire
Sciences			
GROUPE 5			
section 25 - Mathématiques			
section 26 - Mathématiques appliquées et applications des mathématiques			
section 27 - Informatique			
GROUPE 7			
section 28 - Milieux denses et matériaux			
section 29 - Constituants élémentaires			
section 30 - Milieux dilués et optique			
GROUPE 8			
section 31 - Chimie théorique, physique, analytique			
section 32 - Chimie organique, minérale, industrielle			
section 33 - Chimie des matériaux			
GROUPE 9			
section 34 - Astronomie, astrophysique			
section 35 - Structure et évolution de la terre et des autres planètes			
section 36 - Terre solide : géodynamique des enveloppes supérieures, paléobiosphère			
section 37 - Météorologie, océanographie physique de l'environnement			

Table 1 (continued)

School of architecture	ENSA Lyon	ENSA Grenoble	ENSA Marseille
Attached University	Université Lyon 2	Université de Grenoble	Université Aix-Marseille
Linked Doctoral school (ED number and name)	ED 483 Sciences Sociales	ED 484 Sciences de l'Homme, du Politique et du Territoire	ED 355 "Espaces, Cultures, Sociétés"

Universities National Council disciplines - Groups and sections

Sciences			
GROUPE 10			
section 60 - Mécanique, génie mécanique, génie civil			
section 61 - Génie informatique, automatique et traitement du signal			
section 62 - Energétique, génie des procédés			
section 63 - Génie électrique, électronique, photonique et systèmes			
GROUPE 11			
section 64 - Biochimie et biologie moléculaire			
section 65 - Biologie cellulaire			
section 66 - Physiologie			
section 67 - Biologie des populations et écologie			
section 68 - Biologie des organismes			
section 69 - Neurosciences			
GROUPE 12 (pluridisciplinaire)			
section 70 - Sciences de l'éducation		Sciences de l'éducation	
section 71 - Sciences de l'information et de la communication			
section 72 - Epistémologie, histoire des sciences et des techniques			
section 73 - Cultures et langues régionales			
section 74 - Sciences et techniques des activités physiques et sportives			

The doctoral school is new and is carried out by different educational establishments. Clearly, it is still not capable to offer sufficient modules for the 700 PhD students it educates. An important task is now to mitigate these deficiencies. Nevertheless, our students-architects, as well as the other students in other disciplines, do not necessarily see any benefit in these formations. One of the major objectives is exactly that they can meet with their peers from different disciplines. However, they sometimes find that the works or content of studies proposed in these modules are very remote from their immediate scope, or even not at all close to their thesis research.

The third modality of formation/possible professionalization consists exactly in involving them in scientific and educational activities in the broader sense. These activities can show them what could be their role after the completion of their thesis. In other words: "what is of use to my thesis and what professional opportunities does it offer me?".

These activities can be of variable nature:

PhD students can be involved in a research program, including the preparation for the answer to a call of a research project. By getting involved in the life of the scientific team, they can participate in the organization of scientific seminars of research or colloquia. Besides, it can be suggested to them to participate in teachings, under different shape: participate in studio of architectural and urban design, deliver lectures, supervise students, in particular in modules dedicated to the production of reports or memoirs of Master's degrees and research.

Over these three modalities, we should not forget the on-the-job formation, due to circumstances: within the framework of the current restructuring of the research team and also the implementation of the big university project on the site of Lyon/Saint-Etienne, our PhD students live these transformations, understanding in a better way the functioning and the organization of the French research system. The youth of the doctorate in architecture in France explains this specificity: it finally has to find its "place in the family".

On the second series of questions, two notable facts can be mentioned: Actually, the controversy between the so-called academic research and research by design is very intense in the school. The different points of view are not harmonised and, in fact, there is much hesitation on how to prepare the entry of students to doctoral studies, during the master courses.

This controversy is an intern problem and it will not be solved tomorrow. We suppose that it is relatively a classical situation in architectural schools all over Europe. In our particular situation, it is only a local eruption, in a great volcano landscape of the different schools composing our doctoral school.

The D «level» is not organised and managed by ourselves. The basic rules for the management of the PhD students are fixed between the student and the HDR professor. In our doctoral school, the conception of the doctoral studies is very different due to the diversity of disciplines that compose it; the high number of HDR professors and the exigencies of their institution. The goals fixed in each of them are very different if

you depend on a university or on an engineering school, for example. When a student wants to initiate a PhD, in the university of Lyon, s/he signs a doctoral charter, a common text approved by the seventeen different doctoral schools supported by the UdL. This charter fixes the minimum rules and the relations between the student and the HDR professor.

Recently, the new direction of the doctoral school has defined what we expect as this was explain in January 2014, during the ED academic year start session. It is important to understand that doctorates have two components:

- the thesis, which is a product of work, evaluated by a jury
- the doctoral formation, which allows to verify if the student followed the hours of compulsory training among others. These hours of formation are included in a personal way, that we can evaluate through a curriculum vitae.

In this sense, we decided to demand from students, at the end of their course and after writing their thesis but before its presentation, to produce their CV, to appreciate what they have done during all these 3 or in cases 4, 5, 6... years working on their doctorate.

In this sense, it is a good exercise, useful for them and for their future employment and it is a good way to measure how their doctoral years have transform them and prepared their personal strategy for their future career.

We are very conscious that we are at the very beginning of the process in comparison with others countries, that are more advanced in doctoral education in architecture.

The confrontation between the professional approach and academic exigencies demands many years of cohabitation to be productive. We want to be as pragmatic as possible (and in France, it's always a performance). We «do not know». We need time and a more significant number of doctorates in architecture in schools to measure the real statement that we can employ in the doctoral school (we represent less than 1% of all the students who are preparing actually a thesis in the doctoral school).

The school of Lyon counts presently seven PhD students. We can hope this year for the defence of the first two PhD students. We are, thus, lacking background to know if the holders of a doctorate in architecture have a different way of practising architecture (or teaching it, for some of them later).

Similarly, the involvement of practitioners within the research teams of the school is just about to become significant and for the first time this year, several practitioners are strongly involved in research initiatives with the students of the Master's degree. This closer involvement is hopeful towards a significant transformation of Bachelor's and Master's degrees articulating even better and more intensely both formation and research, which is a prerequisite in their future involvement in the doctoral degree.

Since the last academic year, we have proposed incentive measures for the teachers who want to return to or begin a doctorate. We release them from part of their teaching duties. It is a medium-term investment. They can dedicate enough time for a scientific activity and they can imply it in a research team, in our school or in other schools, depending on their disciplinary preoccupation or their personal circumstanc-

es. It is important for us to raise the number of teachers with a PhD, particularly teachers of architectural and urban design.

Our PhD students are still slightly few for us to draw up typological categories of their profiles. But we can notice few things at last:

- they are all architects,
- two of them are still working in their office during their doctorate (like teachers we support in their doctoral project),
- three of them have left their work to dedicate themselves to their thesis full time. After the doctorate, they clearly wish to go back to practice, and dedicate hours for teaching, provided this is possible.
- one of them is preparing for a doctorate, another one is graduate of specialization in heritage restoration at the School of Chaillot. These schools enrol architects who work during their studies. Our PhD student is the first one whose professional activity is the elaboration of his doctorate, as he has a doctoral contract, financed by the Ministry of Culture.
- one of them has an industrial contract of formation by research (CIFRE) with a social housing company. She shares her time and serves the interests of her work between the school and this company.

In conclusion, as the title of this essay indicates, we are at the beginning of our progression. We have to learn from the others but in our personal way.



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For a Doctorate in Architecture¹

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The definition of a “doctorate in architecture” that is to be registered in a post-graduate course of studies “outside the recognized and specified fields of discipline”² subtends two implicit statements: (1) architecture cannot, nor can it be inaccurately, registered in the corpus of scientific objectives constituting these fields and be analyzed according to their methods of investigation; (2) the project, lying at the heart of this specificity, will not only constitute an object of analysis (reflection on a project), but a mode of investigation (reflection by/through the project).

These two statements could be perceived as being somewhat incompatible: can we imagine that research on the architectural field of knowledge (as a project) could be carried out by means of the architectural project in the embarrassing proximity of means and ends? Architectural research has been developed and institutionalized in France since the 1970s, under the domination of the social sciences in the schools of architecture, precisely under this incompatibility. The institution has done everything possible to exclude

the architect-designer/planner/developer from the sphere of architectural research, merely to ensure the scientific recognition of financed works. One might incidentally ask, what may have motivated this change of perspective? Was it a deadline or the pretext of European harmonization that would receive the credit for pointing out our archaic or outdated nature? Or was it not linking architectural teaching to university teaching, a main link which could have been promoted during the 1993 reforms on architectural teaching, which instead experienced the link with the Ministry of Culture, resulting in a perpetuation of the detrimental split among engineers, architects and academics? Or is it the relatively- new question that to obtain the official title of professor requires the recognition of the "real competences of the architect" desiring to obtain the equivalent of what is offered to civil engineers on matter/ materiality in their doctoral formation?

One or several doctorates in architecture?

In view of the difficulty and the existing anxieties in schools and researchers alike connected to positions built on exclusion (one cannot be simultaneously a designer and researcher) the tendency of imagining two types of doctorates in architecture is great, with each approaching, in their methods of conducting research and results attained, the sciences which for many years have "welcomed" architecture: on the one hand, the humanities and social sciences, fundamental research on existing objects; on the other hand, the science of engineering and applied research or experimenting on methods of production, the development of prototypes, where ties with other professionals are essential. Or does the question of a definition of doctorate in architecture call precisely for an understanding of this allocation? Architecture will be closer to these two parallel worlds of research, which is offered by the university and will suffer from the resulting split. On the one hand, architecture will not fully find its place in the field of the humanities and social sciences since it is engaged in the process of conceiving and fabricating a conceptual environment and dealing with the questions concerning it; on the other hand, and almost conversely, architecture overflows with non-technical query the science of engineering. The specificity of the doctorate in architecture seems to make it impossible to draw a calm and steady dividing line between these two realms of research, which in the constituted disciplinary fields run parallel and co-exist without clashing, but between which the effects are limited. Between the sociology of using the object and the appropriate development of the technique related to its mechanism, there is no actual scientific exchange since the architectural project is at times beyond purpose/ use and at other times beyond technique.

The architect transforms a heterogeneous collection of standard data meant for experimentation, without an established hierarchy, even if there was a need for one initially: it is this obscure data present in the project, which is, simultaneously, both irrational and reasonable that constitutes the object of research otherwise referred to as a query into the transformations that the architects impose on the conditions of a structure/ building (must still often create, decide on the playing field), thus involving the material rebuilding of the operation.

Schools immediately reacted when faced with the question of “coloration” or the specialization of future graduates who would obtain in the first 2 cycles, a bachelor in architecture (3 years) and a master in architecture (2 years). The large majority declared one single description, without specialization, at this stage, and without making a distinction between the research master and the professional one. Being aware that this outdated and fundamental split between the “intellectuals” and the «builders»; against which the Architect is defined, is a split which is always readily reopened and orchestrated, efforts developed by the teaching bodies over the last 30 years have availed, not solely to bring to the teaching of architecture the scientific basis, but also to recall that this has contributed to the definition of and need in the architect that what he/she has become is recognized and, at the same time, that he/she has acquired the competency in the two domains as a person that can reason *and* build.

The teaching of architecture and the formation of architects

Architectural thought and pedagogy in schools of architecture reflect this special nature of architectural studies: the constant articulation of the project in the basic and applied sciences, which are said to be the sciences *for* architecture, put at the service of the project and modified accordingly in light of this aim. This also applies to the history of architecture, the history of art, construction, sociology, psychology, philosophy, art practices and, in a nutshell, to all sciences, domains of knowledge and know-how that architecture receives its “nourishment” from.

Every educator who initially adheres to a specific discipline tends to rapidly ask oneself questions on the purpose of his/her teaching that is geared to the future project professional. For example, what history of architecture to teach, where to begin, what periods, in what order, what topics are to be given special consideration, what types, systems, uses? Is it theory, history or the project that is to come into play, etc? When is history not the goal intended for future historians, but future architects? This teaching, from the outset, is profoundly theoretical, affecting both teacher and researcher. The history of architecture, studied from the point of view of the concerns with respect to the formation of architects, deals, first and foremost, with the project and it is with this aim that architectural research finds its specificity.

From this perspective, architecture and its history can be considered as being an accumulation of distinct responses, transformations, renewals, revivals, though often contradictory, and knowledge which each student-architect grasps so as to participate in enriching the discipline as such: the formal, spatial logic devices, the principles of structural theories and/or doctrines, mode of producing and implementing material. The distinction between the history of architecture and architecture carries but a convention which needs to be permanently surmounted and transgressed.³ Moreover, the history of architecture which we deal with is considered more as a corpus of texts and works as an end in itself, even though, thorough investigations in history are necessary that could take the form of monographs or thematic inventories.

One has to simply teach these two different audiences, university students in the history of art (architecture option) and students of architecture (history course) to evaluate the extent to which our teaching has adapted, transformed and evolved in

order to respond to innovative education without affecting the original discipline. The scientific procedure is not diminished here, nor is the rigour of the investigative process, but the questions/concerns are displaced and these questions comprise the methods themselves.

Experience has shown how many young and older architects alike desire to undertake a dissertation / thesis project, often doing so from an intellectual need to understand what makes their discipline work and the conceptual operations/functions they are to manipulate during their studies and their initial work, without actually understanding the fundamentals, theoretical implications and historical background. It is also unnecessary to raise the question of whether it is required, possible or impossible to do an architectural project in a doctorate: the specificity of the doctorate in architecture assumes this to be already in the mind of students trained to produce an architectural project, as they are immersed in this culture, which immediately sets them greatly apart from students who have received a strictly academic course. Undertaking a thesis project is not a normal course of studies for an architect and, not just because the institutional structure has not led him /her to think otherwise since he/she started school.

Without intentionally over emphasizing the training of such an architect, there is still the need to take such formation into account and orient its reasoning in order to evaluate and define what the particularity of the doctorate in architecture is and could be. Presently registered in a recognized field of discipline, the proposed subjects for the thesis in architecture and the methodologies adopted are not less original, but they are regarded as marginal in terms of the universal norms and accepted as such for two reasons: firstly, nobody can competently say what concerning the procedure would be appropriate; in the field of philosophy or aesthetics and sociology, for a long time, professors have led architects to doctoral thesis which referred to processes on project design (conception) and architecture, but not on philosophy, aesthetics and sociology; one often wonders how this discipline has long forgotten its intellectuals. The second is due to the fact that such concerns are more tolerated than accepted, but similarly taken within the constraints of disciplinary questions which are not those of architecture; nevertheless, architects and their questions remain depending on the opening of the doctoral degree program or post-graduate (DEA)⁴ which will include not just architecture, but what's on the margin as well.

Discipline and Multidisciplinary

Another important term for schools of architecture to design the particularity of their teaching and research work, shaded by hybridization is interdisciplinary, which is quite a necessity when not a single independent discipline seems to be able to practice, let alone architecture itself. The notion of interdisciplinary well explains the constant intermingling of the domains that operate within the teaching and research in architecture, while hiding or, at least, not revealing this discipline claimed by architects since the 1970s to be suffering from the ignorance of their own professional environment. For a long time, the question of whether architecture is a discipline has been central to deciding whether architecture could belong to the pantheon of the

sciences of knowledge. However, architectural discipline as part of the knowledge and know-how shared by the community of architects is the license (patent) ; in order to be convinced, one needs only to measure the extent to which the culture of architecture and the project remains greatly misunderstood by other fields of knowledge.

The history of architecture that is taught in schools is not just specific because it addresses itself to future professionals and, for this reason, it fundamentally mixes history and theory, but it is also because it is most consistent: nowadays, no other academic training course is likely to offer an historical and theoretical teaching curricula as complete or comprehensive as could be offered (with few exceptions, perhaps) by all schools of architecture, both in France and abroad, either through specific courses or through the teaching of the project itself, which rich in references and architectural views and reasoning is more or less implicitly transmitted. If we were to highlight the relative methodological weakness of students in schools to elaborate the process of reflection in their domain, this weakness could be compared to that manifested by university students in the area of architecture when they do a specialization and, just as easy or difficult to compensate. The skill or competence of the architect is for him / her to possess the knowledge of his/her discipline, which, even if laconic, will always be superior to that acquired in any other field.

Project and theory design

The definition of the doctorate in architecture is, therefore, precise: the doctorate cannot be anything but an investigation on how to plan a scientific query on the design process in architecture, which includes the culture and fabrication of objects, the culture of the project, the manipulation of tools and scales of the representation. Through this probing, research gets closer to the sciences of design, which is linked to engineers. In this framework, it may quite logically turn out to be necessary to experiment on methods of project design with an understanding of the modes of projecting them. This definition excludes any possibilities other than the architectural project—with program, site and even the “problematics”—that could constitute an admissible subject for a doctorate in architecture. Designing is not scientific query, but an experimentation plan considered as an hypothesis could be subjected to scientific interpretation.

The contrast between basic research and applied research and between the thesis type “humanities” requires a tremendous contribution in order to integrate a culture and knowledge/skills already comprising the object of the research; and the thesis type “sciences of engineering” based on experimentation, which could be taken in the limited time available (3 years) or else it would disappear, should at least be greatly revitalized. The more research maintains this vital link between theory and project, the more it will participate in building the identity of these domains of knowledge and their fields of investigation. However, what countries have succeeded in keeping together these two objectives? In the United States, the question has been dealt with in the following manner: the creation of a *doctorate in architecture*, a year after the *master's* degree, which is complementary to that of the architect (*bachelor's*) has come to highlight the difference, with the traditional PhD⁵ (equivalent to our academic the-

sis) not in any way entailing the project. Christopher Alexander, in the mid-sixties, was close to the acceptable limit⁶ between the two domains of research in preparation for a *PhD* on the “logical research of form” which investigated the “design process” with force diagrams and mathematical descriptions. In Italy, the five, existing doctoral routes do not specify their equivalence. A doctoral student in Palermo, during his/her architectural training in “architecture and project design” (with project) will have little relation with the training created by Tafuri in Venice at the Institute of History and Theory of Architecture (without project).

In an effort to transcend the boundaries between the humanities and sciences of engineering and their corollaries, it would, perhaps, be useful to take an interest in a doctorate in arts and crafts, which combines production and query on a work.

Project theory, and for all projects?

The doctorates in architecture could similarly aim at questioning the evolution of the profession of the architect, such as, among others, the present disappearance of the specificity of the discipline to the point where there is a tendency for architecture to be confused as being the entirety or whole lot of constructed objects; in other words, fascinating/ alluring and consumable.⁷ Not only does architecture approach itself to any other field of creativity (automobile, design, mode, etc.) but it also does not adhere to any “discipline”. In fact, the term, “undisciplined” will be its new world order. This dispersion and multiplication of “doctrines”, however, will eventually lead to a progressive deterioration of the discipline.⁸ Responses to this transformation are as many to be produced as understood. The schools of architecture have a vested interest in renewing their approach to the notion of project, a term which is applied effectively to a large number of professions and disciplines.

The research laboratory, an imperative

In order to counter any drifts—as clearly seen, given the promotional issues at stake indicated above, how the project as a query on the project can lend itself to interpretation...—doctoral students ought to be confined to the research laboratory.

A doctorate in architecture could, perhaps, provide an opportunity to effectively develop research on architecture. As we have seen, research of the doctorate in engineering type does not exist because of the lack or scarcity of laboratories in which to conduct such research. Since when has architecture had a relation/ connection with technical invention? It is remarkable that this process/procedure is almost non-existent with architects who no longer have any contact with technical invention, nor with the methods / means of production. Reintegrating and promoting technical query and innovation in research on environments and materials in schools of architecture is not a minor issue concerning the doctorate.⁹

What is to be expected of a doctorate in architecture, and it is for this reason that we ought to have it, is that it is not solely the formation of future doctors and professors. These have, ultimately, always been resourceful elsewhere at developing their cu-

riosity. The doctorate in architecture should, more fundamentally, while creating interest in the entire architectural formation and its professional implications, contribute to the consolidation and renewal of knowledge, thus stimulating its own environment. Hence there is a need for this to take place within the schools themselves and not externally. Finally, exchanges with the university will greatly increase.

Notes

- 1 This text was the subject of a first publication in *Research in Urban Architecture and the Countryside*, toward a doctorate in architecture, Ministry of Culture and Communication, Department of Architecture and Heritage, Paris 2005. It was registered in the framework of the national reflection and European Reform of the LMD (Licentiate, Master, Doctorate) and implementing Decree in France on June 30, 2005 in twenty national schools for higher education in architecture. The doctorate in architecture is, today, the third cycle of the formation identified in the ENSA, always related to a university which issues the diploma and with the status of a teacher-researcher, on passing, one hopes to gain recognition. Basically, the article has not undergone changes, except for the margins, notes and italics.
- 2 The expressions refer to the reflection suggested by the Bureau for Architectural Research Urban and the Countryside (BRAUP) of the Ministry of Culture, thus relevant to the national schools of architecture.
- 3 Cf. founding text of the department, "Theory, History, Project" for the creation of a new national school for graduate studies in architecture, Paris-Malaquais, December 1999.
- 4 This diploma, equivalent to the Bac+5, after the Licentiate and Master at the university was withdrawn with the adoption of the LMD.
- 5 Philosophical Doctorate.
- 6 Interview with the Dean of the Graduate School of Design, Harvard University, 1998.
- 7 D. Rouillard, "Immediate History of Contemporary Architecture and Disciplinary Issues" in *Discipline, Disciplinary Aims, Thematic Notebooks. Architecture, history, conception n.1*, School of Architecture of Lille and Northern Regions, 2001, pp.140-149.
- 8 Jean Claude Burdese, "The Empty Fortress" in *Discipline, Disciplinary Aims, Thematic Notebooks. Architecture, histoire/conception n1*, op.cit., pp200-209.
- 9 Under the pressure of a doctorate, the state of affairs (2003-05) has undergone a transformation over ten years and due to the present laboratories, carrying a more experimental and constructive orientation (i.e. Geometry laboratory, Structure and Architecture at the ENSA Paris-Malaquais, supported by Ateliers de l'isle-dAbeau)



GREECE



National Technical University
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Doctorates in Architecture for Competitive Architects and Design Studio Tutors

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Do competitive architects and tutors of architectural studios have to possess doctoral degrees?

The present essay will try to respond to a crucial, according to the author's opinion, academic dilemma. Has a competitive designer to work on a doctorate thesis, in order to ameliorate his design capability; or would it be better for him to focus on his primary architectural interest concerning architectural composition?

Placing this introductory question in a didactic academic context, we could thus ask ourselves whether a doctoral thesis seems to be indispensable for a studio tutor. If an architect specialized in architectural design does not necessarily have to possess a PhD degree in order to ameliorate his design capability, would it be necessary for an academic teacher, specialized in architectural design studios, to possess one in order to augment his didactic credibility.

Thus we have already arrived to a decisive dichotomy explaining our introductory dilemma. What do we expect of a

professional architect; design Capability or cultural Credibility? What, in comparison, should we expect of a professional tutor of studio classes?

Discussing the design capability of a professional architect or a studio tutor, in relation to his cultural credibility

In a clear way we have already referred to the comparison between two different domains of qualities which, though interconnected in many ways, appear nevertheless to possess several important distinct features.

The first domain of qualities concerns the design capability of the architect and more specifically of the architect teaching in design studios. Certainly, the capability of working with simulations of building reality, in compositional terms, has always to do with the general cultural physiognomy of the architect, but nevertheless it seems to be distinct, in expressive terms, from a large number of disciplines participating in this general cultural structure. It has not only to do with written or spoken language in which philosophy, for example, is “usually” written;¹ philosophy, the leading discipline out of which the three letters “*PhD*”, standing for the terms “*doctor philosophiae*”, are initially originated. Although we expect from a competitive architect to be able to present his ideas and projects in a sophisticated way, expertise in spoken or written expression does not necessarily mean expertise in design skills. In a clear way *architecture has to be designed*. Even if an architect with high managerial skills or theoretical knowledge may present the results of a project or these of a design studio lesson in a coherent, persuasive and probably seductive way, finally somebody has to design the professional project or to initiate young students into design skills.

The second domain of reference has to do with cultural credibility. We could relate this second domain of skills with the overall cultural aura of an architect, or in a more specific way with managerial abilities, as far as the professional era is concerned, or with theoretical abilities as far as it concerns tutorial activity. In both cases, deep knowledge of architecture would be indispensable for positive results – however could this “exterior” approach of design, no matter how good it might be, substitute the design experience itself? Or, to put it in more theoretical terms of a philosophical, “ontological” question, can interpretation, hermeneutics of architecture replace architecture itself? We should then like to deepen the theoretical insight of our essay by repeating the last question in the reverse way: Is it possible for architecture to express, through a design approach, theoretical propositions? Can philosophy or social sciences, though expressed in verbal form, hope for the hermeneutical support of design expression?

A skeptical reader may answer to our argumentation, as presented so far, with the rational objection that architecture as probably any other cultural practice is not one-dimensional only. It refers to a number of social components having to do with the general cultural, economic and political atmosphere of the society producing the practice in question. The skeptical reader could remark in addition that the more crucial a cultural practice is, the more complicated its social structure becomes. In this way econ-

omy has to do with architecture, sociology has to do with architecture, as well as psychology, philosophy and even politics. Moreover we could not think of architecture without the component of building technology, without its theoretical evaluation, without its own historical presentation or its correlation to the general art history. All those relevant social fields of knowledge may offer a vast variety of investigation subjects, and thus innumerable possibilities for doctoral research.

However the “specific difference” of architecture among other social practices, appears to be the answer to the previous skeptical objection; the differentiation that distinguishes architecture from the rest of cultural production, lies in its specific design “architectural” simulation. It is in relation to this specific quality of architectural practice that we have to distinguish the species of architects practicing design or tutors teaching architectural design studios, among any other professional or academic genus. It is in relation to this specific quality that we have to judge the competence of an architect or a tutor of a design studio and it is according to this specific quality that we have to discuss the need for doctorates in architecture, focusing on design practice.

The three possible arguments

We have examined so far two decisive arguments. The first concerned the differentiation of design practice among other social practices and, in accordance to this, the differentiation of professional architects and tutors of architectural design studios among other practitioners. Then we have also discussed a second argument concerning the importance of “side” cultural and professional education that may offer “side” support to design ability. After analyzing those first two arguments in a more detailed manner, we have to complete the body of our argumentation by discussing the possibility for doctoral thesis “by design”.

The first argument already considered, has to do with the specific quality of the design approach. If architectural design is an expressive approach not similar to written language expression, if it is a completely different expressive system, a graphic simulative system of reality, at the same time qualitative and quantitative, then it cannot be denoted though verbal discourse.² In this last case our argument has to be formulated according to the central expressive, distinct quality of the design process.

Architectural design simulation has to do with the performative ability of the designer and thus design skills may not essentially ameliorate through verbal research, but only through the development of the design practice itself. A designer has to face design problems and resolve them through design processes, and students of architecture have to face, in a similar way, the specific expressive reality of design simulation in order to be transformed into designers. That means that they cannot be seriously taught through verbal explanation but principally through paradigmatic mimesis, through imitation of constructed architectural examples and in any case through imitation of simulative examples, as complicated building, landscape or urban structures has to be composed through design abstraction. Those simulative examples, indispensable for the first formation of a new architect, may be offered by the observation of a professional’s activity, or by more mature fellow students, or by



Fig. 1
Curvilinear patterns of the initial design of the National Garden of Athens - Research program for the "Upgrade of the National Garden of Athens.



Fig. 2
Three dimensional, curvilinear contemporary proposal for the design of the "Area for domestic animals and aquatic birds" in the National Garden of Athens - Research program for the "Upgrade of the National Garden of Athens.

design examples proposed in bibliography and architectural publications; nevertheless the most complete teaching process seems related to studio tutorials. During this teaching process all four previous methods seem to coexist. Built and designed examples may be presented, correlation to others students exists and moreover, a professional architect acting as tutor presents not only his verbal comments but also his design skills to the student. There are tutors that prefer to use their design “pencil” and others who abstain from personal design involvement. However, in the latter case, the tutor has to provoke the desired design proposal, accepted as final ground for every possible verbal interpretation.

In this way it is crucial for the Schools of Architecture to insist on “good riders” than to prefer theorists of equestrian activity, or historians of chivalry, or even “bards” singing in favour of the riding culture. Certainly contemporary universities are complicated institutions, founded on the principles of theoretical and historical knowledge and promoting their activity through their communicative efficiency. Nevertheless all this theoretical, historical and communicative superstructure could not function in Schools of Architecture without the functional core of design teaching. In relation to this functional teaching nucleus could we define a type of doctoral research that could be helpful for professional designers and studio tutors as well?

We have already acknowledged the importance of the overall cultural and educational qualification of an architect and a tutor and we have accepted that architecture is not only produced by architectural thought and practice. We have emphasized, nevertheless, that no matter how rich our culture is, we cannot produce architecture without a certain ability in design practice. It seems that this second argument may stand as a counter-remark, which could be used against doctoral research as primary qualification for professional designers and design studio tutors. However, what if this “lateral” research does not analyze the historical production or architecture in general, its theoretical presuppositions in general, or the economic factors participating to its formation? What if it analyzes the “economy” of architectural design, the history and the theory of design modes in order to introduce and teach them to the contemporary architect or student of architecture? Then this “lateral” research would participate actively in the formation of design experts.

This revealing transformation is responsible for the decision of the author to present a doctoral thesis concerning landscape design. In its research, landscape architecture has been treated as a central cultural product of modern European and Western societies, possessing concrete modes of expression relative to the compositional forms of building architecture and landscape painting. In this way historical and theoretical research, which could remain exterior to the compositional process, has been assimilated by this process. In a certain way the author had to “re-design”, at least partly, the history of the Western landscape architecture. Moreover, this redesign experience did not remain irrelevant to the present landscape design tendencies: in the case of the Research Program for the Upgrade of the National Garden of Athens the redesign of the 19th curvilinear forms, creating the two dimensional compositional substrate of the garden, were associated to three dimensional formations of contemporary inter-

vention proposals that were elaborated through three dimensional computer-aided-design representations.³ Thereafter this immediate design experience has been used, in the doctoral research of the author, as a paradigm of formal schematization in two different design periods. The first one concerned curvilinear design tendencies and related theories of the 18th century⁴ and the second one exemplified contemporary design tendency, having to do with topological and parametric design. In this way a doctoral thesis concerning the historical and theoretical investigation of modes of design has been at least partly transformed to a doctoral research “*by design*”.

Thus, we have arrived to the third argument. Though verbal experience cannot be transcribed in design simulation language, a doctoral research could be helpful for active designers or for design studio tutors, if directly related to design experience and directly classified as research “*by design*”.

Conclusive remarks: The importance of doctoral research “*by design*”, in a period of active representational and compositional research

We have just described a personal experience concerning the investigation of design modes and its relation to a doctoral thesis research. However, individuals appear to be “symptoms” of their societies, their efforts and investigation tendencies having to do with the overall cultural environment of their epoch. In this way we may admit that the author’s interest in landscape design and what is more in compositional modes related to topological and parametric properties is correlated to the general “*epistemic*”⁵ atmosphere of the last two decades.

During this last period, it was not only environmental sensitivity, which has oriented our cultural interest towards landscape, but also our representational techniques have tremendously facilitated the design of landscape formations. In an explicit way the landscape metaphor seems to be the natural paradigm closest to the topological and parametric intuition and thus not only designers may experiment with topological forms imitating “*landscape formations*”.⁶ Moreover contemporary mathematics and computer aided design seem to be in their utmost representational possibilities, landscape oriented. In this way not only landscape architecture but building architecture and contemporary urban design as well tend to imitate natural landscape⁷ in a bulimic, continuously growing number of designed and constructed examples. We thus need more than mere “*notes on the synthesis of forms*”, we urgently need research proposals investigating new formal and compositional possibilities and this demand offers an extremely interest domain of doctoral thesis “*by design*”.

We have progressively reached a conclusive perception completely reversing the conventional verbal oriented ethics of our societies. Instead of expecting the verbal analysis in order to interpret formal entities, as those produced by architectural, urban or landscape design, we insist on formal representations in order to define our verbal theoretical proposals. It is in this way that contemporary architects and designers invaded the theoretical scene imposing their design vision as crucial for the hermeneutics of theoretical thought.



Fig. 3

Design, diagram connecting data mining, sensory spectrums and the city mass. Doctoral research by architect T. Petras, School of Architecture NTUA (supervising professor K. Moraitis).

We have already remarked, in a previous footnote, that though philosophy and theory are “usually” written, they sometimes ask the solicitation of designed forms. We have thus mentioned the example of Gilles Deleuzes’ collaboration with the architect and furniture designer Bernard Cache whose activity has not only to do with philosophical theories but also with software elaborations of his ideas and the application of these software experiments to series of furniture prototypes for production.

This immediate linkage of theory and design investigation seems to be also very close to Jacques Derrida's association with prominent architects as Peter Eisenman and Bernard Tschumi. In this second case, we do not only have architectural forms that may present conceptual correlation to theoretical assumptions but, even more, a theoretical position is proposed according to which signifying forms and not signified context, are the central vehicle of meaning. This theoretical position seems to be typical of what we usually describe as postmodernism. However, it is neither limited to architectural eclecticism nor related to the previous decades of reaction towards modernistic ideology.

A well-known dictum of postmodernist architects of '70s is the phrase "form follows form", in replacement of the famous modernistic rule explaining that "form follows function". This postmodern attack is not to be simplified as a naïve eclecticism decision, looking backwards toward historicism or expressive pastiche. On the contrary, it may be accepted as an important cultural transformation related to contemporary changes in sciences and technology. It is because of this deeper relation to the present historic period that this "formalistic" insistence has not disappeared, accompanying the extinguishment of the postmodern historicist fervor. On the contrary, it still persists, qualifying the overall present cultural condition. In mathematics as in topology or catastrophe theory, the central topic of investigation concerns the transformation of forms. It is through forms that the "function" of transformation is revealed and, furthermore, it is this formal condition that pre-decides for the final selection of the materiality and the construction decisions concerning the object. This completely revolutionary condition, restoring "*causa formalis*", the famous Aristotelian "*formal cause*", in a prevailing position of superiority over "*causa efficientis*", "*efficient cause*" provoking change and motion, is extremely obvious in contemporary computer aided design, where formal results pre-dispose functional, material and constructive decisions.⁸

It is in this crucial way that compositional, design options seem to get into priority nowadays, demanding to conventional architectural and constructive rationalism to follow. However this novice cultural condition has nothing to do with what we could describe as "artistic freedom". On the contrary, it is deeply related to scientific research, to mathematical investigation as well as to the insight of electronic simulation technologies. It is in this central way that the contemporary period of active representational and compositional revolutionary research, indicates the importance of doctoral research "by design", in the schools of architecture.

Notes

- 1 Despite the initial objection of the essay, rejecting the possibility of important correlation between design expression and verbal hermeneutics, there is a final conclusive acceptance for a possible correlation between the two domains; not only interpreting design simulations through verbal commentary, but also on the opposite direction, interpreting verbally formatted theory through design proposals. A rather important example of this possibility concerns the relation of contemporary architectural, urban and landscape design to topological mathematics theory; or the examples of Jack Derrida's collaboration with prominent architects such as Peter Eisenman and Bernard Tschumi, or that of Gilles Deleuzes' with Bernard Cache.

- 2 See author's previous essay (Moraitis, 2013) concerning "The non-verbal Expression of Building Design and its Teaching Importance for the Relative Fields of Urban Design and Landscape Design".
- 3 As presented in the 6th International Congress of «*Science and Technology for the Safeguard of Cultural Heritage in the Mediterranean Basin*». See (Moraitis, 2013) «*Re-designing Garden History: Research program for the upgrade of the National Garden of Athens*».
- 4 As those proposed by William Hogarth, in his famous book *The Analysis of Beauty* (London, 1753). It concerned the analysis of compositional motives, constructed in relation to the s-shaped *Line of Beauty* and the serpentine *Line of Grace*.
- 5 The word "epistemic" is a term deriving from the word "épistème", as used by the French philosopher and social theorist Michel Foucault. Foucault used the term épistème in a highly specialized sense in his work *The Order of Things, Les mots et les choses*, in order to describe the "historical a priori" that is to say the historical preconditions that grounds knowledge and its discourses.
- 6 "*Landscape formation 1*". Terms used by Zaha Hadid in order to describe her building for the exposition of a garden festival in Weil am Rhein in Germany.
- 7 It is the same architect that explains that "*the possibility of an urban architecture that exploits the spatial repertoire and morphology of natural landscape formations has been a consistent theme within the creative career of Zaha Hadid Architects for nearly 20 years*".
- 8 Or would it be wiser to speak of the identification of the "*formal cause*" with "*efficient cause*" and its prevailing superiority over "*material cause*" and even over "*final cause*". In this way we could easily speak of an "active form" being in itself the cause of its own transformation, its own "*efficient cause*", pre-disposing its material need and even its final function.

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Aristotle University
of Thessaloniki

Practising Architectural Research, Researching Architectural Practice

Doctoral Research in the School of Architecture of Aristotle University of Thessaloniki

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Questioning and revelation in doctoral research

Research, as an operation which aims at generating knowledge and at gaining insights and appreciations of a discipline, is a dynamic activity always conditioned by the questions that motivate it. Research questions are always the driving force of research, shaping its practices, determining its methods, forming its tools and ordering its outcomes. As these questions emerge from the dynamics of variable and unstable cultural and economic environments, they do not remain constant, fixed or static but they are in ongoing and perpetual (trans)formation, (meta) morphosis and (re)consideration. If researching research would be a question, then the investigation of research questions would be the appropriate vehicle to reveal the dynamics of the evolving and permanently modified intellectual background of research activity.

The verb 'to question' (*ερωτώ*) in the Greek language has the same root as the verb 'to research' (*ερευνώ*), with a

common root, the verb 'ἔρω' which etymologically expresses the act of speaking or operating. Thus the purpose of this act is to *call into question* something heard-known and to *research* or *seek out* something to be revealed. Having to do with the 'to-be-revealed' after 'being-questioned' research as practice is always a perfect mirror reflecting the ways we question a domain of knowledge and the processes followed, paths taken and itineraries made in a certain period of history, through which new conceptions, considerations and understandings of this domain are revealed.

In order to present the development of doctoral research in the School of Architecture of Aristotle University of Thessaloniki and to approach the issues proposed by the editor, we will follow the diachronic transformations of the nature and contents of research questions. We will examine the impact of the local and international debate on architectural thinking and practicing on the formulation of these questions and their impact on the changes of the legal framework controlling the academic institutions in the Country. We will also follow the changes in the expected research priorities due to changes in the research questions. We want to articulate doctoral research and education with the overall academic profile of the school as it is formulated according to its socio- political and cultural environment as well as its local regional and international interdependencies. Our aim is to use the case of our school to investigate more general issues related to doctoral education in Europe.

The practice of doctoral research

The School of Architecture of Aristotle University of Thessaloniki was founded in 1956 as part of the Faculty of Technology founded a year earlier. As part of the Faculty of Technology, the School awarded the diploma of Architect Engineer. This was a rather common practice at the time as many Schools of Architecture in Europe were founded as parts of Technical Universities or Polytechnics. Being part of a University, the School of Architecture of Aristotle University had the legal capacity to award doctorates. The doctorate was conceived as the ultimate academic degree institutionalizing excellence of the researcher's profile. It was also conceived as the condition for a School to acquire the identity of an Academic Institution. Doctorates were the formal justification of the conviction that a higher educational institution must not only transmit existing knowledge and experience, but also be the place where knowledge is generated. The School awarded the first doctorate in 1965, less than ten years after its foundation. Since then, a total number of 116 doctorates have been awarded by the School¹. A distribution of the different thematic areas of the awarded doctorates appears on Chart 1.

We can detect three characteristics of the doctoral research sustained by our School of Architecture, which have remained stable over the fifty years of its doctoral preparation experience: The strategy for the doctoral research, the origin of the research questions, the mentor-based doctoral development.

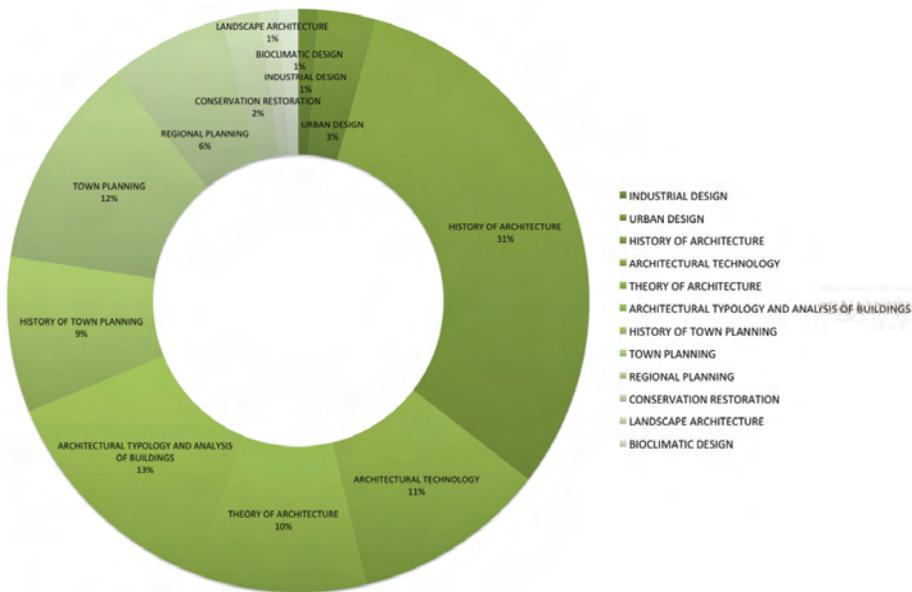


Chart 1
Distribution of thematic areas of awarded doctorates from 1980 to 2012.

The strategy for the doctoral research

The first characteristic is the stability of the strategy implemented by the administrations of the school regarding doctoral production. This strategy aims at avoiding any particular focus on the research of specific subject areas. According to this, the Schools should avoid to prioritize any research topics or to emphasize the development of specific thematic areas. The reasons for such a position are easily explained through the administration model implemented by the Universities in the country. In order to avoid one decision-making authority to draw and implement a strategic development plan for the School, this model distributes the decision-making power to smaller power units (chairs, departments, staff development hierarchies, political parties in the Schools etc). This distribution reflects a spirit of democracy, which in academic terms has been translated into the principle that units cultivating specific subject areas should have active participation in the decision-making processes. In this case, the main concern of the Heads of the School has been primarily to strike a balance between the existing differences and sometimes conflicts between the power units, which encourage compromise, agreement and deals avoiding initiatives or practices that could favor some of these units. A strategy towards a thematic priority-based doctoral research could explicitly prioritize and valorize some of the units, directly affecting established dynamics. Under these circumstances doctoral research has been led by research questions emerging directly from the personal, academic interests of the candidates.

Another reason that the School has not developed a consistent doctoral research strategy has been the fact this research has never been supported financially by the State. The Schools in the Country never had a budget to support doctoral researchers while, at the same time, this research could not be supported by external private funds, with the rationalization that, not only was such a practice illegal, at least till the beginning of the nineties, but also that it used to be in conflict with the principle of academic autonomy and integrity, an imperative in Greek Universities. Under these circumstances doctoral research has been offered by the Schools in the Country for three main reasons: 1. To maintain the academic status of the institutions as knowledge generators and not only as higher education or training providers. 2. To assure the conditions facilitating the academic development of the teaching staff. 3. To develop the research interests of persons or academic units in order for them to become more present in the national and international academic competition and fund-raising mechanisms.

Researcher-based doctoral research questions

The second, steady characteristic of the doctoral research in the School is the student-based selection, not only of the research area, but of the supervisor as well. For a doctoral application to the School to be approved, the doctoral candidate has had to always accompany his/her research proposal with a proposed supervisor. That is to say, it is the student who selects the supervisor and, not the School, on the basis of a number of content and quality criteria (or a predefined research policy of the School) related to the research question of the candidate. The direct consequence of this practice is that the established doctoral process appears to be more personal than institutional. This is encouraged by the absence of strict and formal academic processes by the School controlling the development of the research activity, creating obligations of presentation of the intermediate findings and steps, exposing the candidates to other views and approaches, encouraging their contact with networks and loci of academic debate and dialogue related to their subject areas.

The personalization of the research questions, topic selection and of the supervision obliges the supervisors to accept (or decline) theses belonging to a broad spectrum of thematic areas related to their own academic interests. As the research questions of the candidates come from entirely different angles, osmosis is not facilitated even when the students are under the supervision of the same person. The establishment of this kind of relationship between doctoral student and supervisor definitely affects the interdisciplinary aspect of the research. Despite the fact that the current institutional framework introduces a three-member advisory board, as further mentioned, it distinguishes one of them as supervisor who maintains the dominant role in the development of the thesis and is charged with all traditional meanings and values of the mentor-based doctoral supervision.

The mentor-based doctoral research development

The mentor-based doctoral research supervision is the third characteristic of doctoral research in the School. This model of doctoral research development, dominant in the

academic world and in doctoral research in sciences, was implemented from the very first stages of doctoral research at the school. Even though some changes in the structure of this model occurred in the last fifty years, its main structure logics and characteristics remain unchanged. According to this model, the doctorate supervisor has the responsibility to guide the development of the doctoral research through all its developmental stages, not only on the practical and operational level of the research development, but primarily on its proper contents, results and conclusions. That means that a very particular relationship develops between the supervisor and supervisee with a significant impact on the quality of the research as well as on the evaluation of its quality.

One of the main consequences of this relationship is the implicit and, in most cases, explicit obligation of the candidate to follow the overall viewpoint and understanding of the research topic of the supervisor. This informal obligation is certainly advantageous at the first stages of the research, but becomes problematic during the maturation of the candidate when new ideas and research interests emerge and new paths of investigation appear more attractive to pursue. The pressure to maintain the supervisor's academic identity in the doctoral thesis in most of the cases narrows down the possibility of innovation and creativity of the researcher and stagnates his/her enthusiasm when the first research findings appear and their possible capitalization is envisaged.

This supervision model has also significant impact on the evaluation of the thesis. As the candidate has to follow the instructions of the supervisor and has his/her formal permission to present the thesis, the evaluation does not only concern the candidate. It is extended to the supervisor as well, which makes it hard for the jury to make a clear, objective and independent judgment, especially in cases where the supervisor has the power to be equally critical against these committee members in any kind of future evaluation activity.

The mentor-based doctoral research is developed without any specific mentors' training to supervise doctorates. Mentors supervise the way they were supervised, thus giving the doctoral research a form of diachronic repetition and insistence, which cultivates traditional ethics and attitudes not always compatible with the fast-changing spirit and ethics of contemporary trends and research considerations. The capacity to understand the influence of their own values on doctoral students, to expose them to multiple and variable approaches that best fit their skills and interests and to be flexible in encountering new situations, deviations and re-orientations of their interests, constitute some basic competences of the supervisor which do not automatically emerge from their position in academic hierarchy or the power structure system. The development of the quality of the mentor has never been a concern of the School as doctoral education has never been one of its top priorities.

On examining the above-mentioned characteristics of the doctoral research practices in AUTh School of Architecture, we can conclude that the research questions these practices deal with come primarily from outside the School. The candidates import them as their genuine research interest while the School acts as their facilitator to adapt, transform and develop them in order to turn them into valid and qualified doctoral theses. The doctorates awarded by the School reflect the dynamics of the re-

search interests and questions of the candidates belonging to a broader architectural milieu of the region and the Country. This milieu is influenced by the local and international dynamics of architectural thinking, practicing and researching architecture and, the more we approach our area, the more this influence becomes more essential and decisive. They also reflect the capacity of the academic environment of the School, to encompass those interests, accommodate them as its own questions and transform them into valid doctorates.

The doctoral research on architecture and for architectural practice

We have examined the characteristics of the doctoral research, which have more or less been the same over the fifty years of doctoral research in the School of Architecture of AUTH. Meanwhile, significant changes occurred in this period, which had a strong impact on the development of doctoral research, two of which are worth mentioning. The first is the change of the gravitas of the doctorate degree in the academic development of the teaching staff in schools of Architecture and, more generally, in the professional labour market. The second is the changes in the structure of the supervision of doctoral theses. Both of these had a significant impact on the process as well as on the nature and content of the research questions.

Questioning architectural knowledge

In the first twenty years a doctorate was not a prerequisite to enter the academia. Nevertheless, it was a very strong asset that could enable an academic to reach the highest levels of the hierarchy. This gave doctoral research the character of a mission to be accomplished toward achieving academic maturation in order to attain the academic leadership of a discipline, which may explain why the majority of doctoral candidates already held a teaching post. Till the beginning of the eighties, 35 doctorates were awarded, 17 of which, almost 50%, to members of the already existing teaching staff of the School.

The first doctorates awarded in this period of doctoral research of the School, primarily focused either on the history of architecture, aiming at research on the technical and structural aspects of buildings, or at specific typologies of buildings as well as at the design process influenced by the ongoing discussion of those days, on design methods. Since the mid-seventies, the scope of the School's doctorates shifted into other disciplines such as systems' theories, psychology, behavioral sciences, sociology, and political sciences. All these doctorates were conceived as scientific contribution to the development of architecture as a discipline, extending doctoral research to a domain called architectural theory².

It is interesting to note that this doctoral research, following the international trends at the time, investigated ways of using scientific tools and premises of other disciplines in order to get a better understanding of architecture. Architecture was internationally considered as a discipline strongly influenced, directed and depended upon sciences and technology. From this conceptual view of Architecture, architectural design was conceived as a process guided by rational thinking and architectural

innovation as the result of capitalizing on the outcomes of scientific knowledge and the implementation of rational thinking. However, in most cases, it was architecture that shifted into other disciplines rather than the reverse. In other words, research was implicitly aimed at proving the operational value of the methods, tools, concepts and ideas developed by another discipline to gain a particular insight into architecture. By (re)defining architecture through the basic terminology of the discipline (architecture as system, as political statement, as social representation, as psychological stimuli, as text, etc) this research incorporated architecture into the subjects of the discipline, diminishing its relevance to the practice of architecture and glorifying the modernist split and binary opposition between theory and practice. As a consequence a prioritized reconsideration of architecture through the lens of a specific discipline was revealed.

Questioning the architectural outcome

By the mid- eighties a radical reform in the higher education system took place in Greece. The clear objective of this reform was to democratize, make transparent and structure the administration of the academic units and academic staff development, which had been harshly affected by the violent and obscure practices of the dictatorship. The new law was an attempt to modernize the Greek University and to build a contemporary profile in education and research.

According to this legal framework, the doctorate degree came to be defined as a requirement to teach at University. As a result, the doctorate degree shifted from being a factor of the academic development of the teaching staff to a condition for gaining access to academia. This situation transformed radically the identity of doctoral candidates, who had now become not only the existing non-tenured staff teaching in the school of Architecture, but primarily all those expecting to be part of the academia, that is to say, the young, more or less, talented graduates. The motivation towards doctoral research is now facing the threat of no longer deriving from a genuine interest in gaining better insight into architecture by generating new knowledge, but rather from the procedural formality of finding or maintaining a place in academia. Consequently, the number of candidates has risen dramatically while the average age of the doctoral researchers has dropped drastically, thus affecting the number of completed doctorates as well as the number of dropouts.

There are interesting consequences of this new environment in terms of the academic profile of the school and of doctoral research. The admission to the doctorate program was once regulated by rules assuring the quality of the candidates as mature researchers. However, the maturation of researchers had not been possible in the Country due to the absence of post- master programs. This condition increased the current tendency, at the time, for good quality graduates and/or the financially privileged to emigrate to countries that already offered post- master courses with the risk of continuing their doctoral studies there. In order to tackle this problem, the school tried to incorporate in its curriculum reforms modules and other educational practices, aiming at formulating the basics of the researcher's profile in order to make them eligible for the doctoral program. However, no other strategic measures had been tak-

en in order for the doctoral program to become more attractive beyond those who were unable to pay accommodation expenses and extended doctoral fees in another country. The foundation of three postgraduate courses by the end of the 1990s and beginning of 2000 left much to be desired with respect to enhancing and supporting the doctoral program of the school in terms of content and structure.

This legal reform of the structure and system of architectural education coincides with the paradigm shift in architecture generated in the mid- seventies in the western world and which progressively extended to all architectural education institutions. According to this, the humanities played a dominant role in architectural thinking and practice, replacing rational thinking with critical thinking, objectivity with socially and politically depended relativity, space with meaningful place, process and functionally-oriented design thinking with object and form-oriented design thinking, and scientific theory with criticism.

This new intellectual environment seriously affected the contents and questions of doctoral research in the School. By the end of the 1980s, a shift of researchers' interests could already be detected toward themes related to urban issues investigated in social, political and economic terms, the social demand on architecture, the social and cultural meaning of architectural creations and the social role of spatial production. In parallel, we had a significant rise of doctorates in history, this time, not examined on their technical or structural characteristics, but primarily on the relation between buildings and their social and cultural context as well as the way it was expressed through the form of the buildings. The distribution of the awarded doctorates' thematic areas during the period 1983-2012 is presented in Chart 2. In this Chart we can see the popularity of the different subject areas in the eighties, nineties and after two thousand.

On establishing architectural criticism as a substitute for late modernism, architectural theory had to subsequently encourage a shift from the doctoral research questions to the outcomes of architectural practice. Architectural practice always had as its main task to articulate the social demand with architectural innovation while academia always focused on criticizing this articulation and its argumentation with very limited operational value and impact on architectural production. This situation widened the gap between schools of architecture and professional practice and made it clear that architectural research was in need of redirection in order to have a more direct and constructive impact on practice. Working primarily on the discourse and ideas on architectural creation, design process and values, this generation of doctorates initiated an attempt to bridge the gap between theory, history and practice, which for more than two centuries was considered to belong to two different and separate worlds. Moreover, criticism enabled research to set the limits of architectural discipline and to investigate its own tools developing, in parallel, an interdisciplinary research approach which broadened the spectrum of the academic discourse on architectural practice.

The interdisciplinary aspect of doctoral research in architecture at the School was also supported by the changes in the structure of the supervision introduced by the new legal framework. The new law for the Universities dictated the development of

Thematic Fields of Doctorates from 1980 to 2012

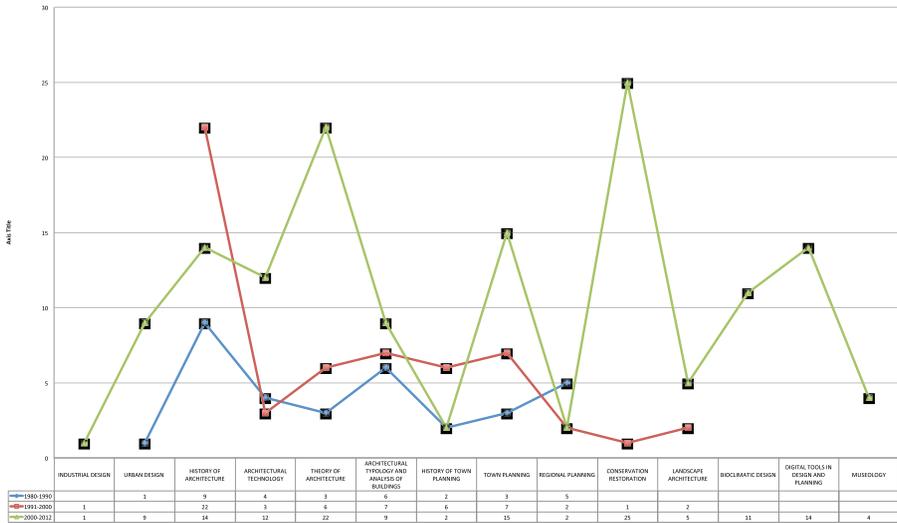


Chart 2

Thematic areas of awarded doctorates per period 1980-1990, 1990-2000 and 2000-2012.

the doctoral thesis to be organized by an advisory committee structured upon one main supervisor and two other academic members. Even though this change did not eliminate the role and the importance of the supervisor, as presented above, it supported the interdisciplinary aspect of doctoral research, which in the following years became a very important factor of the research questions.

This attempt to reconcile architectural thinking and architectural practice and to focus on the outcome of architectural creation, as a multidirectional and multidisciplinary research question, established a new relation between research and professional practice, thus becoming increasingly recognized that architectural innovation is exclusively produced by professional practice and definitely not by academic research. That empowered practice in the production of new architectural experience and knowledge. If both architectural practice and research could reveal new architectural knowledge, then why couldn't practice be considered as part or a kind of research and, consequently, comparable with doctoral research?

The dynamics of this re-consideration of the role of innovative architectural practice in the production of architectural knowledge put pressure on the State to consider the equivalence of the doctoral degree with a significant amount of recognized, published and awarded artistic or architectural work. This exception appeared as an attempt to assure the necessary presence of practicing architects in architectural education in order to keep in touch with professional practice. However, the interest in the approval of this exception is that, for the first time, it institutionalizes a sort of comparability between research and professional practice, which was inconceivable in the past, when these two parts were of two completely different and incompatible na-

tures. It is difficult to say that both sides accept this comparability. The way this exception has been implemented so far, introduces a kind of unfair equivalence between architectural practice and doctoral research. By maintaining unclear, sometimes obscure and ambiguous the terms and conditions of this equivalence, the gravity and rigor of the doctoral research in the School is challenged. However, it creates a new dynamism and, to a certain extent, a new direction for architectural research to become useful to practice or, at least, to bring the questions and the revealed outcomes of the former closer to the latter.

Questioning the creative process

Throughout the fifty years, doctoral research experience in architecture produced by the School has developed answers to different research questions based upon a reasoning generated primarily by discourses, tools and the specific research approaches of the different disciplines to which architecture has been associated. These questions, however, have not contributed to the generation of a purely architectural reasoning. Scientific knowledge on the different dimensions of architecture and observable architectural facts can certainly have a positive impact on future architectural creations and their creative speculations. However, this impact is limited and cannot easily transcend its nature as background information emerging from past experiences. Architectural creations constitute the creative leap from present facts to future innovative complex realities and the demands of culture and society. Nevertheless, it is difficult to accept that those facts can be directly projected to imagining and speculating these future realities. The nature and the structural elements of this leap still remain obscure and not supported by the produced reasoning formulated by the outcomes of previous doctoral research.

By the end of the nineties we can observe that a number of doctorates moved from research focused on the architectural product to research focused on the action through which that product was created. This research, even if in most cases, and especially in its early stages, was based on knowledge and methods from other scientific disciplines, it had as a main subject the act of architectural creation, that is to say, architectural design.

Architectural design is the 'act' of generating architecture. It is the melting pot of all architectural knowledge and experience. By rendering architectural design its focal point, this doctoral research moves from the investigation of the outcome of architectural creation to the process of its creation. A number of doctorates are being prepared under this perspective, aiming to create knowledge on the act of designing and, in this way, contribute to the further development of the quality of architectural production. This is considered as an important shift of architectural doctoral research in the School, moving from the study of how to generate knowledge about or on architecture to how to generate knowledge for architecture³. A move from a more academic and traditional research on what architecture is, to a research emerging from architecture itself and producing knowledge that will help architects to act-- knowledge for architectural action. This shift appears to have been more solid in the last ten years as a consequence of the recruitment by the school of young members of teach-

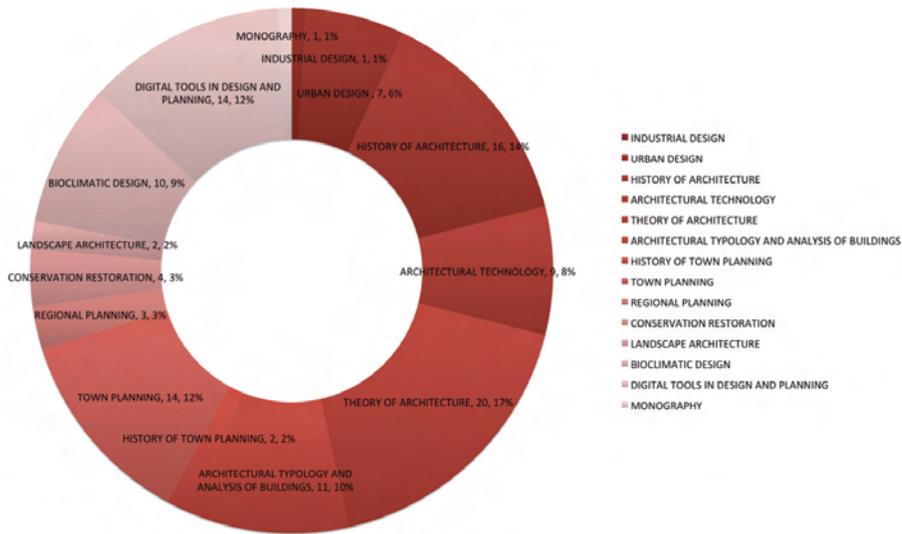


Chart 3
Distribution of thematic areas of under-development doctorates.

ing staff specialized in the use of advanced information technologies in architectural design. The interest of young researchers for this research is dynamic. It represents 12% (see Chart 3) of the total number of the ongoing doctorates in the School and we can distinguish that the different research questions focusing on this subject area can be organized in two categories.

The first group of doctorates understands architectural research as scientific research, which means the objective investigation of ‘problems’. For this reason the research for better design is based on the observation of the designers’ behaviors, strategies and manipulations in order to create objective statements on the observed activity and elaborate useful digital tools to support it. The fundamental principle of this approach is that the observer must remain distant from the subject of its observation with the minimum possible involvement in it so that no influence is exerted on the observed action.

The second group of doctorates considers that for the generation of knowledge for creative practice it is not enough to observe the actor. It is necessary to delve into the development of the creative process or into specific parts of it, elaborating its parameters and translating them into algorithms able to support part of the creative action. In this context there is involvement of the researcher in the creative action as scripting is based upon the observation of his/her own creative activity. The doctorates of this type are based on a conception of architecture as creative discipline and they try to specify the way that doctoral research of this discipline must develop. It is expected that such doctorates will be completed after a couple of years and the

School will have the opportunity to cope with the different practical, academic and institutional issues raised by this new and non-standard form of doctoral research.

The further advancement of this type of doctoral research requires a clear definition of terms, conditions, constraints and limitations in order for this research to be able to develop its own means, tools, approaches and research practices corresponding to the specificity of architecture as a creative discipline. The demand to focus on the act of creating architecture in order to contribute to the development of quality in architectural outcomes has to be accompanied by a new research ethos. According to this ethos the researcher can participate in the creative process as part of the research activity, but this must be clearly distinct from architectural practice. There is certainly a strong dimension of (re)search in design practice but the essential component that makes this 'search' a research is the reflection which has to be made explicit and argued so that others may benefit from it.

Redefining the doctoral research strategy

Doctoral research in architecture has globally been under constant redefinition and reconstruction especially in recent years when we are experiencing fast and profound changes in the way we perceive, understand and create architecture. The school of architecture of AUTH is actually trying to (re)define its research strategy, presented above, and to adapt it accordingly for it to be harmonised with the international architectural education and research environment and the dynamics of the mobility of architectural ideas practices and researchers.

The School has to decide on a wide spectrum of issues related to the contents of doctoral research. It has to decide: if it will keep the research topics open to the entire spectrum of the Thematic Fields appearing in its curriculum or if it will focus on a limited number of fields in order to develop a more focused research outcome and research expertise; if it will organize doctoral research in research areas in order to ensure coherence of the research in the same area, or if it will keep the autonomous development of the dissertations under the emerging dynamics between the candidate and the advisory board; and if the organization of the doctoral research will be articulated within the structure of the School curriculum or if it will keep its autonomy and will be based upon different priorities, principles and development strategies.

The Schools are also discussing their responsibility as higher educational institutions to incorporate in their education and research aspects of academic practices, trends, and experimentations appearing internationally under the label of avant-garde. The School wants this incorporation to be done in a critical way, taking into account its existing human capital, its available infrastructures and its formulated traditions. Its mission is to make an effective contribution to education and research based on solid academic grounds and not on the superficial image of a rapidly adaptable institution to the emerging architectural thinking and research questions or, even worse, on an attractiveness marketing ambition.

The Schools must also decide upon a number of issues concerning the system of doctoral research, that is to say, the way that doctoral studies are structured; if the doctoral research will be expected to have a direct impact on the educational process

of the school, or if it will continue to adhere to its own research priorities and records. Further considerations are if the school will implement precise criteria to control the quality of candidates and their research performance or if this responsibility will be mainly attributed to the supervisor and the advisory board; if the school will implement an overall control of the development of the dissertation in terms of time and process or if it will be left to the responsibility of the advisory board and its understanding of the circumstances encountered by the candidates; if the school will take initiatives to reduce the duration of the development of the dissertations, or if it will keep the current pace, respecting the constraints of the candidates; if the school will develop initiatives toward the better exchange of information, ideas and experiences between the doctoral students by organizing academic events like seminars, meetings or conferences on research or if it will leave it up to the advisory board to assure to the student similar advantages under personal initiatives.

Last but not least, the School has to organize, in a systematic way, the means and processes bringing the doctoral research outcome it produces into the teaching process and the architectural design studio. As long as a big part of this outcome remains unexploited on a library shelf together with the enthusiasm of the young researchers to talk about and teach their research experiences and gains, the School will maintain a significant distance from a vibrant and unexploited source of inspiration, information and knowledge for its undergraduate students.

Notes

- 1 The titles and the authors of the 79 Doctorates awarded in the period between 1983-2012 are presented in the official web site of the School <http://architecture.web.auth.gr/en/phd-studies/>.
- 2 This focus of doctorates appears to be in line with the historical description presented by Halina Dunin-Woyseth, (2005, 84-85) in a form of a summary of doctorates in architecture.
- 3 It is interesting to notice that this attitude against this doctoral orientation is emerging from the interest of the candidates who can more effectively absorb questions on design and research as they are described by Ranulf Glanville (2005: 118-122).

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ITALY



University of Florence

Archidoctor Universalis

Doctorate in Architecture at the University of Florence

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Italy

There is evidence that a far-reaching change in the very nature of the academic educational system has been taking place over the past decades ranging from the second to the third cycle of higher architectural education. Schools and Departments are re-addressing their education strategies all over Europe with a particular focus on the third cycle and doctoral studies. This is aimed at efficiently contributing to creating the European Higher (Architectural) Education Area through a more methodologically innovative process.

The Doctoral Course offered at the School of Architecture in Florence has assumed such changes as bedrock of an innovative and interdisciplinary doctoral training. It is based on a twofold objective. On the one hand, it consists of reframing the context and the way in which architectural knowledge is generated; on the other hand, it intends to pursue an innovative and challenging professional practice.

Structure, contents and expected outcomes are conceived as a tool to support a worldly competitive profile of a highly-educated researcher or professional, able to cope with the contemporary challenges in

the field of architecture, urban studies and spatial planning. Such elements reflect the need to adapt research training to the challenges of the global labour market and the technological advances strictly related to the questions currently occurring all over the world within and beyond the policy objectives of European governments.

Accordingly, the Doctoral Programme in Architecture at the University of Florence is considered to be a crucial source of a new generation of researchers and professionals. It is conceived to serve as a bridge between the European Higher Education and Research Areas and the international one (from global south to global north). As such, it embeds some of the main principles addressed by the Bologna Declaration and detailed in Documents, Acts, Communiqués that have come to further decline it, at least in the European context. Doctoral candidates are expected to prove their ability in performing original and independent research and thinking within a scientific discipline or interdisciplinary collaboration. Individuality, originality and a secure autonomy are consequently considered important features of the doctorate and fundamental objectives of the training programme.

The Doctoral Programme in Architecture at the University of Florence is also addressed to increase the awareness of the importance of the “joined-up” governmental, educational and professional thinking. It is understood as an opportunity both for academics and candidates. The former are asked to address coordinated actions involving higher education institutions, government ministries for education and research, innovation and technology, national research councils, the European Commission, as well as the international research and institutional bodies. The candidates are required to connect their research activity to the educational, political and professional context in order to better fulfill their career perspectives (being it academics, professional, or policy makers).

The following contributions will present the current and expected structures, contents and outcomes of the doctoral education in Architecture at the University of Florence. They will focus on:

- 1) the present of doctoral education offered by the school (answering the question: what are the forms and reforms of Doctoral education in our School?
- 2) the visions for the future of doctoral education (answering the question: what are the main plans and expectations for the future of doctoral education in your school of Architecture?); and
- 3) the expected profile of the researcher in architecture (answering the question: what are the main characteristics of the researcher’s profile that our School wants to generate?).

The present doctoral education offered by the Doctorate Programme in Architecture at the University of Florence

The doctoral education offered by the School of Architecture is rooted into the Italian Education System. It is, therefore, important to mention, at least, some of its early steps to better frame the current offer.

A Presidential Decree 382/80 established the PhD in Italy late and after a long waiting period in 1982. It was characterized as being a path of preparation for research with a limited marketability of the title. It was limited to the area of scientific research within the academic context. The profile of the PhD candidate, then, was quite unique and fully framed within the academic world.

The first transformation of the doctorate took place 16 years after its creation by Law 210 of July 3, 1998, published on July 13, 1999. Such change occurred within the frame of the broader Bologna Process that defines the Doctorate as the third level of post-graduate training. The purpose of the Doctoral course becomes the acquisition of a range of skills necessary to achieve the “know-how” in research. It overcomes the initially suggested conception of the doctorate as the ability to develop original research. The doctoral program thus becomes a third cycle of studies no longer thought of as mere academic training, but as a marketable title.

In addition, the doctoral courses are now established also in agreements, issued by public and private entities in possession of the requirements for highly qualified science and culture. There are also required collaborations with public or private entities, Italian or foreign ones, that allows graduate students to conduct experiences in a context of work activities.

This is the first and fundamental change that has given a consistent impulse to the doctorate programme in Architecture, Urban Studies and Spatial Planning at the University of Florence.

The further inputs came either directly and indirectly from the following Acts: the “Doctoral programmes for the European Knowledge Society” (2005) that poses the bases for a common ground in the European doctoral educational offer; the London Communiqué: “Towards the European Higher Education Area: responding to challenges in a globalised world” (2007) and the “Bologna Process 2020 - The European Higher Education Area in the new decade Communiqué of the Conference of European Ministers Responsible for Higher Education, Leuven and Louvain-la-Neuve” (2009); the “Budapest-Vienna Declaration on the European Higher Education Area” (2010).

They have served as guiding addresses to pursue the followings objectives:

- to improve the quality of the learning process;
- to promote partnerships between public authorities, higher education institutions, students and teachers, and employers, quality agencies, European institutions, and international organizations;
- to support the international cooperation creating bridges between the European Education Doctoral System and the other Systems all over the world in order not to create a hierarchy among different education cultures.

The recent change in the Doctoral Italian System that has highly affected the Doctorate Programme in Architecture at the University of Florence (as well as the other Italian Doctoral Courses) is dealt with in the last University reform law (the Law number 240 of 2010) that provides for the PhD courses to be set up, with the assent of the

National Agency for the Evaluation of University and Research (ANVUR), after having obtained the accreditation by the Ministry of Education, University and Research. The courses can also be set up by consortia of universities or between universities and public and private research institutions (the title in this case is provided by the University as a proper academic degree).

Within such frame the main characteristics of the Italian PhD Programme as they have been adopted by the PhD Course in Architecture in Florence includes:

- a new system of evaluation monitored by a National Agency (ANVUR);
- a new process of accreditation of the structure titled to issue a PhD Course managed by the Ministry and based on the criteria established by ANVUR with particular regard to the practiced internationalization, and to the consistence, quality and positioning of the PhD board and candidates scientific production;
- the development of a new not-only academic PhD profile. The doctorate indeed, finally comes out from the, almost exclusively, academic sphere of public universities to include institutions of private research such as companies and private entities. In addition, such character is accentuated by the equivalence of academic scholarships and apprenticeships in a private company;
- a minimum number of scholarships (at least 6) to be guaranteed for the Schools to activate a PhD Course.

The PhD Programme in Architecture at the University of Florence includes at the moment (XXIX cycle - current year):

- 20 positions among which 10 fellowships: 8 financed by University of Florence; 1 co-financed by the same Department of Architecture; 1 financed by the Ministry of Education ("Fondo Giovani") – Scope number 9 – Energy Saving and distributed Microgeneration;
- 4 supernumerary positions for foreign students financed by other international research institutions or Ministries;
- a PhD board consisting of 75 professors, among them only 16 professors are selected for evaluation by the ANVUR.
- 8 thematic curricula listed below:
 - Architectural and Urban Design;
 - Architectural Technologies;
 - Design;
 - History of Architecture and Cities;
 - Survey and Representation of Architecture and Environment;
 - Landscape Architecture;
 - Urban and Regional Planning;
 - Structures and Conservation of Architecture and Cultural Heritage.

- 8 PhD bodies (one per curriculum) constituted by professors and experts in the field, able to supervise PhD candidates in their specific research work.

Such features have been set out in order to fulfil three different objectives:

- to incorporate the new Doctorate frame (by law);
- to develop the innovative addresses detailed in the European Acts and declaration since the Bologna Declaration came out, in terms of the quality of learning programs, internationalization, comparison with other European Systems, etc.);
- to address a competitive offer as well as better suited to those of other European and International Schools of Architecture and Planning while maintaining the Italian educational tradition based on the local culture, history, and cultural heritage.

By working in such a way we intend to intercept and reflect the requests for innovation addressed by the emerging societal challenges in the architectural and planning field, related to the survival and persistence of our planet and its resources while facing the current financial crisis effects (and its implications in terms of research issues). We particularly intend to address the PhD candidates towards innovative strategies in the field of research (methodology) and action.

As it emerges with evidence by the consistent number of the thematic curricula, we also consider Architecture as a very rich and interdisciplinary frame to be developed in itself and in every single discipline that might contribute to define it.

The main goal is to make PhD candidates aware of the extent to which it is needed to work in order to cope with the contemporary challenges even though it is required to be a very good expert just in one of these aspects.

The main characteristic of the PhD programme may be summed up as follows:

- pursuing an interdisciplinary approach that can be considered experimental and innovative in the way it includes and bridges several sub-disciplines;
- comparing with other international educational systems and architectural domains that contribute to balance the dominant anglo-saxon culture replacing a worldly perspective on the research methods, issues and geography;
- focusing both and simultaneously on research and action as training methodology to prepare either academics, policy makers and professionals to rightly understand the current phenomena and to act or concretely address public policies.

Visions for the future of doctoral education in Architecture at the University of Florence

The key question assumed as the leading concept in dealing with Architecture and consequently with contemporary living landscapes (either produced directly by inhabitants or managed by public urban, environmental and regional policies) is anchored to the following question: what is architecture for? How and why does it

emerge, in the frame of contradictory economic forces and the environmental and climate change challenges?

Taken for granted, in this context, that architecture and spatial planning are two of the most challenging commitments in coping with the contemporary environmental and economic emergency, the doctoral education assumes that, to dwell on the intervention strategies both promoted from below and addressed by the state, it is needed to cope with the unknown challenges and to re-discover and unfold the very known phenomena.

Over the past decades architects, urban scholars and policy makers have made many efforts in terms of education and practice. Most of them seem to suffer from lacking information about the nature of current transforming processes and how they affect contemporary human settlements or may constitute a threat to its reproduction. Mainly they seem not to have concrete and efficient tools to understand the ongoing processes and, therefore, identify intervention strategies. The assumed concept is rooted into the idea that architecture and planning are linked to broader structures of economic and political life. The doctoral program intends indeed to offer a wide-ranging introduction to contemporary key issues to be coped with.

Under a pedagogical perspective it could be said that the doctoral programme is intended as an interactive and collaborative teaching/learning activity. Accordingly it aims at providing a system, which fully develops talents and capacities of all students in the pursuit of attaining the highest educational standards. It needs to be done enhancing different students' backgrounds to successfully address their efforts and personal attitudes and to enable them to recognize their own capacities and potentials in the field of architecture as this has been featured due to the emergent and pressing global change challenges.

Such pedagogical goal might be defined as "dynamic learning" based on the circular and recursive re-framing process of the knowledge tools. More than just a bunch of knowledge and information, the course aims at stimulating and encouraging a continuous learning ability: an approach that is considered necessary to cope with contemporary planning issues and problems and the spread of new forms of communication and learning based on Information Communication Technologies.

The following elements may contribute to address such pedagogical goals:

1. The first one deals with the style of work. The entire course has to be defined and managed through an open and interactive process where people with different roles share their knowledge and expertise.
2. The second element deals with sensitivity to different disciplinary approaches and scientific languages. The pedagogical objective is to implement learners' skills in recognizing and managing different knowledge domains ranging from theory to practice.
3. The third point is concerned with the importance to find a balance between multiculturalism, complexity and research action. Difficulties as well as richnesses of building bridges between different worlds should be embedded and managed in order to enlarge the teaching traditions' horizons. The prevailing Anglo-Saxon cul-

ture, above all in the world of research, obliges those who do not belong to this culture to undergo a form of tension between adaptation to language rules and ways of thinking that are alien, and the need to maintain cultural and personal differences while trying to communicate. The experience of contamination between ideas and ways of representing the world pursued by the doctoral program has to show the possibilities of such kind of encounters.

4. An additional element involves the ability to personally interact with experts within different contexts (academic context alongside with institutions, local communities, associations, social movements etc.) to address the issue so that it could be discussed in a scientific way inside an academic context such as that one created by the course.
5. A very important consequent element deals with the development of students' awareness and independent thinking in managing disciplines, planning theories and tools, in addressing innovative approaches and suggesting new research fields of study and practice.
6. A further aspect deals with the tutor/candidate relationship. It should be understood as the privileged and unavoidable opportunity to build on students' research idea every day. It is as important as the interactive learning process.

The prerequisites of such a pedagogical concept, assumed as pedagogical goals per se, are summed up as follows:

- a) Subjects are organized around problems rather than by discipline (problem-based learning);
- b) Within this frame learners are supposed to be pushed to assume and play an active role in discovering, constructing, practicing, and validating acquired knowledge via active exploration and interactive social collaboration with others; teachers have to facilitate the transfer of knowledge to the student via the creation of a learning environment conducive to active and interactive participation in the learning process.

Through the entire period of doctoral education the School intends to support the candidates training process in:

- working out their research goal;
- synthetizing and communicating such results in as many ways as possible; proposing their progressive and final results to the evaluation of scientific community;
- submitting to the international peer-reviewed journals as many articles as they can write.

This latter should be considered as one of the most important steps in a PhD student career as it also represents for the candidates the opportunity to share, test and argue on their research topics in a national and international academic context. It is also an important tool for the doctoral candidates progress assessment. It might moreover be useful in the reframing and evaluation of supervisors' responsibilities and duties.

At the end of their three-year course, PhD candidates are asked to discuss and defend their thesis in front of, at least, two experts and/or discussants that do not belong to the PhD Board.

Doctors are expected to publish their thesis or, at least, to submit parts to some journals or reviews. Supervision, monitoring and assessment procedures are critically important for the quality of the experience and training of doctoral candidates.

Mobility and European as well as international collaboration are fundamental components of the doctoral training as well as the work on the main research calls in order to develop the follow-up and the potentiality of the research project addressed during the doctorate course. Such work may include the European calls such as Horizon 2020 platform, the international cooperation sector, the Erasmus Plus project etc.

The expected profile of the researcher in Architecture at the University of Florence

The doctoral education programme expects to support research activities with high scientific impact, although restricted, on a small field of studies. Candidates are addressed and supported:

- to undertake research operations which could be defined as innovative;
- to build research results in fields not yet explored;
- and to respond to the challenges posed.

For these reasons it is strategic to construct a comprehensive survey of contemporary challenges in the field of architecture and urban studies, as the starting point of the doctoral training. On an equal footing, it is also crucial to work by problem rather than by disciplines from the very beginning of the research project.

The researchers/learners are expected:

- to improve flexibility in combining their own knowledge;
- to merge contributions from different disciplines;
- to discover the way to use the new technologies to better cope with specific and new architectural problems in the contemporary landscape whether in the academic or professional context.

They are also expected to embed and make visible the results of their work as new architectural knowledge to be spread out and shared within the academic and professional field.

We may group and detail the effects of the doctoral training in three different categories:

1. The first one deals with the candidates' learning process. It includes either the sphere of the self-training and the one of tutors led-learning activities. By deeply focusing on planning problems, candidates are expected to become familiar with

the scientific approach to architecture and spatial planning and to learn how to use the scientific tools like books, theories, papers, research colloquia, workshops and experts' contribution. Moreover they should have built the basis on which to develop their independent thinking, enhancing the other authors' theories in a proper way.

2. The second category concerns the "socialization" of candidates' works. It deals with the ability to select and collectively focus on certain problems considered emergent in the face of the global change; the attitude to communicate with people from the academic context, and the institutional one along with the social movements reality and more in general, the world of practice. Candidates have come up with the potential to collaboratively and interactively address a scientific conversation, discuss and develop a problem from its theoretical formulation to its concrete opportunity to be tested in a real context and within a multidisciplinary community of theorists, practitioners, activists, policy makers etc. They have also been trained to organize lectures and seminars on contemporary problems (even related to the unknown effects of global change) with a multidisciplinary approach. This further category relates to candidates' capability of synthesizing their research results in different kinds of scientific products being able to work in different contexts ranging from the academic to the institutional ones. It concerns the capacity of creating better and more effective products, processes and organizations by working in an interactive way, confronted with different languages and disciplines, taking into account the dynamism, unpredictability and complexity affecting the changing landscapes (as a result of the global change) we are living in. They have been put in conditions to write papers at different levels (papers for attending conferences, papers for international scientific journals, peer-reviewed journals, position papers, and scientific and divulging research statements. They learn how to write a research project based on a consistent interdisciplinary state of the art, how to present (in the case of PhD students) their research work and improve their approach.
3. The last category concerns the candidates' preparation for practice. It is embedded in the training efforts they have been asked to make. The entire course has been conceived as a tool to address both the attitude to research and practice with a specific focus on the latter, as a crucial part of the learning process as well as of higher education activities. Students have built their own preparation for practice throughout the cycle of lectures, seminars, workshop and context-surveys, mobility programmes. Particularly they have acquired the awareness of the importance of practice; they have become familiar with the complexity, diversity and variety of the world of practice (ranging from the professionals and practitioners to activists); they have learnt how to figure out a perspective on problems considering and arguing about a scientific/academic along with a practice-rooted approach; they have focused on how to interact with the world of practice at academic level, into the professional world and within the third sector.

Concluding remarks on the doctoral education in Architecture at the University of Florence

Building on this overall mission statement, the doctoral education programme held at the University of Florence is expected to set out and develop five specific objectives for research activities during the next cycle in order to:

1. develop scientific research under either a comparative and interdisciplinary perspective;
2. produce territorial evidence through applied research;
3. upgrade knowledge transfer and support to users in targeted analyses which need to be developed within the third cycle educational programmes;
4. improve tools and methodologies for research and analyses under the “smart era”;
5. broaden out reach and uptake of territorial analyses to make evident the impact of research on territories and on people’s lives.

Moreover, over the past decade the PhD board has, together with Italian and International partners, been working on shaping cooperation programmes and research networks. The contemporary challenges and the changes in the academic context under the global system, implies the strengthening of such cooperation opening it up further to the east and south of the world.



University of Genoa

An Interdisciplinary and inter-University Doctoral Experience in “Preservation of the Architectural Heritage”

Giovanna FRANCO

University of Genoa

Italy

The effects of the recent reform of the Italian Ministry of University and recurring problems of PhD Programmes in Architecture

The Ministerial Decree of February 8, 2013 and the Guidelines concerning the PhD programmes for the academic year 2013-2014 May 22, 2013, have imposed major changes in the matter. These changes, also induced by economic cuts, provoked, in the majority of cases, the unification of several existing doctoral courses, previously splitted inside the same University, Faculty or Department. The current situation thus sees the merging of preexisting separated courses into, at least, one course for each Faculty or Department of Architecture, as a branch of the PhD School of the corresponding University. The presence, in the Academic Board, of a founder committee made up of 16 professors (full or associate), ensures, at least “on paper”, the essential requirement of interdisciplinarity and the quality of the programme from the point of view of its academic assessment.

The innovations introduced by our national legislation should not be confined to a process of reduction and unification, as a consequence of the proliferation of courses matured during the recent years. These innovations should aim at the pursuit of a higher quality and competitiveness compared to some “traditional” situations that still afflict many doctoral courses (organized in many different ways even in the same subject area).

It should definitely release the doctoral programme from the widespread practice, where very often the final doctoral thesis are carried out by the candidates under the guidance of a single tutor and without the necessary confrontation with the Board of Professors that, at least, represent its true “Scientific Committee”. This attitude tends to confuse the personal research of the Professor with the training of the candidates as professional figures, eliminating the differences that should always exist between the doctoral education (third level) and other forms of research grants to support the training of young people.

Another major problem is the actual possible employment outcomes of any PhD programme in Architecture. There are many PhD graduates still out of work or employed in areas where their skills are not well used or not used at all. Often both graduate students and employers complain about the lack of training in the skills needed for the “pure” or “applied” research, which is also reflected in: the ability to work with others; to communicate with non-experts in a specific field; to organize and manage projects; to identify innovative solutions to real problems that affect the social and economic spheres of our Country.

Since the Bologna process to the Tuning approach: a new impetus for doctoral training

More than 10 years since the Bologna process started, and as a result of the experience and of the debate that has developed around the education within the third level, it appears appropriate to extend the Tuning approach to the design and management of the doctoral programmes. This means to re-focus our activity on the figure of the candidate based on competences, as well as the necessary knowledge¹ and skills² to be acquired by any student enrolled in a PhD programme.

The competences, as specified in the EU Tuning approach, represent a dynamic combination of cognitive and meta-cognitive approaches, demonstration of knowledge and understanding, intellectual and practical skills, ethical values. Competences must specifically be developed in all teaching and verified at each stage of the training programmes. They may have a disciplinary (for a specific area of study) or general (common for all courses, or “crossing”) character.

Specifically, according to the EQF for the “third educational cycle”, the end credits are awarded to students who:

1. have demonstrated a systematic understanding of a field of study and mastery of research methods associated with it;
2. have demonstrated the ability to conceive, design, implement and adapt a substantial research with intellectual integrity;

3. have carried out original research that extends the frontier of knowledge by developing a contribution that, at least in part, deserves publication in national or international level;
4. are capable of critical analysis, evaluation and synthesis of new and complex ideas;
5. can communicate with their peers, the larger scientific community and with society in general about their areas of expertise;
6. are capable of promoting, in academic and professional contexts, technological, social or cultural in a knowledge-based society.

It is necessary to point out that the traditional models of the pre-existing doctoral programmes focused almost exclusively on the achievement of the objectives set out in points 2 and 3, i.e. on the skills related to doing “research” in a very strict and traditional sense. However, those who are awarded the Doctorate should have an important role in the development of knowledge and for its transmission, communication and integration with other knowledges, to address the issues in a broad perspective, to regulate the advancement and benefit for the society.

We thus agree, in this perspective, with the claims of the working groups inside the Tuning process (see, for example, the work of prof. Ann Katherine Isaacs, University of Pisa), which state that:

- defining the competences (both general and specific) to be developed and their relative levels is a key step for the effective planning of doctoral programmes;
- defining the competences helps to structure the Doctorate and to provide, during the training path, a coordinated framework of activity;
- defining the competences is essential for awarding a PhD title, the mobility of the student, the same self-awareness of the candidate about his/her potential, skills and professional figure that he/her is developing.

Is unification of doctoral courses really an added value?

The process of a forced aggregation of pre-existing and already established doctoral courses doesn't automatically give a response to the highlighted problems and to the opportunities offered by the Tuning process. On the contrary, in some cases, it has led to the closing of some “virtuous” experiences that were characterized by a true and effective aggregation in the form of a consortium between different Universities, whose teachers were bound by disciplinary interests and research, bringing into the Academic Board of the PhD their own experiences.

The survival of the doctoral consortium is, in fact, only related to the ability to ensure, by all institutions involved, at least three scholarships per year, while the doctoral courses belonging just to one University could be activated also with a minimum of four scholarships per year at all. This is a very challenging and difficult requirement that, at the end, does not encourage the creation of this type of inter-University collaborations.

The experience that the author wants to explain and provide to a wider public, through this paper, thus refers to one of the few doctoral programmes still alive in Italy, in the form of a consortium, which is characterized by a strong thematic map and is well recognized in the field of Restoration of the Italian Schools of Architecture. The principal aim of the programme is, in fact, the training of experts in Preservation of the Architectural Heritage, under the coordination of prof. Carolina Di Biase, in which the Author is participating as a member of the Academic Board (within a group of more than 16 Professors), bringing her knowledge in the specific field of Renovation Technologies. The programme, according to the Guidelines and to the Tuning process, arises in a new formulation, hoping to find the minimum number of scholarships necessary to guarantee its survival also in the academic years besides 2013-2014.

The researcher profile in Preservation of the Architectural Heritage: the experience of the consortium led by Polytechnic of Milan³

The 29th PhD programme in "Preservation of the Architectural Heritage", first activated at the Polytechnic of Milan back in 1983, is envisaged to run in a new form.

In addition to the professors of architectural restoration, history of architecture, art and structural strengthening of the Politecnico di Milano, the PhD Board now includes several representatives coming from other Universities and research institutes. They collaborate actively in the teaching and research activities: in particular, the professors of the University of Genoa and IUAV (Venice), the experts at the highest level in the field of preservation of Cultural Heritage and of the administration of Cultural Heritage in Italy (Director of the ISCR -formerly Istituto Centrale del Restauro, Central Restoration Institute-, director of the ICCD, Soprintendente Regionale della Lombardia).

The ultimate purpose not only resides in broadening the experiences that the PhD candidates will acquire over the first three years of the course, where they will have the opportunity to interact with professors and researchers/scholars belonging to different cultural and professional backgrounds. The PhD programme, in fact, first of all aims at providing the PhD students with a unique training experience in the Italian panorama, so far unparalleled also in domains other than the simple and strict preservation and restoration of our Cultural Heritage. Such a context, where different traditions and approaches are compared, investigates the synergies and responses to the modern themes of Cultural, Architectural and Landscape Heritage protection. The PhD programme is thus meant as the place where theorization, methodology, investigation into the most significant aspects of the protection of historic architectural and cultural heritage will be connected to complex, challenging operating research themes, on-site and lab experimentation of analytical and diagnostic stages and, finally, the experimentation at building sites which cater for the foremost Italian works.

The PhD Academic Board, in this perspective, really allows to investigate and share extremely relevant and up-to-date topics that, by having architectural heritage as the high spot of research, describe the complex domain of preservation and correct use of our Cultural Heritage items, a strategic field and, at the same time, one of the chief resources of the Italian economy for the future.

Being a mix of differentiated research, experimentation and operating methods, the PhD programme will provide the candidate with a rich and very interesting experience. In recent years the relationship with the “Ministero per i beni e le attività culturali e il turismo” (Ministry for Cultural Goods, Activities and Tourism-MiBACT), has been definitely fruitful, especially when we consider that many among the best PhDs in Preservation of the Architectural Heritage have been hired as officers and executives to the above ministry. The on-going contact with the breakthroughs from studies and research carried out in Italian and international contexts and the will to promote joint projects are fostered through expanding the network of relations the university entertains with other universities and research centers in different geographic areas of the world. In this regard, over the past three years the PhD programme in Preservation of the Architectural Heritage has been committed to promoting and coordinating inter-doctoral courses offered by foreign professors from different European countries and lately the Course of the PhD School Tradition and Perspectives of Polytechnic Culture in Europe. Such activity will further benefit from the co-operation with other PhD programmes in the Polytechnic of Milan and the universities that collaborate with the PhD programme activities.

Training objectives and course offering

The PhD programme, lasting three years, calls for the acquisition of 180 credits overall.

Thirty credits are concentrated on the first year and are divided as follows: 25 (minimum) offered by PhD courses organized by the PhD programme in Preservation of the Architectural Heritage, and 5 credits offered by the PhD School. The remaining credits are aimed at personal study and research for preparation of the PhD thesis.

In addition to compulsory courses, for each PhD candidate a specific study path is organized that will include attendance of other courses. PhD candidates may attend courses offered by the master-or post-master School for Specialists (*Scuola di Specializzazione in Beni Architettonici e del Paesaggio* - SSBAP) in Milan and in Genoa (where the author teaches), in order to add more specific knowledge to that already acquired within the Masters of Science courses from which the PhD Students arrive, as well as in relation to the various topics of their final thesis.

In support of the research carried out for their PhD thesis, in fact, students will benefit from several laboratories both inside and outside the Universities involved (archaeological, chemistry of materials, climate and building physics, old and contemporary structures). The activities undertaken during the second and third year also include attendance of workshops, seminars, practical training periods, national and international conferences related to individual research, with great attention to conferences wherein PhD candidates present the results, even partial, of their research theses.

The academic plan of the PhD programme revolves around five main research areas:

1. Preservation culture and practice
2. Diagnostics of materials and structures and rehabilitation of historic buildings
3. Methods and themes of historical research

4. Construction history
5. Historical territory and landscape

Candidates to the 29th PhD programme will have access to a wide-ranging, diversified academic plan: besides the doctoral courses mentioned above, the PhD programme comprises workshops, visits and intensive courses dealing with innovative themes (amongst others, the protection of the underwater heritage). Educational activities are often related to research either under way or at an early stage of development, some of which addresses major monumental structures and some of the most renowned sites of the world.

To the aim of their thesis research, PhD candidates will have the opportunity to rely on facilities and laboratories the breadth and width of which provides them with a crucial support to the aim of acquiring “competence for highly qualified research activities” in the domain of cultural heritage protection.

In this connection, the PhD programme deems to carry on the long-standing collaboration with the CNR and, above all, the Institute for the Preservation and Enhancement of Cultural Heritage “Gino Bozza” of Milan and the Institute of Sciences of Atmosphere and Climate CNR-Isac of Padua.

Courses are organized in a variable number of lectures and seminars (one day long) and are complemented by study visits. Seminars are organized by the professors in charge - which provide information and the acquisition of basic bibliography - and have a systematic presence of lecturers from other Italian or foreign Universities in order to allow PhD candidates to acquire research knowledge in the various disciplines dealing with architectural and Cultural Heritage. In case of lectures held in a language other than English, the PhD course will organize a consecutive or simultaneous translation into English. The doctoral programme has, in fact, a good level of internationality, developing connections with European laboratories, inviting visiting professors and hosting, in the course, a considerable number of foreign candidates (from Spain, France, Bulgaria, Romania and even from Syria, Armenia, Iran, China, Center and South America).

The table below, showing the path outlined for the candidates, refers only to the coursework activities. At the same time, the candidate is expected to be devoted to the research activity in a continuous way, following the lead of his/her supervisor and of the Board of Professors.

The PhD School organises every year general, inter-doctoral courses and courses with foreign professors. The acquisition of, at least, 5 credits is mandatory among the courses of B type.

The PhD Programme in Preservation of the Architectural Heritage organises Characterising Courses, and offers at least 25 credits.

Admittance to the final exam calls for the mandatory acquisition of at least 30 credits. These credits have to be acquired through “characterising” PhD courses offered by the PhD Programme.

First year

Courses	Possible details or reference to following tables	Numbers of credit (min-max)
PhD School courses	Physical methods for Cultural Heritage International PhD summer school Architectural Preservation, Design and Planning in World Heritage Cities and Landscape	5-10
Courses characterising the PhD Programme	Heritage Preservation Culture and Practice	5
Courses characterising the PhD Programme	Diagnostic of Materials and Structures and Rehabilitation of Historic Buildings	5
Courses characterising the PhD Programme	Methods and Themes of Historical Research	5
Courses characterising the PhD Programme	Construction History	5
Courses characterising the PhD Programme	Historical Territory and Landscape	5

Second and third year

In the second and third year the PhD candidate should focus on research activities and their PhD thesis.

The PhD study and research work will be carried out, full time, during the three years of the PhD course. The possibility of on-the-job training or study periods at either Italian or foreign companies or external entities and universities is envisaged. The main objective is the development of an original research contribution.

The PhD thesis has to contribute to increase the candidate's knowledge in the research field selected. Besides, the thesis has to be coherent with the research issues developed in the department dealing with the PhD programme chosen by the candidate. The candidate has to present an original thesis, discuss its state of the art contribution in the research field and community.

The PhD research will be developed following the lead of a supervisor, who supports the candidate across everyday activities and thesis approach.

Upon completion of the studies, admittance of the candidate to the final exam will be evaluated by the Board of Professors. Subsequently a final exam is needed for the attainment of the title. In this connection, the research work carried out and the thesis

will be evaluated by an examination Committee composed by three members, at least two of whom are external evaluation members.

As for the thesis research, candidates will thus have the opportunity to address and investigate in-depth the wide-ranging themes connected to heritage knowledge and preservation broadly meant, while arising interest from different universities (advanced methods of investigation, knowledge management and preservation processes applied to historic buildings tradition, twentieth-century heritage and cultural landscapes), including the development of the new Italian legislation (UNI) and the European one (CEN/TC346) on environment and Cultural Heritage. This aspect will increase the technical aspects, and will make PhD immediately competitive at the European level.

A set of competences to be developed in a research field in between Natural Sciences, Social Sciences and Humanities

The PhD programme of Polytechnic of Milan aims at developing a research-oriented mindset in the candidates, with expertise and skills in a specific research topic.

The PhD thesis has to contribute to increase the candidate's knowledge in the research field addressed. Besides, it has to be coherent with the research topics dealt with by the department wherein the PhD Programme chosen by the candidate is carried out.

The main objective is the development of an original research contribution, emphasizing the following specific competences:

- knowledge of the state of the art concerning the specific subject
- clear and complete overview of an epistemological basis
- ability to promote cultural progress.

However, even before focusing on the specific skills, it is appropriate to place the attention, even from the Board of Professors, on some competences so-called "generic or general", which constitute the core of the attitude to research.

- a) The ability to combine analysis and synthesis, through a mental process of abstraction that makes it possible to formulate a general idea from the particular.
- b) The ability to be critical and self-critical, in relation to the effective use of the candidate's employment in academia or labour market, being aware of the possibility of applying the research in real contexts.
- c) The ability to be creative, to generate new ideas and to take a divergent thinking. We need to extend the horizon of creativity even in the work of scientific research, developing the ability to create new and useful connections between seemingly unrelated things.
- d) The ability to trace a cultural progress in the field of preservation and enhancement of Architectural Heritage.
- e) The ability to communicate with peers and scientific community.

In order to develop a research-oriented mindset, the candidates have to acquire problem-solving capabilities in complex contexts, including in-depth analysis of problems, identification of an original solution and the ability to figure out solutions and their applicability in given contexts.

These skills provide the PhD candidates with major opportunities of development of their research both in the academic field and in public and private organisations.

The research has to be submitted through a PhD thesis, which contains and discusses also the state of the art contribution in the research field and community.

The PhD research will be carried out according to the guidelines of a supervisor who supports the candidate in the everyday activities regarding the development of the thesis.

The supervisor can be a member not included in the Board of Professors and may also belong to an institution different from Polytechnic of Milan. One or more co-supervisors may support the supervisor.

With a view to acquiring the capability to carry out research activities, the candidate will have to attend the courses according to the PhD programme, defined for his/her study plan and pass them with a positive evaluation.

For each candidate admitted to the programme, a tutor, belonging to the Board of Professors, is appointed. The tutor supervises and personally supports the candidate throughout the overall training path. The supervisor and the tutor may coincide. The choice of the courses will be overseen by the tutor, and it will be formalized in a study plan and approved by the Coordinator of the PhD Programme.

Other activities for the development of personal skills and research expertise are encouraged during the PhD path.

The candidate has to acquire the capability to present and discuss his/her work in the research community. Consequently both the participation to international conferences and publication of the research results in international magazines with review are encouraged.

The candidates are also encouraged to carry out part of their research activities in contact with other research groups in their field of interest, preferably abroad.

Research visits of, at least, three months are strongly encouraged at research groups through which the candidate can acquire additional skills to develop his/her research work and thesis.

Conservation, enhancement and management of Architectural Heritage with the use of ICT: an example of interdisciplinary doctoral research

The research that is being developed within the doctoral program at the XXIX cycle, are affected by this new approach, which aims to promote, as much as possible, interdisciplinarity in methods and to obtain results available for a wide community.

One of the issues raised, for example, relates to a research project of national interest (PRIN 2010), which has as its objective the introduction of a new and innovative methodology, based on the so-called Building Information Modeling (BIM), capable of improving the current sustainable preservation policies of the Architectural Heritage,

here including monitoring, management and retrofit. The research project includes one grant specifically devoted to the PhD programme in Preservation of the Architectural Heritage.

The research carried out on protected historical sites - to establish the appropriate management of the refurbishment and preservation work throughout the entire life cycle of such sites - aims at constructing a tool whose effectiveness may be assessed and which can be employed to:

- gather, store, and manage the information required for the planning process and the stages of the refurbishment work (this information will then be used for drawing up the project cost estimation);
- manage and maintain the buildings in the future. Advances in information technology now allow us to construct a BIM (Building Information Modelling) meta-model in 3D, 4D, and n-D, based on the volumetric and spatial constitution of the buildings and on the parametric relationships between their constitutive parts.

This BIM can manage, in the long term, information and incomplete, limited, and continually-evolving data collected during the surveying, planning, and management operations taking place on the site of the buildings undergoing refurbishment. The primary objective is the development of a relational system that can store the useful information required for the appropriate management of the buildings throughout their life cycle (preventive maintenance, refurbishment, conversion, improvement of energy efficiency, etc.). The Research Unit of Genoa, within the PRIN framework, will work on a real, vast, and unique architectural complex, which is however representative of larger portions of built heritage. This architectural complex is the Albergo dei Poveri of Genoa, the use of which has been granted for gratuitous use to the University of Genoa for 50 years, on the condition that the University restores and maintains it. The University has taken great care in designing the refurbishment project of this vast site, abandoned for many years and unknown to most. Its restoration would certainly be significant from a cultural standpoint for the city and its environment and would undoubtedly stimulate national and international interest. The PhD candidate will work on the aspects related to its technical expertise. The research team is defined by a strong interdisciplinary and intersectorial approach and has acknowledged expertise in architectural restorations; preliminary surveys and diagnostic work in the archeology of architecture field; in building recovery; and in environmental sustainability (with particular reference to the compatibility between innovative energy-saving technologies and preservation of the original features of the building) with a specific contribution to the BIM. In these sectors the research team, and especially professors that will be tutors for the PhD candidate (Stefano F. Musso and the author), will work on developing a system that is suitable for collecting and storing the information (with the respective relationships) required for an appropriate decision-making process. Moreover, it will point out the risks involved in the stages of representing the real building in a virtual model. In fact, any undue automatism must be avoided during the information-gathering and decision-making phases, as this is not in line with the most updated restoration theories, methods, and techniques. It is actually quite dan-

gerous and not very effective from the standpoint of the construction processes supported by the BIM. The innovative aspect of the project lies in the interaction between restoration experts and ICT experts, who work jointly on identifying and validating methods for implementing the tools currently used on new constructions, with the aim to protect and enhance the architectural works acknowledged as Cultural Heritage. The ongoing exchange of ideas between the various University departments and with the authorities responsible for protecting the site will contribute to the positive results of the study, carried out at a local and national level, which have thus shaped an actual best practice for the management of the restoration, recovery, conversion project of the Albergo dei Poveri.

Notes

- 1 In this context knowledge is intended as the most advanced frontier within a specific field of work and study.
- 2 Skill is intended as more advanced and specialized techniques, synthesis and evaluation, solving critical problems in research and/or innovation and extending and redefining existing knowledge or professional practice.
- 3 The following three chapters are based on the document prepared by the Head of Doctoral Course, prof. Carolina Di Biase, Regulations of the PhD Programme "Preservation of the Architectural Heritage", cycle XXIX (available at: www.ricerca.polimi.it).
- 4 The project, funded by the Italian Ministry of the University, is called "Built Heritage Information Modeling/Management" and includes 6 Research Units; the coordinator of the project is prof. Stefano Della Torre, Polytechnic of Milan; scientific responsible for the Research Unit of the University of Genoa is prof. Stefano F. Musso.

Acknowledgments

Academic Board of the PhD Course in "Preservation of the Architectural Heritage"

The Board of Professors comprises the following members:

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Paolo CARPEGGIANI - Full Professor - History of Architecture (Politecnico di Milano)

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Stefano MUSSO - Full Professor - Head of the Specialization School for Architectural Heritage and Landscape (Università di Genova)
Giovanna FRANCO - Associate Professor - Renovation technologies (Università di Genova)
Gisella CAPPONI - Head of the Istituto Superiore per la Conservazione e il Restauro ISCR (formerly Istituto Centrale del Restauro) Rome
Barbara DAVIDDE - Archaeologist on behalf of the Ministry for Cultural Heritage and Head of the Underwater Archaeology Unit at ISCR
Giulio MIRABELLA ROBERTI - Associate Professor, Università degli Studi of Bergamo - Strengthening and Rehabilitation of Historical Buildings (Università degli Studi di Bergamo)
Marco PRETELLI - Associate Professor - Università degli Studi "Alma Mater" of Bologna - Architectural Restoration (Università degli Studi "Alma Mater" di Bologna)

Participating also in the Faculty Board:

Marica FORNI - Assistant Professor -History of Architecture (Politecnico di Milano)
Antonella E. SAISI - Assistant Professor - Diagnostics of Historic Buildings(Politecnico di Milano)
Cristina TEDESCHI - Assistant Professor - Referring Professor of the Material test Laboratory - section "Historic Buildings Materials - Diagnostic, monitoring and investigation on materials for historical buildings end cultural heritage" (Politecnico di Milano)
Pietro MARANI - Full Professor - History of Art (Politecnico di Milano)
Caterina BON VALSASSINA - Regional Head of Architectural Heritage and Landscape of Lombardy;
Laura MORO – Head of the Central Institute for the Directory of the Cultural Heritage Ministry
Andrea ALBERTI – Head of the Department of Architectural Heritage and Landscape for the territories of Brescia, Cremona and Mantua.



Politecnico di Milano

The City as the Great Sea towards the Rivers of the Architectural Research Flow

Adalberto DEL BO

Politecnico di Milano

Italy

Research has a central role in the Higher Education of Europe. It would be impossible to evaluate the Bologna Declaration complete without the third cycle of doctoral education been considered a structured reality, recognizable and shared among the European countries.

The necessity to establish a close relationship between research and teaching is due to the following reasons:

1. a teachers' proved commitment to research;
2. the active role of teaching in the discipline as an innovation accelerator;
3. a broader level of international exchanges of research and the respective findings.

Moreover, the teaching of architecture -due to its nature and history and nowadays furthermore also due to the critical situation of the building field- requires considerations that should be added to those more general and common to all disciplines.

Architecture as a world construction discipline, alongside its nature between art and science at the same time, the close coexistence among materiality and theory, the role of human and social sciences and the important role of history together with the contemporary phenomenon of the rapid advancements in techniques, transform architecture into an activity of high complexity and remarkable specificity.

Architecture deals with conditions that characterize the structure and development of research in this field.

Architecture, from its central position, as it is taught in the world today and as its status has been fixed from the European Directive, has relationships, exchanges with and contributions from various disciplines.

Many of these disciplines benefit from strong autonomous statutes for which the relationship with architecture is not necessarily the main focus.

This is the case, for instance, of technological disciplines, i.e. search activities that deal with technology and the advancement of scientific applications primarily related to building.

The results obtained by technology in construction and urban transformations may act as potential contributions to architecture, but cannot certainly be considered as specific contributions that belong to architecture.

A similar reasoning may be elaborated with history, sociology and philosophy.

Philosophy, in recent times, in acting as a support in architecture, has risked and still risks to distort its status (through the accreditation of the only and indeterminate term of *design*) by confusing architecture and urban design with an indistinct 'design' that covers the most disparate fields involved in the design activity.

My recent remarks on the subject, raise an issue that is considered alarming and even dangerous for architecture, as it arises every time with more frequency also in technical fields in which it has propagated so far the collaboration with architects.

"It is unclear, as is proposed by recent philosophical studies texts (...) the relationship with the so called 'design', a rather vague and controversial topic that seems to highlight a difficulty in deepening on architectural themes and on their actual reality and consistency, as today is essential to practise with great seriousness.

Meanwhile it is necessary to clarify the terminology (without corporate intent) of the term 'design', that indeed can create confusion and subtract - directly or indirectly - the specific quality of architecture; the term 'design' means planning in general, an activity that, in effect, to be specified - as it is essential in order to give precise indications - has been usually accompanied by different adjectives that qualify the different fields of the project: urban, building, industrial, graphic, with many others ranging from shoes to airplane engines.

It concerns - mentioning the first indicated - different fields that affect different areas, theories, scales, techniques, materials, and so on...very different and distant from each other and for sure the term 'design' doesn't unify them at all.

To pretend to deal with architecture – and thus with city – by studying coffeepots and tv sets means to totally misinterpret the character of a discipline that deals primarily with space at its construction. Moreover, it also means that we contribute to delegitimize the actual reality, however based on a thousand-year' history.

A coffeepot is by no means a miniaturized architecture. It is just a coffee maker. A miniaturized type of architecture does not exist except for some forms of its representation, as it is in scale models. But in that case it is a reduced representation that refers to the concreteness of architecture, to the knowledge and design control of its spatial, typological, constructive, distributive, dimensional aspects.

What is being designed as an object has nothing to do with architecture. Architecture is designed according to standards, techniques, characters and with some specific purposes that are first –it is necessary to underline- of spatial, constructive, formal, organizational nature.”¹

Given the different types of knowledge in architecture schools (those useful to the achievement of the 11 points required by the European Directive) according to a very schematic frame, the possible searches may concern:

1. the discipline of architecture (directly related to transformations and therefore to areas related with buildings and cities);
2. disciplines characterized by different disciplinary matrices, useful for knowledge and design activity as part of the whole group of teaching connected with the general aims of architecture and city construction (from the technological and applicative to the physical-mathematical, to the structural and connected with representation, to the historical and restoration, to the analytical – quantitative, and so on).

What matters, besides the research quality, is the mutual relations established within research with the obvious principle according to which in architecture schools subjects cannot relate – more or less in a direct way – to that of the purpose of the construction and of the architectural and urban transformation.

It is not possible to interpret differently the phrase *'Architecture must be the principal component of the study'* reaffirmed in the recent emended new Professional Qualification Directive in Architecture.

It is a determination that, in redirecting the studies fields towards a necessary generality, felt the need to further emphasize –after thirty years experience of the EU Directive– the centrality of the discipline of architecture.

By analogy (but also for logic), even the PhD architecture study cycle cannot be affected by this centrality.

At such high level of studies, the centrality itself as a theme, covering the unity of the discipline of architecture, is an element of fundamental importance for the search activity carried out in schools of architecture.

This is a research activity particularly necessary, considering the instances posed by climate change (with strong physical transformations necessary to face the consequences) together with the severe Western world-building crisis (caused by an uncontrolled financial system and by a programmatic incapability) that raise today crucial issues on research in architecture.

The questions are of a disciplinary, technical and strategic order and concern doctoral research in terms of choices of subject content, organization and enlargement of partnership according to a desirable process that requires a unified vision of not so simple and rapid creation.

Each school is, indeed, the bearer of the vision developed from the experiences that have defined the characters and from the knowledge accumulated over time on various topics of research and, often, on the cities and physical context in which they are located.

Overall, schools are potentially a *unique operational network capable of contributing in an organic and extended way to the research in architecture.*

Starting from this point of view and from this interest, in June 2012 the Politecnico di Milano organized an international Conference on the topic '*Cities in transformation. Research and Design*' with the collaboration of EAAE (European Association for Architectural Education and ARCC (Architectural Research Centres Consortium).

Numerous researchers from Europe and from the rest of the world brought significant contributions to the conference, demonstrating the Schools' strong attention to urban topics, and the city ability to fully represent the common aim of different contributions.

In this way, as expected, the city is the place of convergence of the research efforts in the domain of architecture.

As it was written on the occasion of the Milanese Conference: the city is the great sea towards the rivers of the architectural research flow.

If is intended to create a third European cycle able to contribute to the problems that architecture is now facing, it is essential to build a structure exchange between the Doctoral Education and the schools or a network of structures that are motivated by the various interests of the single schools and from the agreements among the school groups and their Doctoral Education.

It is, however, imperative to have a wide and open coordination, also useful to overcome the current state of confusion in which architecture and the debate over it are located.

It is necessary to turn towards horizons, starting from a structured research, characterized by a system based on shared processes of knowledge that can generate an open discussion among all schools and possibly also include the profession.

Individualism, the result of a competitive marketing operation that tries to find the most unique bright idea, to that point, used to enmesh and to satisfy the media –powerful consensus vehicle– and to best ensure the investors' capital and their profits (to-

gether with those of the professionals who created the business operations) has to be abandoned.

Therefore, we should even consider to sworn off the idea that there may still be demiurgical figures able to find personal solutions to problems whose size has become by now, in most cases, of too high complexity to be solved individually.

It is not just the increased technical complexity, but the complexity of the connections and the increasing knowledge that such complexity requires and entails, making even more difficult and delicate the task of architecture to drive and lead the transformations.

A similar situation is reflected in many schools of Architecture where generations' shifts and profound changes and transformations occur –and this is no coincidental to the departure of particularly prominent theoretical and professional figures, who in the past characterized the teaching of architecture.

The necessity to face urgently the issues set by sustainability and by the serious crisis in the building industry attributes an even greater responsibility to the research in architecture.

We need to be aware of the limits that the moment imposes and observe that, along with a technical updated building design, the search must help regain the rational and historically aware design of the city to reduce energy and the consumption of natural resources.

The theme has directly to do with the nature and the techniques of architecture, a discipline that cannot act if it is not taken as an integral, unified and organic answer to problems that concern it since its origin.

This also applies to technical and technological aspects that –although if relevant as already mentioned– cannot substitute architecture which, in close and natural relationship with innovation, aims at translating the whole set of elements in the architectural form with definite relations.

Such condition is not always taken into account, especially when architecture is not acknowledged for its disciplinary specification, denying in this way its experience and history.

The multiplicity of the domain of architecture has to do with different scientific areas often characterized by overlapping and in many cases by competitive attitudes that obstruct common research.

To overcome these problems it takes strong shared motivations that encourage collaboration, with the awareness that:

1. the disciplines involved, although with different roles, contribute equally to research;
2. it should be useful for a structure to exist according to which, working in unity with common goals, the different contributions can complement and rectify each other, resigning even to omit any dissonances and overlaps or repetitions;
3. the ability to contribute to the common goal advancement enriches the final meaning and value of specific results.

The observations so far underlined partly refer to the themes and issues related to the experimentation context that is taking place in Politecnico di Milano in the field of doctoral research in Architecture, particularly to the Doctorate '*Architecture, Built Environment and Construction Engineering*'.

The new PhD program involves the connection of previous doctorates (Architectural Composition, Building Engineering, Design and Technologies Exploitation for the Cultural Heritage, Technology and Design for Environment and Building) in a single structure.

These four programs have been partly joined by a group of researchers from a fifth one: the PhD Program in Structural Seismic and Geotechnical Engineering. All these Programs have been active separately, since '90, mainly focusing on one discipline only.

This is also a result of new national standards, of cuts in resources and of the recognized need to contribute to the formation of a strong polytechnic education able to face as a unit the challenges that are posed to the fields of architecture and the city.

The main fields on which there is a discussion, cover the following general topics:

- Architectural Design and Urban Design
- Preservation, Valorisation and Promotion of Built Heritage
- Advanced Materials and Innovative Systems for Buildings
- Design and Technologies for the Energy: Efficient and Sustainable Built Environment
- Seismic and Fire Safety of buildings, infrastructures and construction sites
- Complex Buildings Design, Construction and Management
- ICT and Smart Systems in Construction and Planning
- Built Environment Economics and Management

Their merge was aimed at optimizing the capability of the Department in training new researchers to face and solve complex research needs, with a single organizational unit.

To conclude, in this rich and articulate scene, there seems to emerge a need for a polygenesis in the fields of architecture and urban planning or, at least, a wide review of the way through which development took place in recent decades; this position mostly coincides with the opinion of all those who increasingly view global environmentalism as a defining paradigm of the new millennium demanding a responsible and historically conscious attitude, to go along with the terms of a new austerity.

As it is evident, a rich perspective of civil and professional opportunities for those working in design and construction fields emerges in response to the actual difficult context, and raises the necessity, for those involved in institutional structures, of a

suitable framework for the best ways and the redefinition of adequate environments for teaching and research.

Note

- 1 'Il realismo e la ragazza di Corinto', in 'Architettura e Realismo', a cura di S.Malcovati, F.Visconti, M.Caja, R.Capozzi, G.Fusco, Milano, 2013.



Second University of Naples

Doctoral Education in Architecture offered by the Second University of Naples

Antonella VIOLANO

Second University of Naples

Italy

“Teaching began when a man, sitting under a tree, began to discuss, not knowing what is to be a teacher, with people who did not know themselves to be scholars (...) but wished that their children meet with a man like him.” (Louis Kahn, 1964)

This paper illustrates the evolution of doctoral research in Architecture at the Second University of Naples (SUN) in the last fifteen years. In this period, new laws have led to profound changes in the management and especially in the economic resources available. The academic career has so far represented the privileged sector of employment by PhDs. However, conducting analysis on the formation of the third level, the impact of legislative actions in recent years on the university system, that has drastically reduced the possibility of access, must be considered.

However, it is still valid to believe in the importance of scientific knowledge to

guide, qualify and substantiate the architect's work, both in terms of discipline and methodology.

The doctoral research is the highest level of education of the new generations who are entering the world of living and working in civil society. The doctorate in architecture educates, informs and forms, sowing the seed of knowledge, scientific consciousness and responsibility, encouraging and mediating observation of the natural and built with the support of studies from the world of scientific research. In this way, the analysis of the problems is transformed in:

- opportunities for the development of strategies, and technical tools, processes and products;
- detailed analysis of the causes and critical considerations on the effects (which are rarely simple and straightforward, but complex, random);
- assessment of environmental, social and economic implications, with respect to various time horizons;
- search for the appropriate design rules (Best Practice), supported by cost-effective, efficient and fair technologies; mostly, they must be feasible not by governments, but by citizens/technicians.

A Glance at the Past (XVII-XXIII PhD Cycles)

A major push to adopt a new and concrete international openness of the Italian university system has come from European policies:

- Bologna Process (1999) "Construction of European Higher Education Area"
- Lisbon process (2001) "Europe of Knowledge"

So, there has been talk of the "knowledge triangle" which refers to the interaction between higher education, research and innovation, as the main carriers of a society that is based on knowledge.

After that, in 2003 in Berlin, the third cycle was introduced in the Bologna Process. There has been a significant increase in the enrollment of PhD courses. In the period 1998-2006, the Italian university system "produced" 53.795 PhDs¹. In order to promote an appropriate "use" of the title of PhD, the Italian universities, in analogy to what happens in Anglo-Saxon countries, have set up offices for job placement and/or career centers, with the specific task of guiding research towards employment consistent with the training received (in terms of content and pay). In addition, particularly doctorates in architecture have close relationships with the business world, adding to the internal tutor a corporate executive or an entrepreneur as outside tutor, coherently with the recommendations contained in the document of the European Commission Mobility of Researchers between Academia and Industry (2006).

The project "Training and Innovation for Employment" (FlxO project), sponsored and supported by the Ministry of Labor and Social Security, is very interesting because it aims to network universities, enterprises, system of research, development of regional

policies. The results are also in facilitating the integration of young people, including PhDs, in the world of work, reducing time between the acquisition of the qualification and employment. For these reasons, the PhD Schools have facilitated the training activities and internships at organizations or companies.

Furthermore, the Legislative Decree no. N. 276/03 has institutionalized the presence of universities among the persons authorized to conduct brokerage activities at work, connecting to the National Stock Exchange of continuous work, defined as an open system of matching supply and demand of work aimed, in line with EU guidelines, to promote greater efficiency and transparency of the labor market. In addition, the Decree-Law no. 112 of 25 June 2008, introduced the PhD as a new type of apprenticeship.

In this direction, the PhD in “Technologies of architecture and environment” of the SUN has strongly promoted research topics of interest not only for the government but also private entrepreneurs. It has trained researchers and experts in environmental issues, such as technological design, protection of cultural heritage, environmental recovery and restoration of sensible areas, eco-design.

The objective was the acquisition of skills that refer to the principles and appropriate methodologies for the design of building structures and eco-sustainable settlement in a scenario where building is an open system of flows of matter, energy and information, and “the environmental friendly behaviour” is key to understanding and tool for design innovations. The imperative is to envisage processes and products with low environmental, economic and social negative impacts. In this sense, design research, in the complex relationship between nature and artifice, establishes new kind of balance between environmental and anthropogenic changes, at different scales. There were examined topics in which neither consolidated nor theoretical research still appears, nor the verification of design tools, or optimization of results through specific analytical procedures for evaluation and selection of alternatives.

The four research topics are:

- I *Building Energy Quality*: the search for energy quality of the built environment is one of the thematic areas on which European policies are focusing their interest. It is promoting, on the one hand, strategies guided by efficiency and rational use of resources; on the other, policies of conservation and enhancement of the existing architectural heritage, but also new construction, according to the inseparable duality of “integration” and “innovation”.
- II *Environmental Design and Management*: the technological design to environmental scale studies, the phenomena that affect the territory/landscape through the construction of structured and scientifically identified indicators, and it offers technological solutions of bioengineering and environmental design. It is moving towards an approach where the formalization of complex environmental problems can be supported by methods and tools that fall in the category of Volunteers Tools for eco-management.

- III *Technology Systems*: the importance of technological design, through valorizing the ability to design appropriate technological and integrated at the level of detail of the executive component solutions, is reflected in the innovative systems of construction and management of architectural works. In terms of technological choices for the design to working drawings, organization and management of the realization processes, the design solutions that employ recycled and/or eco-oriented materials, controlled by both the entire life cycle assessment and the integration with existing, are preferred.
- IV *Fruition of Sensible Context*: the concept of sustainability in the sense of “wise use” of natural and cultural resources, represents a starting point for the delicate issue of the management of sensitive contexts (cultural heritage minors, archaeological sites, natural and fitting areas, disused industrial zones), which requires a methodological and design approach, oriented to process over that of the product innovation.



Fig. 1
Research topics.

For example, in Table 1, there are all the doctoral researches conducted in the range of PhD Courses of Technology of Architecture and Environment from the seventeenth to the twenty-third cycle, with the indication of Reference topics.

Table 1

Doctoral research in the Technology of Architecture sector (XVII-XXIII Cycles).

PhD Course	PhD cycle	PhD Student	Tutor/Co Tutor	Title	Topics								
					I Tools	I Process and Product Innovation	II Tools	II Network	II Technological solutions	III Product	III Process	IV Strategies	IV Design
Technology of Architecture and Environment	XVII	Teresa Alvino	Marocco/ Franchino	The new dimensions of school buildings performance							X		
	XVII	Emanuela Gravina	Muzzillo	River Places. Instruments of perception and fruition			X		X				
	XVII	Cristina Sannini	Bosco	The project Mediterranean Envelope: guidelines for residential energy efficiency	X								
	XVIII	Caterina Frettoloso	Marocco	Integrated methodologies for cultural fruition of archaeological parks								X	X
	XVIII	Angela D'Angelo	Violano/ Amirante	The characters of eco- industrial prefabricated envelope. A grid of indicators	X								
	XIX	Manuela Musto	Rinaldi	From industrial to residential building: Passive cooling for a sustainable use							X		
	XIX	Mah'd Ibraim Odeh Arinat	Marocco	Towards sustainable management of cultural heritage: a planning model for the Jordanian context								X	
	XX	Luca Pagano	Rinaldi	Hydrohouse. Architecture, water, energy		X							
	XX	Mariachiara Catani	Valente	Eco-technological corridors. Environmental upgrading of infrastructure for the urban primary network				X	X				
	XX	Monica Cannaviello	Violano	The energy performance in summer conditions. Criteria for the rehabilitation of envelope	X						X		
	XXII	Assunta Fusco	Grimellini	Urban Management: the color plan							X	X	
	XXII	Raffaella De Martino	Lauro/ Franchino	River Redevelopment: ecosystem assessment and interventions for the construction of an ecological network				X					
	XXIII	Mariarosaria Arena	Rinaldi	Integrated training systems for the transfer of technological innovation in the construction industry							X		
	XXIII	Luigi Foglia	Amirante/ Rinaldi	Living in the subsoil: requirements for a sustainable model of residential land					X	X			
	XXIII	Alessandra Scognamiglio	Bosco	Greenhouses and landscape	X	X							

The present Doctoral School in Architecture (XXIV-XXVIII PhD Cycles): Recent Transformations

The PhD School in Architecture Disciplines (PhDSinA), established with the Rector's Decree n. 99/2010, promotes collaboration of teaching and research with universities, institutions and national and international research centers and delivers three doctorates:

1. Environment and structures representation, protection and safety and land management,
2. Architectural and Urban Design and Restoration of Architecture,
3. History and Technology of Architecture and the Environment.

Training on the issues of the disciplinary sector is structured according to the following articulation:

- Basic learning
- Specialized topics
- Smart tools.

Training² involves carrying out cultural activities in collaboration with other universities and research national and international institutions, participation in congresses, conferences and architectural competitions, training in the use of new information technologies. The development of specific research themes involves the active par-

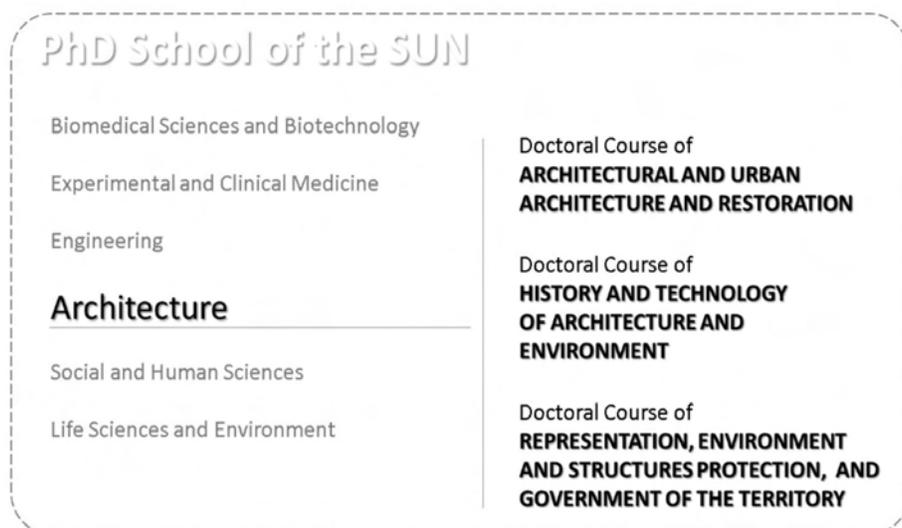


Fig. 2

PhD School of SUN from a.y. 2008-2009.

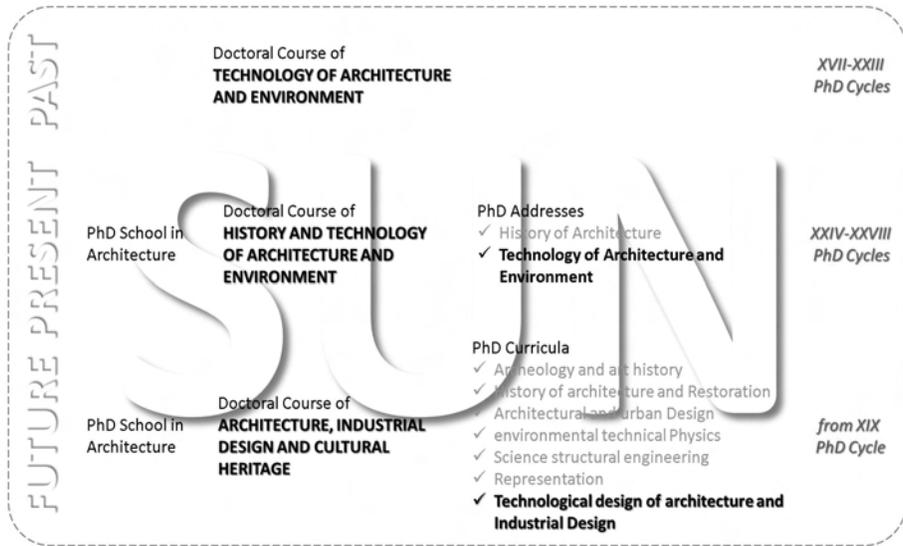


Fig 3. Evolution of doctoral education offered in Architecture at the SUN

ticipation in lectures, seminars and conferences organized by the teachers and the organization of study tours. The specialized research training includes training periods abroad, for at least one month, at universities and foreign institutions.

The individual study has great importance, conducted in line with the educational objectives of the PhD, following the directions of the Council of teachers under the guidance and supervision of the tutor and co-tutor.

The PhD student, each in his/her own location, contributes to the development of a scientific and productive ecosystem based on a strong interaction of social and environmental issues. National networks have been created in order to coordinate research in various universities. For example, the network of the Italian Observatory of Doctorates of "Technology of Architecture" (OsDotTA) is proposed to implement a continuous comparison of the issues identified internationally by agreements among the PhD, the research institutions and the researchers.

The TA Address trains researchers in order to multiply future career possibilities, through reflection on innovation, sustainability and feasibility.

The PhD researchers work in the realm of research, investigating the systemic processes that govern design at different scales, in public and private research institutions and the academia. PhD researchers can be even technicians with highly professional profile, that work in the field of technological innovation, in public agencies and administration, and as part of research groups and industry design.

Table 2

Doctoral researches in Technology of Architecture sector (XXIV-XXVIII Cycles).

PhD Course	PhD cycle	PhD Student	Tutor/Co Tutor	Title	Topics									
					I Tools	I Process and Product Innovation	II Tools	II Network	II Technological solutions	III Product	III Process	IV Strategies	IV Design	
Design, Environment and History	XXIV	Bruna Rubichi	Fumo	Processes and technologies for a sustainable energy management: the case of Pompeii excavate									X	
	XXIV	Luigi Castaldi	Franchino/De Giorgi	Strategic and applied research in the field of plumbing fixtures for the reduction of environmental impacts in production and operation					X					
History and Technology of Architecture and Environment	XXV	Leonardo Boganini	Sala	Building elements and construction components evolved to the integration of sustainability aspects in the Mediterranean area	X	X							X	
	XXV	Luca Sgrilli	Sala	SOCIAL HOUSING. Technology integration in the evolution of new social housing									X	
	XXV	Antonio Maio	Violano/Amirante	TECHNOLOGY FINGERPRINT OF LAND. From Ecomuseum towards a dynamic model of development								X	X	
	XXVI	Andrea Tulisi	Franchino	Lights and shadows in the city: environmental and social potentiality of the semi-closed spaces of the consolidated urban					X					
	XXVI	Sabatino Michele	Sala/Carillo	Disposal of the heritage of the defense Department: a complex operation. The case of Florence									X	
	XXVII	Francesca Verde	Violano	Smart neighborhood in Mediterranean area	X								X	
	XXVII	Concetta Giuliano	Violano/Jacazzi	Technological innovation and energy quality of the historical buildings	X	X								
	XXVIII	Lucia Melchiorre	Violano/Muzzillo	Innovative systems and technologies to manage the frontier of sustainable construction buildings sites in urban areas		X				X				
	XXVIII	Mariangela Buanne	Fumo	Performance and matter: the building envelope and the external environment									X	

Therefore, a doctorate reflects the quest for innovation addressed by the society and by architectural practice.

The Future: Expected Profile of the Researcher in Architecture

The PhD research SUN from 2013 are further reduced and merged in order to remedy the large fragmentation.

For the future (from the Cycle XXIX), the doctoral course in Architecture, Industrial Design and Cultural Heritage brings together the three PhDs from the Department of Architecture of the SUN. It is set up and activated by Rectoral Decree, after accreditation granted by the Ministry of Education, in the opinion of ANVUR mandatory, as required by Law 240/2010 Ministerial Regulation no. 45/2013³.

A doctorate provides a highly vocational training to allow the use of scientific competence and disciplinary exercise not only for advanced research activities at universities, but especially to take place in the world of work (public or private) with a qualifying competent researcher, able to promote spin-offs.

The Second University of Naples (SUN) has always identified the doctorate courses as a strategic sector for the production of research advanced and higher education. For this reason, despite the reduction in public funding for research, it enhances the quality and quantity of specific teaching imparted by its Doctorate courses, their international connections and their attention to countries emerging culturally, relations with the productive and social realities on the territory and the quality and quantity of research carried out by the teachers.

With the conviction that the construction of the European Higher Education (EAHE) cannot be separated from the construction of the European Research Area (ERA), the PhD in Architecture of the SUN is organized with increasing stimulus to international mobility and international PhD integrated.

The multidisciplinary approach is encouraged to increase the ability of PhD students to communicate with experts from other disciplines, to organize and manage integrated projects. However, the opportunity to work together with PhD students of different fields is still rare.

Reading these changes, hopefully for a long time, one thing is indisputable: public University trains experts while the public education system innovates itself, is substantiated and enlivens itself in connection with the territory and its dynamics of evolution.

Therefore, the only actionable strategies are the strategies of lifelong learning, the only one that can keep pace with the development of the times with the systemic changes.

In fact, a decisive factor is the relationship between university, industry, and government, in which the game is to be played under the banner of cooperation and information.

Notes

- 1 Source: Data CNVSU, 2007
- 2 The courses of the School of PhD require the acquisition of 180 credits. The acquisition takes place when students pass tests of profit related to the passages of the year and when students pass the final exam to obtain the title of PhD (Doctoral School Regulations, Article n. 10).
- 3 The PhD courses of the SUN have a duration of not less than three years and PhD Schools organize them.



La Sapienza, Rome

PhD in Architectural Design: a five-point Algorithm or why a Computer Scientist must Produce a Program and an Architect not a Design?

Antonino SAGGIO

La Sapienza, Rome

Italy

History and Background

In Italy the history of the PhD program is different from that of other European countries. Traditionally, the way to access teaching positions in Italian Universities was granted through the “*Libera docenza*” (an official professorship accreditation process in which the candidate submitted his or her scientific publications for evaluation).

The PhD course was introduced within our education structure only in 1980. One of the ideas behind the introduction of the PhD program was that the acquisition of the title of “*Dottore di Ricerca*” (abbreviation in Italian “dott. ric.” Doctor of Research) would have substituted the previous title of “*Libero Docente*”. Although it was left open and technically possible to get the PhD title with the presentation of an important “independent” dissertation, the three-year university graduate program should have granted a solid structure to form high-qualified researchers and faculty members. Very naturally, the posses-

sion of the PhD title would have represented an important “priority” factor to access teaching and research public positions. It should be said, however, that this “priority” was not granted. The well-consolidated criterion of “anzianità” (seniority) was adopted instead, to favor access to the previous generation of researchers who did not have a PhD. It was an unnatural decision, full of negative consequences. Of course we are within the realm of political decisions that are not the concern of the current publication.

In the field of architecture, PhD programs were introduced in, at least, nine different disciplinary areas: Architectural Design, Representation, Planning, History, Restoration, Technology, Construction, Product Design, Design Economics. The first PhD program in Architectural and Urban Design (*Composizione architettonica e urbana*) started in the academic year 1985-1986 at the IUAV (*Istituto universitario di architettura di Venezia*). The year after, in 1986, the PhD program in Architectural Design started at Sapienza University of Rome. This program was coordinated by professor Paola Coppola Pignatelli and had a prestigious “*Collegio dei Docenti*” (Faculty Board of the Doctorate). Among the members were Carlo Aymonino, Franco Purini, Costantino Dardi, Enrico Guidoni and others. Among the PhD students, Ruggero Lenci and the author, Stefano Panunzi, Roberto Cherubini, Fernando Recalde from Ecuador and Francesco Garofalo who is now the president of Area 8 (Architecture Planning and Engineering) of Anvur, the national system of evaluation of the quality of research in Italy. All the Italian PhDs of that cycle became tenure professors. In November 2011, the author was elected to be the coordinator of this PhD Course *Architettura Teorie e Progetto* (Architecture-Theory and Design) which has now reached its 29 cycle and is still offered at Sapienza University of Rome, by Dipartimento of Architettura e Progetto headed by Piero Ostilio Rossi, who was previously the coordinator.

In our website there is a complete description of the goals, the structure, the faculty, the theses topics and so on. In the present essay the abbreviation *PhD Diap* will be used with no further mention referred to a citation from our web site <http://w3.uniroma1.it/dottoratocomposizionearchitettonica/>.

Bologna declaration

One of the key questions to respond to is the variation in our doctorate since the Bologna Declaration in 1999. In our case the variation was important and sensible. Our doctorate program was structured after the Bologna declaration with a very formalized credit structure, throughout its three years of program, the extra six to sixteen months to produce the final Dissertation, are of course outside the credit system.

“The PhD course is developed according to the acquisition by graduate students of 180 CFU (university credits), generally divided into 60 credits per year. 60 credits correspond to an overall activity of 1,500 hours. Graduate students are also requested to actively participate in the activities of the Department, which allows them to achieve a useful cohesion within their group, a mutual exchange of ideas, as well as a practical implementation of architectural teaching methods as well as of the training processes of planning conception.

Training credits correspond to hands-on teaching activities, apprenticeship inside of organized research units, including individual study and research" (PhD Diap). For example, this is how the second year is structured:

- 20 credits minimum to the Formation (Seminars or design workshops, usually ten credits each);
- 6 credits for the organization and presentation of the official Dissertation proposal;
- 12 credits as maximum to the training to research carried out preferably on research structures abroad or within the different Department Labs;
- 6 credits as maximum for meetings and discussion with the Faculty board, and for the participation in conferences and seminars;
- 8 credits, at maximum, to the Assistantship within Design studio courses;
- 8 credits, at maximum, for the participation in architectural design Competitions and for presentation and publication of conference papers;
- 8 credits for the attendance to an official University course to follow a subject, which is central to the research of the candidate (PhD Diap).

In the first two years PhD students are required to follow doctorate seminars and workshops. These seminars are offered directly from the faculty members of the PhD course. They are intended to present stimulating areas of research for the emerging interest of the PhD students. They are mandatory, but the students can pick the four to seven they want to follow within a much longer list. It is possible to acquire credits also through the participation in University Courses or teaching modules launched within Specialization Schools, University Master Courses and other PhDs on the basis of a previous approval by tutors.

The PhD course is divided into a first training year and two years mainly devoted to the drafting of the Thesis, which is jointly analyzed by teachers through a series of collective and individual revisions, in addition to the eventual external contribution of a specialist in subjects and disciplines not represented within the Teaching Staff.

Cultural lines

Naturally very relevant are the questions of content, particularly in our case because it is a doctorate in architectural design, a field much more sensible to this issue than others. Traditionally the School of Architecture of Rome, the first and oldest in Italy, has not been characterized by a strict cultural and scientific direction, but, on the contrary, by the coexistence of more lines of thoughts. This rather open and even eclectic position fostered the possibility to research accordingly to different angles. It allowed the coexistence of rich and, at the same time, very diverse cultural personalities. In the 60s and 70s this openness was represented by the presence in our School of three completely different figures such as Ludovico Quaroni, Leonardo Benevolo and Bruno Zevi. This "open" characteristic continues nowadays and it is mirrored in our doctorate. The PhD students are allowed to follow different fields of research with diverse cultural angles. These areas of interests are ranging from the strictest studies about the fun-

damentals of architecture (we have completed a dissertation about the proportional and the Neo-platonic numbers) to several emerging fields such as the relationship with the current philosophical debate or the researches in the connection between architecture and Information Technology.

These open range of researches are well expressed in the history of the official publications of our PhD. These publications had two phases. A first one, with the publisher Gangemi, with twelve books which were produced in mid 90s and a second phase that started last year with the publisher Alinea. The last four books of our doctorate range from an essay on Mediterranean figurative culture, to the structural search of Toyo Ito, to the Public Housing of Ina Casa in the 50s to the relationship between photography and architectural design. The very different books (authors respectively Alexis Tzompanakis, Carlo Gamboni, Daniele Carfagna, Amanzio Farris) have been sending vectors to very different directions but surely all of them are of good quality. My colleague prof. Orazio Carpenzano assisted Prof. Coppola with the first edition with Gangemi and now edits this new series of PhD books. This rather open field of research was also mirrored in the lecture and exhibition series of our PhD course. They go from exhibitions that monographically analyze the work of previous faculty of the school (Purini, Aymonino, Panella and others) to lectures organized around key figures of Rome contemporary architecture such as Alessandro Anselmi, to conferences with theoreticians of today such as Juhani Pallasma or very engaged research personalities such as Branko Kolarevic, Lucy Bullyvant, Marx&Serraino etc.

Since the large majorities of our Scholarship are coming from the Italian Ministry of Education, our PhD program has not the pressure to find external funding to finance research. If this peculiarity is, on the one hand, a great advantage towards freedom of research and produces some outstanding results, on the other hand, this autonomy brings to a certain level of academic "self referential" attitude and to a too abstract and often irrelevant research. This aspect in our case is mediated by the presence of several workshops of design in the course of the programs. These design workshops tend to face real issues that are present in Italy and abroad and to force PhD candidates to intertwine research with design and with real situations and crises.

Main areas of research

The PhD programs cover seven areas of research and they tend to converge towards a final thesis dissertation that may belong to one of them (following information is contained in PhD Diap and it has been revised here for clearer communication).

1. The Program aimed at the experimentation of a complex urban plan.

This program is targeted to the education of researchers meeting the needs of research and training authorities, as well as governmental and territorial management authorities, besides the organizations dealing with territorial management, planning and production authorities operating in the infrastructures and building

industry that are interested – for their institutional purposes – in the development of complex projects.

An example of PhD dissertation in this program is Vincenzo Tattolo, *The architecture of the underground network and its relationship with the city. The case of Chatelet-Les Halles in Paris, / L'architettura delle reti della mobilità sotterranea e il suo rapporto con la città. Il caso di Chatelet-Les Halles a Parigi* tutor prof. Roberto Secchi.

2. Analytical and historical-critical profile on the architecture of modern and contemporary cities.

The aim of the program is to educate researchers meeting the needs of research and training organizations as well as of territorial management and governmental authorities interested in the scientific interpretation of urban phenomena and urban structures.

An example is Patrizio Emilio Giordano, Buenos Aires, *The bad mix / Bueneos Aires. La cattiva mescolanza* tutor prof. A. Criconia and prof. A. Capuano

3. Theory and criticism of contemporary architecture.

The aim of this program is to educate researchers meeting the needs of research and training authorities, but also territorial management and governmental authorities interested in the interpretation of architectural proposals in their theoretical and methodological horizons in relation to the genealogy of ideas, techniques and figurations.

Giorgio Pasqualini Yohaku, *The role of the symbol in the relationship between Architecture and Nature in the young Japanese architects / il ruolo del simbolo nel rapporto tra Architettura e Natura nei giovani architetti giapponesi* tutor prof. Luigi Gazzola.

4. Study and experimentation of housing in its transformational and evolutionary processes, also in relation to environmental sustainability.

This program is targeted to the education of researchers meeting the needs of research and training authorities as well as public and private subjects operating in this sector and interested in the sustainable transformations of the city and of the natural environment transformed to meet human needs.

Daniele Carfagna, *L'architettura tra le case. Strategie compositive del piano INA-Casa (1949-63): materiali per un approccio contemporaneo/The architecture of INA-Casa plan (1949-63): material for a contemporary approach* tutor prof. Massimo Del Vecchio, prof.ssa Paola Di Biagi.

5. Study and experimentation of architecture as communication in the use of contemporary information tools.

This program is targeted to the education of researchers meeting the needs of research and training authorities as well as the territorial management and governmental authorities interested in the conception and experimentation on urban spaces as well as of the architectural elements of the city, their representation and communication through IT tools.

One dissertation in this program is Antonino Di Raimo, *Il corpo come strumento del progetto architettonico contemporaneo. Verso un'architettura come sistema vivente* tutor prof. Antonino Saggio.

Carlo Gamboni, *Il ruolo della progettazione strutturale nell'opera di Toyo Ito: 2000-2009* tutor prof. Luigi Gazzola, co tutor: Leone Spita.

6. Study and experimentation on architectural and urban planning in countries with a non-European traditional culture.

The aim of this program is to educate researchers to meet the needs of research and training authorities as well as the territorial management and governmental authorities – both Italian and non-Italian– as well as the planning and production authorities operating in the infrastructures and building industry, which are interested in the development of architectural and urban planning methodologies suitable for the conditions and the needs of countries with a non-European traditional culture.

Sokol Huta, *The role of ex-industrial sites in the new territorial city of the Adriatic-Balkan area. The case of "Durana"*, tutor Prof. Alessandra Criconia, prof. Ludovico Micara.

Afshin Gorbani Param, *The Architecture of Iranian Caravansaries* Tutor prof. Lucio Barbera, prof. Hassan Osanloo.

7. Fitting out and exhibition areas including several educational frameworks: arts, architecture and multimedia.

These programs are targeted to exhibit and communicate on the occasion of exhibitions, artistic events or shows. This topic, based on the idea of contemporary cities as "cities in the making," represents a filter through which analyzing trends and languages of contemporary architecture. This curriculum is aimed at training researchers interested in the development of methodologies suitable for the growing spread of setting up public buildings and public areas.

Paolo Rodorigo, *I media di nuova generazione nel formarsi del progetto architettonico. Cittadinanze attivate dai media digitali / new media in the formation of architectural projects. Citizenships activated by digital media* tutor prof. Antonino Saggio.

Dissertation structures within the realm of architectural design

A key element to discuss in conclusion is the characteristics of a PhD Dissertation in the case of theory and architectural design. The key question is: How will a PhD research "be incorporated in the so-called "research-by-design", "research through design", "artistic research" or "practice-based research" in the existing doctoral education structures?". To address the question one has to think of the relationship between Research - or better, Scientific Research - and Design. Well known components of scientific research are:

1. Validity of results
2. Explicitness of process and methods and
3. Declaration of sources.

All these three criteria are rather ill defined in design. In architectural design the three key parameters are instead:

1. Effectiveness of results,
2. External interests for results,
3. Singularity and novelty of the proposal.

It is evident that scientific research and design do not match immediately, hence the “apparent” contradiction and the fact that in many PhD programs in architectural design, including ours in Rome, the field of Theory is much more followed than that of Design.

Let’s try to understand how we can stimulate more design theses to face the domain of architectural design *per se*. To address the question we have to better investigate the relationship between design and research. Let’s make three cases.

The first is that “Design *is* research”. The second is that there is a field that oscillates between “Design *and* Research”. The third focuses on a very specific research aspect but excludes the synthetic operation of design; “research *or* design” is the case. This is the case of the largest majority of Dissertations in architecture in Italy in the field of History or Planning or even Technology; to be scientific, design must be excluded.

The author is a strong supporter of the possibility to have PhD dissertation in the field of Design itself. This is based on the conviction that for an architect, as mentioned above, “Design *is* research”. There are many examples of this approach in the history of architecture. Let’s forget, because too obvious, the Renaissance times with the Ideal city and the famous Trattati (Tractatus) from Alberti to Vignola, or the Baroque times (just to remember “Le Carceri” - The Prisons- by Giovanni Battista Piranesi should be enough), and let’s move to the last century. We can think for example of The Linear City by Arturo Soria y Mata, The Industrial City by Tony Garnier, la Ville Radieuse by Le Corbusier, Broadacre City by Frank Lloyd Wright and more recently Electronic Urbanism by Takis Zenetos or Arcology by Paolo Soleri.

Design *is* research

Also based in the relevant tradition described above, the author believes that the option based on the assumption that “Design *is* research” should be left open to PhD candidates who are judged by the Faculty Board as exceptionally gifted individuals who can produce a well-articulated program of objectives.

In these cases, the central aspect of a dissertation is of course the presentation of the design *per sé* and, therefore, it must fulfill the three criteria, above mentioned:

1. Effectiveness of results,
2. External interests for results,
3. Singularity and novelty of the proposal.

But here there is a key aspect to consider within an official university program. Giovanni Battista Piranesi did not ask to have a PhD. To have an official accredited title

is not only necessary to have produced "*Le carceri*" but also to add to the dissertation two other components. These are:

4. The dissertation must present a section of "Critical self evaluation and assessment of results" and
5. It must contain a section of "Methods and processes of the work".

Issues 4 and 5 are crucial within a PhD program as they demonstrate the capability of "expression" and articulate what is fundamental for a researcher and eventually for a teacher. Here are "the Five points algorithm of a PhD dissertation in architectural design". As a counterproof, use these five points algorithm in another creative field. Apply, for example, to architectural programming in computer science and you will see how they work. Or do another test. Do you expect that a PhD in Architectural programming is not required to write a program? Probably instead you will require that he or she fulfills the five point of the just proposed algorithm, right? Why architectural design should be different?

Design and research

Naturally there is a case of minor difficulty to address the issue. It is based on the formula "design and research". For this area the key aspect of the dissertation is not the production of one exemplary and innovative design but the emergence of criteria, methods, issues. In other words, one of the key aspects of the dissertation is its capability of "Using goals In Design" which is the underlined formula for this type of Design dissertation. Naturally for this type of dissertation, the fields related to *Utilitas* or *Firmitas* are more common than those to *Venustas*, although even in this case it is possible to have an approach Goals driven that avoids the ideal of the a-historical perfection of the Academic Tractatus for a more changeable and contextual approach¹.

In these cases the dissertation area is restricted to a very specific subset of issues. This restriction will allow the PhD dissertation to bridge between research and design: the dissertation does not focus on the high level of a design result, but on a more pragmatic evolution of design knowledge. The operational field, therefore, is that of "*Un manuale*" (an handbook, or *repertoire*) that are numerous in all fields as well as in architecture. In subfields such as distribution systems, typologies, architectural briefs, specific climate context, or very specialized construction methods these restrictions can create interesting fields to allow the progression of design. It is important to notice that the criteria in this case are completely different from the previous ones. These are:

1. Definition and updated knowledge of the fields of investigation
2. Cultural, economical and political importance of the subject area
3. Collection of pertinent examples analyzed through criteria relevant to design
4. Presentation of examples produces by the candidate with methodology to achieve expected results
5. Progress of the dissertation in comparison with the existing literature.

Point 4 is clearly fundamental as it shows the possibility of a researcher to operate also as a designer and as a teacher of design. In other words, if in the case where “design is research” is fundamental in a PhD program to show not only the capability of a designer but also that of a researcher and teacher, here is the opposite: it is important to show the capability of a researcher to be a designer and a teacher.

I have to confess that although I am in the Board of PhD since more than a decade and I am coordinating one since 2011, the majority of our dissertation theses do not fulfill either of the two cases that I have just described. Many of our PhDs tend to produce good essay, some of which may deserve publications but very few address the core of what a dissertation in Architectural Design should be about. For this reason I am happy to have put together this essay in order to clarify this possibility and to have been given the opportunity to push more PhD Students in this direction.

Conclusion

The paper wished to give a brief overview of the development of the PhD program in architecture at Sapienza University of Rome, followed by a presentation of the structure of the program of study and the main areas of research. In the last part of the paper, aspects of PhD research and the design are explained, and five assessment criteria are proposed. The perspectives of doctoral research in architecture are implied through closer interrelation with design.

In this final section, this paper wants to provide information and the main criteria for PhD dissertations that focus on Architectural Design and Theory. To this goal, the paper presents five assessment criteria for two cases. One according to which the dissertation has, at its center, a new design and another case according to which design is strictly related to pertinent research. More specifically:

Five point assessments for a Dissertation based on «Design *is* research».

1. Effectiveness of results,
2. External interests for results,
3. Singularity and novelty of the proposal,
4. Presence of a section of “Critical self evaluation and assessment of results”,
5. It must contain a section of “Methods and processes of the work”.

Five point assessments for a Dissertation based on «Design *and* research».

1. Definition and updated knowledge of the fields of investigation,
2. Cultural, economical and political importance of the subject area,
3. Collection of pertinent examples analyzed through criteria relevant to design.
4. Presentation of examples produces by the candidate with methodology to achieve expected results
5. Progress of the dissertation in comparison with the existing literature.

Other questions posed by the editors are relevant for common discussion and I will answer them in conclusion:

The first question: *"Which are the forms and reforms of Doctoral education in your school of School?"*

The Italian PhD program is going through a general reform in these last years. On the one hand the PhD programs are becoming the 3rd Level of university education (which implies a more formalized "credit" system and a more formalized frontal teaching activities). On the other hand, the cultural and scientific Level of each PhD program is passing through a National agency of evaluation ANVUR for accreditation of the results, for the quality of the academic body, for the level of scientific results.

The second question: *"Which are the main plans and expectations for the future of doctoral education in your school of Architecture?"*

The School of architecture in Rome offers, at least, ten different PhD programs. Three are in the area of Urban, Construction Architectural and Landscape design. The tendency is to create larger unified Schools. This tendency may detract from the quality of focus of individual programs.

The third question: *"Which are the main characteristics of the researcher's profile that your school wants to generate?"*

My school traditionally wanted to generate a profile of young faculty but also a personality able to work within research institutions. More and more our PhD are being occupied outside Italy.

Note

- 1 I remember, as an example, a research of my American master Louis Sauer on how the residents perceive their housing and in the consequences that this research brought to actual form making of new projects.



Vilnius Gediminas
Technical University

Stable Tradition in Times of Change

Eglė NAVICKIENĖ

Vilnius Gediminas Technical
University

Lithuania

Doctoral training in architecture, as compared to classical sciences, is a relatively young phenomenon. In 1934 an Institute for Aspirants (equivalent to doctoral education) was opened in the Academy of Architecture of the Soviet Union thus starting doctoral studies in architecture in the countries of the Eastern bloc. In the beginning of the 1960s doctoral training in architecture at universities of the USA and, afterwards, Europe initiated doctoral studies in architecture in the Western bloc countries.

Following a break of one hundred years in architectural education, which occurred due to restrictions implemented by the czarist Russia, the largest and oldest school of architecture in Lithuania – at present: the Faculty of Architecture of Vilnius Gediminas Technical University (VGTU) – started its functioning in 1922. It evolved in different forms from a department to a faculty consisting of several departments, in shifting its institutional subordination due to the changed structures of univer-

sities or institutes, and even relocating from Kaunas to Vilnius. Doctoral training was first introduced there in 1962, which indicates quite a long period of development. Transformation of this school was determined by major factors related to the state, such as priorities given to architectural research and position in the classification system of scientific research fields; and related to the institution itself, such as the structure of doctoral education. Doctoral training at the Faculty of Architecture, VGTU, has obtained quite different forms, has been regulated with different guidelines and went through different priorities in the Soviet period, as well as the period of the independent state from 1990 on, including also the Bologna Process. The aim of this paper is to reveal major changes that occurred in the process of doctoral training at the Faculty of Architecture, VGTU, because of the political transformation (assuming that many European countries did not experience this) and major changes it faces with regard to dynamic reforms in the area of doctoral education, an outbreak of specific forms of doctoral studies and emerging priorities in research, both general and architectural. It is a narrative of an established tradition in doctoral training, quite specific in the context of Europe for its stability and conservativeness, which helps to withstand and maintain the know-how during political and any other transformations in the country, although at present this peculiarity may turn into a short-sighted impediment. Besides the development tendencies and perspectives of doctoral education at the Faculty of Architecture, VGTU, the current situation in doctoral training and main characteristics of researchers' profile are described.

Evolution: Soviet Period (1962-1990)

Lithuania was occupied by the Soviet Union in 1940, and in 1944 the occupation brought ideological, economic, political, cultural restrictions on Lithuanian people. Although the impact of the Soviet rule on Lithuanian state and society in many spheres was negative and destructive, the Soviet system with elaborated progressive architectural research and doctoral training opened some new possibilities. In 1934 the Academy of Architecture of the Soviet Union was established in Moscow as an institution concentrating on architectural research. It comprised an Institute for aspirants educating architects-masters in equivalent to western PhD [Косенкова, Самохина 2007]. Since then the process of organized research and doctoral (so-called "aspirant") training for the Doctor's scientific degree in architecture (so-called "candidate of architectural sciences") evolved and spread in Soviet institutions; meanwhile no-one was studying or striving for a scientific degree at the only Department of Architecture in Lithuania.

Lithuanian architectural research and doctoral training benefited from the Soviet experience in the field: first Lithuanian architects defended their PhD theses in architecture in institutions for research or higher education located in Moscow, Leningrad, Minsk and Riga from 1951. Human potential of researchers holding a scientific degree in architecture was accumulated at the Departments of Architecture and Urban Design, and in 1962 these subdivisions were granted the right to qualify aspirants (equivalent to doctoral students) and organize the defence of their dissertations for candidates of scientific degrees in architecture (equivalent to the PhD thesis). The

aforementioned period was especially productive for local doctoral training and coherent process using Lithuanian language in Soviet times and reached the rate of almost two scientific degrees obtained per year. Since 1976 the complete process of doctoral training in local research and education institutions all over the Soviet Union was restricted to educating aspirants locally and afterwards defending their thesis in a centralized way in Moscow and Leningrad. The complicated process, use of the Russian language, increased scientific requirements determined the decrease in number of the scientific degrees obtained by Lithuanian architects, although the number of aspirants working at the Faculty of Architecture, VGTU was quite even.

Distribution of research fields represented in dissertations defended by Lithuanian architects during the Soviet times shows that urban design and regional planning issues outnumbered architectural ones; every fifth work analysed history or theory issues and urban, architectural, vernacular heritage [Navickienė, 2013]. It should be mentioned that in major cases the subject of research was defined by typological aspects on the basis of the subject's function, position, significance, etc.; it was a characteristic feature of Soviet architectural research.

Research works for scientific degree in architecture done by Lithuanian architects during the Soviet times corresponded to the general situation of Soviet architectural research that was determined by global tendencies and Soviet formalism and ideology. Those days, globally the world was obsessed with modernity aiming at progress; the prominence was given to professional competency; specialized, mono-disciplinary and depth-oriented research dominated. In the Soviet Union scientific discipline, as well as practice of architecture and territorial planning was a priority in its ideology: according to the Soviet classification of scientific research specializations, architecture was included as one of the main 25 scientific fields. It was divided into the sub-fields of architecture, regional and urban planning, and since 1972 complemented by a subfield of theory and history of architecture; and, in addition to this, by a subfield of industrial architecture, which was applied for a certain period only. The Soviet recognition of autonomy for the architectural discipline as a separate field avoiding correlation with cognate disciplines (this kind of autonomy is unique in Europe till now) was a condition for development of miscellaneous disciplinary identity, specific methods, tools and questions; on the other hand, it determined the insularity of the discipline, rigorous specialization, explorations only within an established framework done exclusively by architects, little incorporation of humanitarian, social, technical issues or knowledge of other creative professions. Another specific feature of research made by aspirants and architectural research in general was its applicability, empiric nature and connection to practice; applied research dominated over the fundamental. It was an outcome of demand for applicability of research results within the Soviet priorities, and also the lack of know-how of theoretic research in academic discipline on the initial stage of its development. Thus the described Lithuanian experience (as an integral part of the Soviet one) was a bit different from Western experience in starting doctoral programs in architecture that followed the models, tools and methods of humanities and social sciences [Dunin-Woyseth 2005; Dunin-Woyseth, Nilsson 2011].

Evolution: Period of Independent Lithuania (since 1990)

After regaining the state Independence in 1990, Lithuanian institutions for higher education adjusted their educational structure and research processes to the ones settled in Western Europe. In 1992 doctoral studies were established instead of aspirant training; at the same time research field classification was set where architecture was positioned as a separate field in Humanities. In 1993 main educational and research institutions in architecture were granted a right to implement doctoral education. In all fields, including architecture, changes of different kinds were linked to quantity decline of theses defended in spite of numerous, yet unstable, number of doctoral students.

In 1998 the research field classification system was changed according to recommendations by the EU Commission. The position and significance of architecture as a separate scientific field was downgraded to a subfield of History and Theory of Arts in Humanities and it was interconnected with sculpture. Coupling of disciplines of sculpture and architecture was neither self-adjusting nor efficient as there were almost no interdisciplinary or multidisciplinary works representing both disciplines coherently. New research classification disorganized the original unity of architecture sphere that comprised architecture, interior design, urban design, urban planning, territorial planning, landscape architecture and their heritage. Research works in the diverse architectural ranges were no longer concentrated in the same scientific field. Research in architecture (in its broad scope) in Lithuanian institutions is distributed within the subfield Sculpture and Architecture in the field of History and Theory of Arts in Humanities; in the fields of Civil Engineering and Environmental Engineering and Land Management in Technological Sciences; as well as in the subfield of Town and Country Planning in the field of Sociology in Social science. In 2012 the temporary research classification with listed sciences and fields without any subfields was confirmed and the new classification system that is especially relevant because of newly emerging research themes, often interdisciplinary ones, is still pending. Different and variable treatment of architecture research is presumable in the new classification.

In the period of 1993-2013 the largest number of PhD theses defended in the field of architecture (in its broad scope) in Lithuania – 29 – were prepared at the Faculty of Architecture at Vilnius Gediminas Technical University (VGTU). Except one, all of the graduates are Doctors of History and Theory of Arts in Humanities. Regrettably, it could be stated that qualification in architecture as a discipline is represented only by the title of the thesis.

Contrary to the Soviet times, doctoral dissertations prepared and defended at the Faculty of Architecture, VGTU, on architectural issues outnumber the ones that deepen into urban topics; the least popular topics are the aspects of historical evolution and heritage preservation [Navickienė 2013]. The issue and subject of recent doctoral research shifted from typological-based to problem-based. Considering their disciplinary attribution, in terms of P. Jenkins, L. Forsyth and H. Smith, the dimension of “width” (cross-disciplinary aspects of the subject in general) in research became more

important than the dimension of “depth” (specialization) [Jenkins et al. 2004]. The topics of theses are no more rigorously specialized, going deeper into a particular part of architectural sphere like architecture, interior design, urban design, landscape architecture, etc. Levels of interdisciplinary approaches may be discerned: research covers certain interacting parts of architectural sphere in a particular scheme (e.g. contemporary architecture and urban heritage) or investigation covers borderlands among certain parts of architectural sphere and cognate disciplines like cultural studies, sociology, philosophy, psychology, cultural heritage, art critics, and law (e.g. architectural heritage and law). The latter approach covers the exploration of question and subject of interdisciplinary position, or contextualising the research of architectural subject in perspectives of cognate disciplines. Integration of interdisciplinary elements is of growing importance, and mono-disciplinary concentration into a particular part of architectural sphere becomes a rarer case.

Position of architecture as a subfield of the History and Theory of Arts in Humanities was one of the major reasons for a new approach to doctoral research at the Faculty of Architecture, VGTU, during the last 15 years. New situation shifts issues of research towards the triad of classical theoretic discourses: history, theory and criticism, and towards deeper analysis of its artistic nature. Recent architectural research uses concepts and experience of other humanitarian disciplines; research is based on the search for fundamental knowledge according to classical methodological principles. The very nature of humanities – to analyse, systemize and evaluate artefacts of the mankind – sets a direction for architectural research towards investigation of past and present state. But, as H. Dunin-Woyseth and F. Nilsson state, “to look forward and construct the future is the central part of architectural design” [Dunin-Woyseth, Nilsson 2011, 83]. The specific bias in architectural research enriches architectural history, theory and criticism in Lithuania. But at the same time it restrains elaboration of innovative, progressive ideas of the dynamic discipline. It lacks a focus on new forms in practice, on technological progress, on theory paving the way instead of fixing the past and the present. Also, regrettably, the theoretic discourse determines a split between academia and practice as it prefers fundamental knowledge to empirical and practice-oriented ones generated for the live needs of profession. Moreover it dissociates from the certain constituent parts of architecture as a discipline like urban design and planning. The very nature of urban research determines its position on the borderland of humanities, technological and social sciences, consequently, research of urban issues is lost in a set pattern of research classification in Lithuania. Doctoral dissertations on the urban topics are sheltered in the subfield Sculpture and Architecture in the field of History and Theory of Arts in Humanities, and are constrained to fit, at least partly, to its tools and methods that are inappropriate and ineffective.

Recent domination of fundamental research over the applied one and of theoretic discourse over the practical one shifts the academic research apart from the profession. It is determined not only by the specifics of scientific field represented in the national research classification – experts from the professional arena are excluded from the process of doctoral training; there is a scarce feedback of research to the profession. The situation in Lithuania corresponds to the global shift in tendencies of

research in architecture and architectural knowledge. The search for fundamental understanding, ideas and knowledge by theoretical, cognitive research became prior to dissemination of the knowledge by applied research in tune with real-life problems in profession and practice within recent decades in Europe [Evaluation 2006, Jenkins et al. 2004].

Doctoral Training at Present: Requirements, Format and Profile of Researcher

Doctoral studies in Lithuania are regulated in a quite strict and detailed way. Therefore the format of doctoral training and the profile of Doctor in architecture must follow the educational system adopted according to the Doctoral Training Regulations of Vilnius Gediminas Technical University and Klaipėda University in the field of History and Theory of Arts, Humanities (2011) drawn up in conformity with the state Bylaws for Research in Doctoral Training (2010). Doctoral training is arranged on the full-time (up to 4 years) or part-time (up to 6 years) basis. The scope of doctoral studies encompasses the total of, at least, 30 credits. Doctoral training is supervised by the Doctoral Committee consisting of 9 scientists conducting high-level research and employed at the academic institutions. For defence of a thesis the Doctoral Committee sets up the Defence Board consisting of 5 scientists. Everyone involved in the doctoral training process: members of the Doctoral Committee or Defence Board, supervisors or consultants of thesis, teachers responsible for taught courses, must meet the following requirements: 1) at least 10 articles published in scientific journals (or 1 monograph and 5 articles in scientific journals) since the award of the PhD degree, and 2) efficient research practice within the last 5 years (at least 3 articles in scientific journals or presentations at scientific conferences), and proactiveness in applied, educational research and dissemination of its results. During the first year of his/her doctoral studies a student must pass 4 examinations; during the studies he/ she must publish at least 3 peer-reviewed articles (at least one in a scientific journal abroad), also present his/ her research results at international scientific events and have at least 2 month-long internship training abroad. The doctoral thesis consists of the text of the thesis, synopsis and copies of scientific publications on the topic of the thesis; usually it is published as a book of 150-200 pages, in A5+ format, in the Lithuanian language. Conventional text of the thesis includes introduction, analytic review, theoretic part, experimental part, generalization and recommendations. Full-time doctoral training is financed by the state and students get scholarships; part-time students do not get any scholarship. Doctoral training in architecture is funded by the State, which is increasingly poor. Doctoral training may be funded from other sources.

Requirements set by the Doctoral Training Regulations draw a clearly defined picture of the process for doctoral training and explain scarcity of collaboration links between academia and practice. Strict selection of persons involved in the doctoral training process eliminates any possibility for acknowledged architects (practitioners) to take part in it. Besides such exclusion of practicing architects from the doctoral training process, there is no established tradition of searching the relevant needs of

the profession to be researched in theses. The fixed format of a thesis as an individual piece of scientific research cannot be replaced by installations, experimental projects, and actual buildings as the outcome of the research; yet the alternative outcome may complement the thesis. Such format of doctoral training separates research from practice, disconnecting academic education in the third cycle from the professional arena. The problem of feedback from doctoral research to the profession is evident, as practicing architects usually do not read scientific papers or theses; the only possible way of dissemination of its results is a published book based on the dissertation material, but it is not a usual case. The only steady links with professional practice are established by the very nature of architectural research: relevance of problems analysed, subject and objects of research, and researcher's personal engagement in architectural design as an extra activity.

Doctoral education at the Faculty of Architecture, VGTU, meets the recent standards of structural and innovative doctoral education at least formally, as doctoral training has not changed much during the last 2 decades; there is a slow change in minds concerning reforms and new possibilities. Taught courses (seminars, lectures) are not organized because of too small number of first year students (less than 4 persons) and individualized study plan for each student; first year students present the papers and pass the exams individually after consultations. International networking for taught courses is limited by shortage of resources. Topics for theses are formulated in advance by scientific supervisors with or without the intentions of potential student mainly searching for *terra incognita* in the discipline of architecture; topics are not prompted directly by practitioners on urgent need in professional practice, also they are marginally connected to teaching courses missing the lecturer at the faculty. Investment in public or private companies in the doctoral education of their employees has not started yet and is not even probable in a small country of less than 3 million.

Talking about the profile of the researcher, the main focus in doctoral training is set on developing scientific competencies of students leaving the general competences and transferable skills aside. Considering the impact of performed doctoral work, it is treated as a way to expand the knowledge in the discipline; considering the profile of the graduate – he / she is educated as an academic and scientific researcher. The main goal of doctoral training is to educate academic staff. In the period of independent Lithuania 29 graduates of PhD studies at the Faculty of Architecture, VGTU, were awarded a doctoral degree; 27 of them work at VGTU (25 – at the Faculty of Architecture, 2 – at other faculties of VGTU) and only 2 of them work outside the academia. Every fifth out of the aforementioned PhD graduates, beside his/her *Alma mater*, works in other higher education institutions of Lithuania, mainly schools of architecture. The established academic career of the doctors shows their quite unidirectional qualification as academic persons. As doctors, they are not educated for the career in public or private sector; there is no need to train them in other than scientific competences or transferable skills. Anyway, as every second PhD degree holder beside the academia is involved in design practice as his/ her extra activity, success of their architectural or urban design works might be a key to the personal benefit from the

doctoral education to architectural practice. Having in mind that the goal of doctoral education is mostly training for the academic career, expectations for the future of the Faculty of Architecture are not inconsistent with the focus on traditional scientific competences set by the Regulations for Research of Doctoral Training. Reducing the number of doctoral students educated at the Faculty of Architecture, VGTU, (1-3 defended theses per year), leaves few possibilities for the career outside academia, and consequently, answering the need to train a researcher meeting the needs of employment market beyond the academia.

Facing Changes

The idea of doctoral training in architecture has changed tremendously all over the world during the recent two decades, firstly by conceptual strategic modelling, later on – realizing the new concepts in educational practice. Since 2003 doctoral education is promoted as a synergy between European Higher Education Area and European Research Area. Accordingly, doctoral training in architecture is the space where two dynamic and challenging spheres – doctoral education and architectural research – intersect and both spheres generate specific (or similar) impulses. It might be easier to understand the course of doctoral training in architecture and contextualize the forms and reforms of doctoral education at the Faculty of Architecture, VGTU, if the main challenges, tendencies and processes in architectural research and doctoral education were singled out separately.

The process of training for PhD in general – one of the main two spheres having an impact on doctoral training in architecture – was rearranged substantially as the doctoral level was integrated into higher education as the third cycle in the Bologna Process by the Communiqué of the Conference of Ministers responsible for Higher Education in Berlin (2003). Subsequent documents by the European Commission, European University Association and Bologna Process highlight the main directions for structural and innovative doctoral education: diverse and inclusive research environments of high quality as the basis of doctoral education; the rich diversity of doctoral programs; achieving the critical mass in doctoral study process by graduate schools or collaboration between universities; increasing geographical, as well as interdisciplinary and intersectoral mobility; promotion of innovative structures: interdisciplinary training and development of transferable skills meeting the needs of employment market beyond academia (posted on presentations at Lithuanian Presidency of the Council of the European Union Conference “Invest in Researchers”, Vilnius, 14–15 November 2013).

The field of architectural research – another substantial sphere making impact on doctoral training in architecture – experiences dynamic changes and faces challenges. The nature of architectural research as a discipline of some particular knowledge base, tools and methods developed over the last decades complying with the general expectations of originality, accuracy and significance applied to research, recently have been supplemented by growing interdisciplinary / cross-disciplinary character and legitimacy of a wide range of approaches and modes, acknowledging research by design as part of the diversity of valid methods, and recognizing installations, ex-

perimental projects, proposals, models and actual buildings as research outcome. Essential aims of the discipline: expansion of its knowledge base and improvement in teaching, learning and practice of architecture recently have been complemented with meeting the contemporary challenges of climate change, globalisation, urbanisation and social transformation and broadening the horizons of architectural experimentation with the development of new technologies and media. There is a constant demand for stronger links between theoretical and practice-based research and therefore between academic and the professional arenas [EAAE 2012].

Insights into forms, reforms and tendencies in doctoral education at the Faculty of Architecture, VGTU, viewing it from a standpoint of recent changes in dynamic architectural research and innovative doctoral education:

Diversity of doctoral programs

Diversity of doctoral programs corresponds to integration of research by design into field of architecture as a creative discipline. The gap between the proportion of practical and theoretic (creative and research) activities in the first two cycles and the third cycle of education, and academism of architectural research were additional stimulus to develop general tendencies in doctoral education focusing on professional doctorate to increase relevance of research by design in architecture. Research by design relates to originality, creativity, innovation; it aims to solve the problems through design work by changing the reality: producing, applying and evaluating the results of creative work for new design actions, artefacts or methods. In Lithuania research by design as a doctoral program in creative disciplines was legitimated in 2000 by the Law on Higher Education and Research by Republic of Lithuania; Regulations of Doctoral Studies in the Field of Art came into effect since 2002. The right for art doctorate was granted to Vilnius Academy of Arts with programs in fine arts and design, and to Lithuanian Academy of Music and Theatre with programs in music and theatre. Vilnius Academy of Arts once applied for an art doctorate in architecture but it was not granted. The Faculty of Architecture, VGTU, has never applied for an art doctorate. As the largest architecture school and main school for PhD in architecture in Lithuania, it faces a challenge of time to initiate an art doctorate program and in such a way to expand the field of traditional analytic, logical and knowledge-consuming research by the creative, conceptual, emotional and knowledge-generating approach towards research. Such extended scope of doctorate would diversify the existing traditional single-minded profile of the doctor as an academic researcher at the Faculty of Architecture, VGTU, by including wider competences and skills to the profile of art doctors, and would enable to build missing links between the academia and practice.

Interdisciplinary research

The main concern in raising relevant problems as topics for the PhD studies is the expansion of the discipline's fundamental knowledge base in a traditional way with inadequate attention towards urgent global challenges of climate change, globalization and social transformation or broadening the horizons of architectural experimen-

tion with the development of new technologies and media. The PhD theses analyzing urban topics might be defined as the most interdisciplinary ones; however, it is not intentional that this position is determined by the specific location of research in urban design and planning on the borderland of humanities, technological and social sciences, which is missing in the Lithuanian research classification system. There is a growing practice in recent doctoral studies to investigate the questions arising at the borderlands among certain parts of architectural sphere and cognate disciplines (cultural studies, sociology, philosophy, psychology, cultural heritage, art critics, law). Recent dissertations like "Theoretic Preconditions for Psychological Values in Architecture", "Expression of Cultural Functions in the City Spatial Structure", "Architectural Heritage Protection in Lithuania (1918-2000): Legal Possibilities and Results of Conservation", "Ideas and Structures in Architectural History", "Policy of Development of Urban Architecture and Society under the Modern Democratic Conditions" might be distinguished for the most interdisciplinary points of view that integrate methods and approaches of cognate disciplines. In those cases, where the subject of research represents the discipline of architecture, research often includes identification, positioning and ranking of the subject in the outlook of cognate disciplines, in order to contextualize it in the worldwide research area.

Intersectoral mobility / links between academic and professional arenas

Scarce links between academic and professional arenas are settled down due to several reasons: strict requirements for persons involved in the doctoral training process are applied to productive and active scientists excluding practitioners; practitioners rarely consult scientists on relevant problems in the professional field to be researched; the outcomes of doctoral research reach practitioners only when a doctor publishes a book based on the material of his/ her thesis. Establishment of art doctorate might be a way out for integration of practice into research. Intersectoral mobility is not a recommended part of a research project supported top-down by the institution. Anyway, in most cases doctoral students are engaged in design, or work in cultural and public sectors before or during studies as their personal activities. A part of students are proactive freelance architects, another part publishes reviews for architectural journals, and there are also students engaged in public non-profit making initiatives, such as the Fund of Architecture (discussions, excursions, photography). Although the outcomes of architectural design, review articles or public activities usually are not applied in research directly, it gives extra competencies and skills. Fruitful and real-life dissertations based on the students' experience of work in the state cultural or heritage conservation offices prior/ during their doctoral studies and making use of the know-how and information for doctoral research should be mentioned as a result of unintentional intersectoral mobility.

Critical mass in doctoral studies of architecture in Lithuania

In 2011 there was a state initiative to accumulate the critical mass in doctoral studies by joining studies in different higher education institutions in the same field. It

was not as effective as one could expect: the institutions and programs were joined formally rather than making use of the critical mass to start innovative or specific research directions. The Faculty of Architecture, VGTU, initiated joint doctoral studies in architecture in association with a small school of landscape architecture at Klaipėda University, the Faculty of Arts. At present, beside the Faculty of Architecture, VGTU, there are 4 schools in 3 cities training doctoral students of architecture in Lithuania.

International networking

Since 2010 new requirements for international networking were set maintaining a foreign internship and at least one publication in scientific journal abroad compulsory during the PhD studies; a rule was set that, at least, one member of the Defence Board should be from a foreign research or higher education institution. Anyway, the main obstacle for foreign communication and dissemination of research results on the international level is the language barrier as PhD theses and publications in local scientific journals are written in the Lithuanian language.

During more than six decades of its evolution, the doctoral training at the Faculty of Architecture, VGTU, experienced many changes due to political, legal and institutional reasons and educated the largest part of Doctors in the field of architecture in Lithuania. During the last two decades the dominating fundamental research in close interdisciplinary relationship with humanitarian fields and lack of future-oriented constructive approach, estrangement from professional relevance and direct interrelation with practice have been determined by the specifics of architecture as a research field in the Theory and History of Arts in Humanities according to the national research field classification. Stability in doctoral training at the Faculty of Architecture, VGTU, at a safe distance from dynamic reforms and searches for changes by establishing new modes, training of transferable skills and focusing on innovations in research of architecture might seem marginal in the context of most progressive architecture schools in Europe. The stable tradition in fundamental academic research as a safe way to expand the knowledge in the discipline of architecture and profile of PhD holders as academic staff evolved during the long years of its development and settled a cautious resistance against the external pressures. Such conservative attitude prefers the value of tradition and high quality scientific doctoral training. The established stable tradition might be broken by revision of the national classification of research seeking for the integrity in the field of architecture, and, especially, by introducing a program of research by design. Priorities of innovative, practice-embedded, interdisciplinary, future-oriented research in the doctorate studies at the school level must create much more positive means for progress.

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Architecture between Art and Technology

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The Faculty of Architecture and Fine Art is one of seven faculties at NTNU, and Norway's oldest and largest institution for education of new architects, dating back to the inauguration of the Norwegian Institute of Technology in 1910. A large part of the country's architects are educated here.

The Art Academy in Trondheim (KiT) was founded as an art school just after World War II, and became a public art academy in 1987. In 1996, KiT merged into the new NTNU, as one of five departments at the Faculty of Architecture and Fine Arts.

The Faculty has more than 500 students in various architectural and planning studies, and about 100 students in the visual arts. Nearly 40 researchers are occupied with PhD and postdoctoral work. There are 110 employees at the faculty, of which approximately 55 permanent scientific staff.

The Faculty has experienced a significant economic growth in recent years. This applies especially to externally funded research activities such as the Research Centre for Zero Emission Buildings (ZEB), which has a 40 million Euro budget (close to) for 2009-2017. The Faculty's annual budget lies at about 15 million Euros.

Doctoral studies represent an important part of the research within a univer-

sity, and in this publication we provide a brief presentation of the PhD programme and projects at the Faculty of Architecture and Fine Arts at the Norwegian University of Science and Technology (NTNU). Unless specifically mentioned we use the term PhD-programme both in its traditional use, and to designate the Norwegian Artistic Research Fellowship Programme.

Which are the forms and reforms of doctoral education at the Faculty of Architecture and Fine Art, NTNU?

History and scope

Our traditional three-year PhD programme in architecture addresses topics in architecture, planning, art and technology related to important research questions in our knowledge field. We are now in the process of extending the scope of our PhD-programme by seeking to join the Norwegian Artistic Research Fellowship Programme.

NTNU encourages research and artistic development work in order to fulfil the strategic goals for being an international highly recognized university. Research and artistic development work is also a priority area for the Faculty of Architecture and Fine Art. We see the PhD education and our PhD candidates as our most important activity and asset in research.

The candidates are working in a broad range of subjects within the field of – and related to – architecture and fine arts. Architecture is in itself a profession and a scientific discipline, and is also classified as a form of art and an artwork. The knowledge platform for our discipline also builds on traditions and elements from the Fine Arts, humanities, social sciences, technology and engineering. A specific character is that architecture as one of “the making disciplines” also builds on skills and craftsmanship learned in practice.

The PhD studies and research work in our faculty reflect this broad knowledge platform for our discipline. Our candidates are working with development work and reflections in fine arts, in planning and development studies, in architectural theory and history and in architectural design using a “research by design” approach.

A more sustainable development in architecture, planning and construction is of vital importance for solving the global challenges for our society. And the majority of our doctoral candidates work with subjects related to challenges caused by climatic change. In 2009, the Research Council of Norway assigned the Faculty of Architecture and Fine Art to host the Research Centre on Zero Emission Buildings (ZEB). Already during its first year ZEB recruited 10 PhD and postdoctoral researchers, and more are regularly recruited over the eight years lifetime of the research centre. They join ZEB in developing fundamental knowledge, products and solutions for zero emission buildings related to their production, operation and demolition.

Architecture, both as a profession and an academic discipline, needs to develop a stronger knowledge base and more articulated reflection and insight, to be competitive as an industry and in academia. And we need to tear down the walls and barriers between academic research and the professional practical development. We see the

doctoral studies and our PhD candidates as very important for establishing a stronger knowledge base for both our architectural education and professional practice.

Structure

The traditional PhD programme in architecture is a researcher education at postgraduate level. The PhD programme may be appropriate for people who are aiming for a career in higher education or research, or for positions in business and public administration. In recent years, the PhD programme has, to a greater extent, become appreciated by private and public sectors, with an increasing number of researchers cooperating with and finding a job in those sectors after having obtained their PhD.

The PhD study is standardized to a three-year full-time program consisting of a training and research section. The PhD program must:

- Provide training and experience in scientific research and methodology
- Be internationally oriented
- Form an integral part of overall research activities at every academic
- Provide a basis for leading work in business, government, education and research.

Admission and start-up

To be admitted to the PhD programme the applicant must have a master's degree or equivalent education (equivalent to 120 ECTS during the past two years) with a grade of B or higher in accordance with NTNU's grading system. Candidates who do not meet these admission requirements, must demonstrate a satisfactory theoretical background and/or experience that substantiates them as suitable candidates for a PhD education. The Faculty may also request that an applicant takes appropriate examinations in subjects with approved results of B or better, before being admitted to the PhD programme.

In order to be considered for approval, an application must include an adequate training plan and a project developed in collaboration with potential supervisors at the Faculty.

After approximately six months of study a revised project is delivered to the PhD Committee for approval. After approximately one year the project description is edited and presented as part of the faculty guidance and outreach activities in an open PhD consultation (crits). This consultation process is repeated in the candidate's third year.

With few exceptions, our PhD candidates are members of staff and are, as such, offered an attractive and inclusive environment, both academically and socially. We deem it necessary that the PhD researchers receive the best possible start in order to lay the foundation for a successful PhD progression. To this goal the Faculty aims to ensure that the organized academic training is of high quality, and that supervisors have updated skills and competencies in their fields as well as supervision.

The training component

NTNU requires completion of a training of at least 30 ECTS. For the Faculty of Architecture and Fine Arts, the training component is recommended and is composed of:

- An Introduction course for PhD candidates at the Faculty of Architecture and Fine Arts
- Science theory and research methodology
- 1-2 electives

Apart from the introduction course, these courses can be taken as a subject at other faculties at NTNU or other higher education institutions that provide doctoral education. There are requirements for final examinations or other forms of assessment for all subjects included in the training section.

NTNU encourages doctoral candidates to undertake part of their studies abroad. Courses taken at foreign institutions which have collaboration with NTNU will be approved as part of the training component. This may also apply for courses at other institutions. Validation occurs after application.

Electives are determined in each case by agreement between the candidate and the supervisor and may be customized in order for the candidates to need the requirement for technical material in their PhD research.

PhD submission

The research component leads to a scientific thesis, which at the end of the study must be defended publicly and approved by a committee appointed by the Faculty. The research will be fundamental and original within the selected area, and conducted under the guidance of a supervisor and co-supervisor(s). Parts of the thesis should normally be published in international journals (article-based dissertations). The thesis may be published as a monograph.

Financing of the PhD program

Scholarships are granted on a regular basis by NTNU, research programmes and projects, as well as the industry. To be admitted to the PhD study one must normally have been awarded a doctoral scholarship. Open PhD positions are advertised on the Faculty's website and in the media.

Main plans and expectations

Form, climate, impact

Society is characterized by unpredictability and high rate of change. Large global and national challenges require new questions, answers and solutions. This encompasses

an important role in safeguarding cultural heritage and common identity rooted in existing art, buildings, cities and landscape. The Faculty of Architecture and Fine Art shall be an arena for knowledge at the forefront of contemporary society needs and currents.

Selection and management of PhD education and researchers will, to a larger degree, be aligned with main Faculty strategy, i.e. emphasising its role as academic institution in society being “Visible, Meaningful and with Impact”, and strengthening the role of architecture and fine arts in society through three main topics “Form, Climate and Impact”.

- Form (aesthetics, space, shape) is the faculty's DNA and core competency. Aesthetic awareness and knowledge formation represent intangible values in how we align ourselves in the world. Unfortunately these perspectives are getting less and less meaning and acceptance in society, despite their large impact on our quality of life. Authority of aesthetics in society must be rebuilt.
- Climate (sustainability, energy, environment) is a prerequisite for existence. Climate requires interdisciplinary understanding and cooperation. It should permeate all activities of the Faculty, both in content and behavior.
- Impact (power, influence, leadership): The Faculty should be aware of its role and academic foundation as well, contributing to professionalization, empowerment and creating leeway both for professionals and users. The Faculty shall, by virtue, of their professional competence seek influence and show willingness to take leadership in societal processes.

PhD and artistic research

Artistic activity is equated with basic and applied research at the Faculty and NTNU and includes both artistic and architectural production, reflection and developmental work. The Faculty's international profile, academic integrity and interdisciplinarity are at the basis of projects of very different character and of cooperation with a number of national and international academic communities. Our doctoral programme and student-driven entrepreneurship are important resources in our research and artistic activities. The interaction between research, the arts and education at the Faculty provides a unique potential for knowledge and innovation, both within NTNU and the private sector, public sector and society in general.

Architectural and artistic development

The Faculty of Architecture and Fine Art is a member of the Norwegian Artistic Research Programme programme through its Art Academy, and aims to apply for membership of its architectural programme as well. The Norwegian Artistic Research Fellowship Programme is parallel to other research educations organised as academic PhD programmes. The programme intends to secure high level artistic research and leads to expertise as Associate Professor.

The subject area of the program encompasses the whole arts field, as it is manifested in Norwegian institutions of higher education. It also includes a project-specific and subject-specific dimension.

Emphasis on critical reflection has a central place, including how it is developed through practice (in project work as well as in assessment processes) and through discussions in various forums such as Artistic Research Forums, thematic seminars etc.

The Art Academy in Trondheim is based on openness, dialogue and critical reflection in a flexible working environment, where teachers and guest teachers with varied artistic orientation and background support students and challenge them to gather knowledge, reflect and act, with active engagement in discussions about art and the artist's role in today's society.

Local and international context

PhD researchers at the Faculty of Architecture are encouraged to contribute actively to public debates through innovative projects that inspire thinking and discussion – in collaboration with local and global partners.

A large proportion of the Faculty staff, doctoral candidates and students has an international background and are active internationally through architectural and artistic activities. Mobility and international activity comes partly expressed through international topics that include global issues with field work in other countries and other institutions, such as Europe, China, India, Tibet and Africa.

The Faculty aims to be an attractive partner and develop new knowledge with leading national and international expertise in the earlier mentioned “Form, Climate, Impact” especially within (*kanskje relatere dette til vår hovedutfordringer/oppgaver – form klima impact?*). This includes openness towards adopting mentoring roles to institutions in developing countries.

Priorities and academic concentration

The faculty's teaching, research and artistic activities comprise a wide range of disciplines and diversity. Most activities are at the core of our academic character and our social mission to promote the form, aesthetics and design of the built environment. The diverse portfolio of activities is currently spread across different departments, researchers and research groups. Through better coordination, these individual PhD research scholarships and staff can be collected to become a more targeted, clear and robust academic environment.

The faculty has several professional research groups with the potential to develop an international high level. This potential can be triggered through long-term development and strategic priorities – and through cooperation with other faculties, NTNUs strategic areas Energy, Health, Sustainable Development and Ocean Life, and with national and international academic environments.

The faculty currently hosts two research centres, “Zero Emission Buildings” and “Centre for Real Estate and Facilities Management”, and additional centres are being planned. Both have through many years of targeted development reached a high in-

ternational level. These centres are important venues for faculty interaction between education, research and artistic activities, and collaboration with other faculties, research institution SINTEF, the construction industry and the public sector.

Main characteristics of the researcher's profile

Architecture and art are important for individuals and communal quality of life, identity and value perceptions. Architects, artists and planners influence society through their innovative activities and the environment through the production and management of cultural heritage and existing environments. The Faculty of Architecture and Fine Art hosts PhD researchers in architecture, energy and environment, urban planning and real estate development and management, as well as artistic researchers. This provides the Faculty with a unique national and international context, which is further emphasized by the faculty's connection to a university with a technical – scientific main profile. The faculty is one of the most diverse and interdisciplinary of NTNU, while representing professional expertise in key areas of form, aesthetics and design of the built environment.

PhD research at the Faculty ranges from artistic projects to pure scientific-technological research, from developing construction details to urban and regional planning, from dealing with local challenges in the local community for it to illuminate global issues, from curiosity driven single projects to large and long-term research tasks in complex professional environment.

Faculty PhD researchers work in the field of tension between art, society and technology. Our PhD research touches and relies on theory and tradition in the social sciences, humanities, natural and engineering sciences, as well as artistic research. This is both directed towards architecture, artwork and the environment itself, as well as towards planning, production and management of architecture, art and the environment.

Research and artistic activities at the faculty also aim to safeguard and manage assets related to heritage, in which architecture, art and environment are included. We have an important mission to discover, explore and create the unknown. The Faculty thus encourages holistic and synthesis thinking, discovery and improvisation, experimentation, analysis and reflection. PhD research is based on understanding of room and location, aesthetic and visual literacy and knowledge of processes and systems. This is based both on the artist's and craftsman's insight and a historically and theoretically grounded understanding of the basic principles of our subjects.

The Faculty's PhD education has a long tradition of social interaction with strong ties to practice and business activity. Innovation, innovation and entrepreneurship are central to this tradition. So are the Faculty's architectural and artistic activities. Our doctoral candidates as well as other staff and students are important resources that contribute actively to the creation and development of our disciplines, through dedication, creativity, and well-being.

Mission

The faculty's research and artistic activities have a special responsibility to meet national and global challenges with a comprehensive and holistic approach. Through development of new insight and knowledge in the field of form, climate and impact the faculty aims to contribute to improving society through the impact of engaged and competent students, dissemination of knowledge and empowerment of culture through artistic, architectural and action research.

The Faculty's activities shall be based on innovation in teaching, research and artistic activities. Our mission is to foster innovation and new knowledge underpinning sustainable value creation and competitive business. Our artistic activities have a responsibility to create an environment for innovation, tolerance and openness to new possibilities and contexts.



The Oslo School
of Architecture and Design

AHO PhD

Tim Ainsworth **ANSTEY**

The Oslo School
of Architecture and Design

Norway

AHO offers a single doctoral degree qualification, Doctor of Philosophy. Doctoral projects are supported within architecture, design, urbanism and landscape, and across the interface of these areas with theory, technology and history. PhD studies are hosted by AHO's four institutes: Design; Form, Theory and History; Architecture; Urbanism and Landscape. AHO funds four three-year internally funded stipends annually, and takes between four and six additional students supported through external research funding; internal staff development (practice into research); government programmes for over-seas students; and industry. PhD students commence their studies as a group at the start of each academic year. Enrollment requires full funding for three years.

At AHO PhDs can vary significantly in terms of method. Both analytical and design-based PhDs are supported at high level. The PhD examination rules at AHO require the submission of a text-based document of record (at AHO called the

“thesis”) at the conclusion of the PhD period. The doctorate is granted on the basis of a review of this document by an adjudication committee, of an aural interview and of a trial lecture by the PhD candidate. Design based production and enquiry is presented within the context of the text-based document of record, or within the frame of the aural exam, and a praxis now exists to allow material production (artistic and design-based) to be exhibited and presented in conjunction with the PhD examination.

An AHO PhD includes 45 ects of obligatory course work within a three-year full-time funded period (four years with 25% teaching).

Current educational structure

PhD School

The AHO PhD Programme provides training for higher research in design, architecture, urbanism and landscape studies, and the various interfaces these four hold with theory, technology and history. This is a demanding agenda, because of the breadth of its scope. From its start, the programme has been based on a compulsory taught component of 45 ects, the PhD School. This component is common to all doctoral students at AHO, and currently takes place over the first year of PhD study (this is being reviewed). Courses within the PhD School are centred around three types of activity to support the PhD: activities to understand the *research context* which surrounds the study; activities to provide the student with a base understanding of the *apparatus* within which formal higher-level research takes place; and activities to directly support the development of the PhD *project*.

Courses in *research context* explore, on the one, hand the communality of culture between design, architecture, urbanism and landscape as “making disciplines”, finding interconnecting themes that link them. At the same time these courses emphasise the specificity of design, architecture, urbanism and landscape as distinct research disciplines to be studied, to be understood and to be used projectively. Teaching within the AHO PhD Programme thus looks seriously at the specifics of the discourse in these various cultures: When did the discourse start and why? What kind of questions can be asked and answered within this discourse? Based on what kind of enquiry, method and evidence? What are the habits of communication for this enquiry? What have been the key moments/areas of dispute in the development of this discourse? What are its allies, and from where does it habitually adopt methods?

Courses around *apparatus* consider the common infrastructure that defines research as research within academia. PhD teaching at AHO is committed to experimenting with, and therefore understanding the existing structures that condition formalized research: systems by which research gains academic authority, such as peer-review; conventions and systems of communicating and disseminating research, including the various genres in which such communication takes place; systems that allow individual research effort to engage with and support a broad research culture, includ-

ing systems of referencing and group working; and, not least, the apparatus by which funding for research is allocated and acquired. The School also emphasizes, and has significant expertise around, the development of rigorously academic design-based enquiry. The development of this field is also intimately connected with navigating infrastructures of formalized research. Within the PhD School the aim is that students are given a critical perspective on this *apparatus* that surrounds research enquiry in all its forms, from peer-review to research funding.

Courses around the PhD *Project* teach genres of writing; methods of literature review; definition of research in the field; conceptualization of research activities and methods; the design of research deliverables; and the place of projective design and project based enquiry within research frameworks. Such course work is structured around the writing of a research design proposal and the creation of an archival infrastructure for the PhD project presented through an annotated bibliography. The aim is to make students understand the constructive alignment that needs to exist between a set of research questions, a set of activities and methods, and a set of research deliverables in order to make a coherent, communicable and productive PhD project.

In sum, the aim of taught courses within the PhD School is to make the student/researcher confident and able to make their own decisions about the best form for the research they undertake.

Supervision, Progression seminars, PhD Colloquia, Readers report and Examination

The PhD School produces a research design proposal for the three years of the PhD project, and the aim is that this piece of work creates also the strong relationship between student and supervisor that will support the later development of the PhD project. The form of supervision during the PhD period is defined between student and supervisor, and is reviewed once a year at progression seminars and through doctoral colloquia where the current state of the PhD work is presented in an interdisciplinary context. The examination process at AHO follows the Norwegian University regulations, and consists of three final stages: an external reader's report is prepared on a draft of a substantial section of the proposal final document of record, and detailed comments are provided to the student and supervisor to assist the final stages of the PhD period. When completed the proposed document of record (the thesis) is presented to an adjudication committee for approval for defence; the committee is able to make recommendations in relation to the final proposed document and may require changes and amendments before accepting the thesis for defence. The PhD is examined by the same adjudication committee, through a public defence of the thesis and a trial lecture on a subject provided by the committee to the student.

Future plans

Research networks in doctoral education and support for supervisors

AHO is relatively young as a research institution, the first AHO PhD having been awarded in 1985. In the first period of development there was an emphasis on creating a self-sufficient teaching environment for formalized teaching at PhD level, which communicated the existing research expertise of a small number of senior researchers via a taught syllabus aimed at the whole the student group. In terms of supervision there was a need for external support because of the lack of research trained senior faculty. Now that situation is changing. The number of senior research faculty has grown significantly; and there is less need for external support in supervision but a clear need to develop competence internally. At the same time, in terms of its formalized taught courses AHO now needs to readdress the teaching syllabus of the PhD School and to review how that syllabus should be delivered. Within that review, the place of AHO as one institution among other networks offering education in higher research should be emphasised. AHO is now working to participate in inter-institutional contexts both in Norway and within the Nordic Region. AHO students are able to attend courses within ResArc, the Swedish National Research School in Architecture, and those organized in relation to NORDES, the Nordic Design Research network (in which a strong initiative is formed by the NORDES summer school and by Designfakulteten, the Swedish Faculty for Design Research and Research Education). AHO is currently negotiating with a group of schools including TU Delft, Trinity College Dublin, The Bartlett School of Architecture and the University of Edinburgh to form an international PhD seminar in architecture. AHO aims to develop stronger links in doctoral education with the University of Oslo and Kunsthøgskolan, Oslo. The participation in extra-institutional culture of PhD studies will also be used to review and support skills in supervision at the school.

Research through education

In relation to the Bologna system Scandinavian schools of Architecture and Design have seen a significant development in the last ten years. Previously the emphasis in the five-year Diploma Programmes was on the preparation of skill sets for professional practice rather than preparation for research. This situation is changing slowly now that the education has been restructured to distinguish between first and second cycle university teaching (Bachelor and Masters). AHO now runs Post Professional (third cycle) Masters Courses in areas such as Urbanism and Preservation, which are research based, while the 2-year Professional Masters Programmes include elective courses that are specifically preparatory for formal research training. A clear development of the current third cycle doctoral education is to include within its syllabus courses in university level pedagogics and course design, and to use this as a vehicle through which PhD students can refine and develop research design proposals. The overlap between constructive alignment in designing research (research questions/research activities/research products) and constructive alignment as a principle for university level course design (learning outcomes/student activities/course deliverables) is clear-

ly exploitable in a research culture based, fundamentally, on evaluation as a means for judging competence and value.

Research centres and project based PhDs

The AHO Doctoral programme supports PhDs across four disciplinary institutes at AHO. In order to develop its potential as a research institution during the late 2000s AHO created Research Centres in relation to each institute. This initiative was successful. AHO is now established as a base for externally funded higher research, and a result of that success is a sharp growth in the number of PhD fellowships offered in relation to externally funded higher research projects. Today in any yearly student intake around 50% of places are likely to be made available through funding that comes through specific applications for external grant calls or through industry. Recent examples of this phenomena at AHO are: design based PhDs carried out in relation to a major collaboration between AHO and the shipping industry (Ulstein Bridge Project, 2012-2015); PhDs in Urbanism and Landscape sponsored through an AHO-based national project on the far North (Future North, 2013-2106); PhDs in architectural technology through an AHO-based national project on the potentials for timber in urban construction (Wood be Better, 2012-2016); and PhDs in architectural history and theory funded through a series of successful AHO applications within the architectural humanities (Routes, Roads and Landscape, 2010-2013; Place and Displacement: Exhibiting Architecture, 2012-15; The Printed and the Built, 2014-2017). A challenge and an opportunity for the AHO Doctoral Programme is to work symbiotically with AHO's increasingly ambitious culture of Research Centres and to support and draw support from the framing of individual PhD projects within larger research initiatives.

Modes of presentation

While the AHO examination regulations require the submission of a text-based document of record in order for a PhD to be examined, the School is actively experimenting within that framework for the form and modes of PhD submission. A project on the digitally based PhD commences during 2014, based on a wide ranging review of the current guidelines for formatting a written thesis, and in 2014 AHO examined its first PhD in which a presentation of artistic and design based production was included as part of the examination event outside the format of the written document of record and the PhD defence. Within the formal format of the written document of record at AHO both monograph- and article-based PhDs are common, the emphasis being on finding the form that best fits the PhD project advanced. For all types of PhD project there is now an emphasis on making the display of research part of the research production itself, admitting the importance of mediation and communication to the substance of the research topic.

Researcher Profiles

The emphasis on three main types of learning in relation to PhD studies – *research context*, *apparatus* and *project* reflects an active strategy about the kind of PhD graduates AHO wishes to produce.

Despite their long existence and their wide habits of publication, in terms of arguing their own validity as research, design, architecture, urbanism and landscape have often been thought of as “quiet” disciplines. Thus in terms of the PhD graduates produced, a major emphasis at AHO has been to create individuals that can vocalise this value – who can understand the processes, mechanisms and guiding frameworks in these disciplines that have not previously been articulated. This vocalisation has necessarily a double agenda: to make clear to the respective disciplines themselves their research potential; and to present that potential in terms that academic science and humanities discourse can understand. In order to carry that agenda through requires that at AHO PhD students acquire skills that allow them to:

- Analyse and reflect over a research/practice context to which they will be contributing, and which will frequently contain a mixture of formalised and non-formalised systems for dealing with research enquiry. This requires them to be “bilingual” between the genres of discourse that belong to academia and those that exist outside it.
- Understand and have a secure working experience of the formalised apparatus of academic research enquiry.
- Have experience of varying forms of research communication, from the presentation of academic papers to the production of peer-reviewed articles, conferences, blogs, research applications and pedagogical formats.
- Understand how a PhD project can be used to negotiate between the fluid, formalised and non-formalised systems of research within an evolving design or academic discipline and the permanent underlying apparatus that conditions the acceptance of academic research as research.

In terms of the destinations of PhD students from AHO, it is clear that while a PhD is becoming an increasingly self evident qualification for a career within academia, there is a large interstitial field between academia, culture, industry and practice where a formal academic research training is valuable. The ‘feed’ of PhDs out of a School of Architecture and Design in part creates a context in which design-orientated higher research skills can be used. AHO has a role to play in supporting the development of this context and supporting its own graduates through:

- Supporting the overlap and involvement with industry and practice contexts where research becomes widely operative within culture.
- Acting as a destination where the connection between research questions and broadly experience societal issues can be broached.
- Maintaining an emphasis on research dissemination during the course of the PhD, in different contexts both academic, professional and cultural.
- Experimentation with the forms and formats of PhD research.

Recent AHO PhDs

Engaging Realities - Diagrams and Architectural Practice

Lene Basma, *Institute of Urbanism and Landscape, AHO*

Advisors

Main supervisor Karl Otto Ellefsen

Co-supervisor Jonny Aspen

Date of defence

December 10th 2012

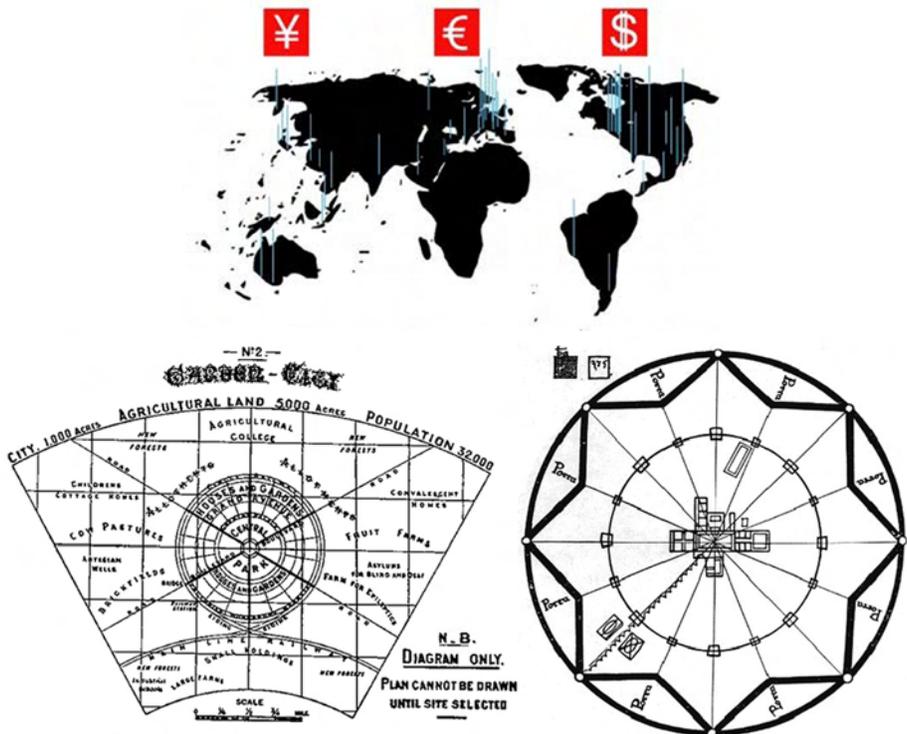
Adjudication committee:

Professor Fredrik Nilsson, Chalmers University

Associate Professor Boris Broman Jensen, Aarhus School of Architecture

Associate Professor Peter Hemmersam, AHO

The thesis analyzes different deployments – graphic and conceptual – of the diagram, and its implications for architectural practice, giving priority to the identification of



general trends concerning intentions, repertoire as well as attitudes towards the role and task of the architect. The investigation is based on two forms of primary empirical material. Firstly on visual diagrams acquired through a mass sampling in architectural journals in the time period between 1995 and 2005, and secondly, on texts and diagrams presented in three different architectural journals dedicated to the diagram and published between 1998 and 2000. The focus of the thesis has been to position the various deployments of diagrams in relation to changes in the socio-material and cultural context surrounding architectural practice, as well as in relation to different diachronic trajectories.

Service Design Leadership
Shaping service innovations at the intersection of design
and strategic management

Judith Gloppen, *Institute of Design*

Advisors

Professor Andrew Morrison, main supervisor

Professor Alison Rieple, co-supervisor

Date of defence

December 11th 2012

Adjudication committee

Director Dr. Bettina von Stamm

Professor Lisbeth Svengren Holm

Associate professor Synne Skjulstad (coordinator)

This thesis contributes to the field of Design Management as well as to the emerging field of Service Design. It addresses the field of Design Management at a strategic level and the role of Service Design in shaping service innovations and corporate strategies. The research includes theory building in design management that goes beyond managing design at an operational level by lifting the strategic use of design to the corporate leadership level in a service context. The thesis argues that in order to exploit the potential value of investing in design, a strategically managed process that integrates both design expertise and business expertise is needed.

Service design is an emerging, multicompetence design specialization, and the design of services may include all design disciplines in order to create services that are perceived as valuable by the user, service provider, and other stakeholders. The design of services requires close cooperation with a number of internal and external stakeholders, multidisciplinary cooperation, and necessitates linkage to business strategy.

Given the novelty in using professional design disciplines for developing innovative services and the complexity of the issues involved, this thesis proposes a concep-

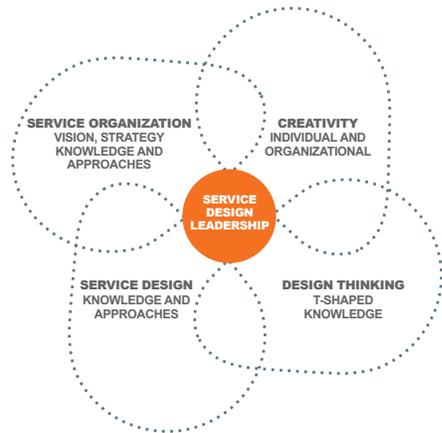
tual framework for service design leadership focusing on the front end of the service innovation process. Service design leadership is shaped via cross-disciplinary, holistic and integrative approaches through synthesizing design proficiency knowledge, skills, and methods with organizational strategy and competence. Therefore, the main elements in the framework include organizational vision and strategy, service design and design thinking, as well as individual and organizational creativity.

The study draws on cross-disciplinary research and theories as well as utilizing the author’s hands-on experience in design management. Furthermore, insights and data were collected through an empirical study that included participative and non-participative observations in workshops as well as semi-structured interviews.

This study is part of the AT-ONE service innovation project, which was funded by the Research Council of Norway in collaboration with industry.

A service design leadership framework for shaping service innovations at the front end of innovation processes. Service design leadership aims to shape service innovations by an integrative approach exploiting the framework’s elements and their dynamic relationships with one another. Together, the synthesis of these elements informs and influences the leadership approach and capacity to shape service innovations.

Illustration: Maria Elskær



- Graphic design
- Interaction design
- Industrial design
- Uniform design
- Furniture design
- Interior design



Flytoget – The Airport Express Train. The illustrations show selected touch-points of the service journey before, during, and after making use of the transportation service. Various design disciplines that contribute to the intended customer experience are specified at each touch-point.

Illustration: Thea Mehl

Social Concerns in Contemporary Architecture: Three Architectural Practices and Their Works

Lisbet Harboe, *Institute of Form History and Theory*

Graduate

Advisors

Professor Mari Hvattum

Associate Professor Tatjana Schneider

Date of defence

February 27th 2012

Adjudication committee

Professor Flora Samuel

Associate professor Tom Avermaete

Associate professor Peter Hemmersam (Coordinator)

In recent years, architectural writers and curators have pointed to a new social engagement in contemporary architecture. What does this renewed social interest consist of, and how does it materialize? The thesis looks at contemporary architectural practices whose methods and application display a distinct social commitment. Through her research, Lisbet Harboe identifies a set of shared social concerns and uncovers a diverse range of working methods discernible in today's architectural landscape. Three architectural practices are selected for in-depth studies; Lacaton & Vassal Architectes, Fantastic Norway and Collectif Exyzt. Based on in-depth explorations of their methods and application, the study investigates how these architects incorpo-



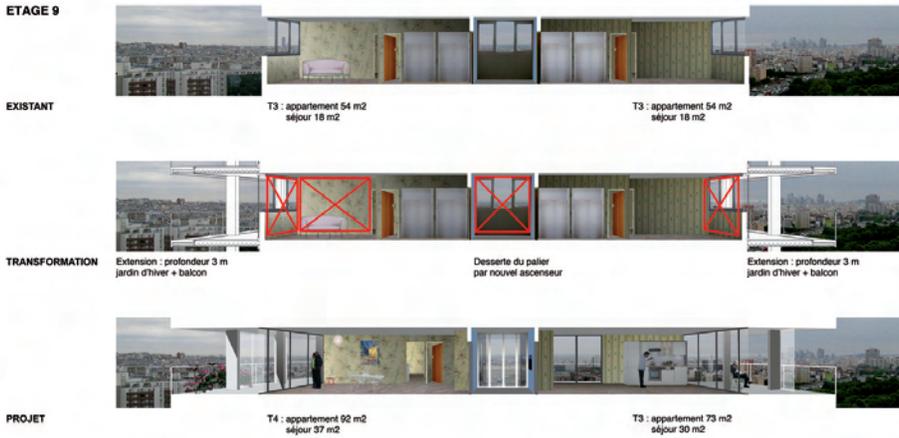
Citizens discussing architecture and eating waffles in the caravan of Fantastic Norway. Northern Norway 2003-2007. Source: Fantastic Norway



Transforming the Bois-le-Prêtre Tower. Paris 2004-2011.

BEFORE at the top - CUTS and ADDITIONS in the middle - AFTER at the below. Rendering by Druot, Lacaton & Vassal. Source: Lacaton & Vassal Architectes

rate social concerns into their practice and how these concerns inform their work. The study moves from practice to theory, using selected theoretical and historical references to contextualize and interpret the findings. Informed by the specificity of local situations rather than overarching theories and strong ideologies, practitioners in this study hold a social responsibility and the hope of step-by-step changes. They are concerned with bottom-up viewpoints and initiatives, and a fairer distribution of architectural qualities. They do not produce a “social architecture”, but create environments – physical or process – that relate to, facilitate, and improve social life in its broadest sense. Discharging established dichotomies, such as aesthetic versus social concerns, or bottom-up versus top-down viewpoints, the architects combine these concerns with pragmatic approaches and fantastic solutions.



Southwark Lido by Collectif eXYZT. London 2008. Source: eXYZT



Dalston Mill by eXYZT. London 2009.
Source: <http://flickr.com/photos/jaypeg/3767531929>.
Ph: Jay Peg.

Munch's Room

Wenche Volle, *Institute of Form History and Theory*

Advisors

Professor Mari Hvattum

Date of defence

November 9th 2012

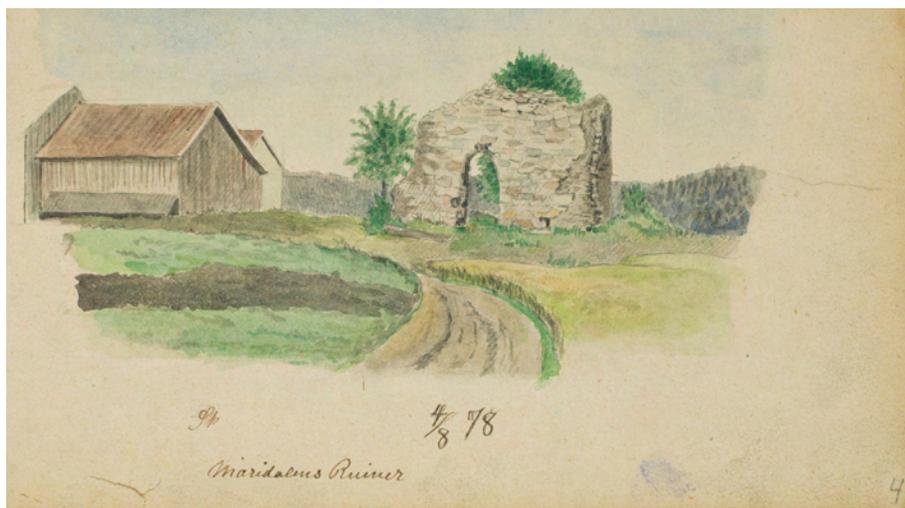
Opponents

Professor Carsten Thau, Royal Danish Academy of Fine Arts

Dr. art. Frank Høifødt, FrankArt, Oslo

Professor Thordis Arrhenius, AHO (coordinator)

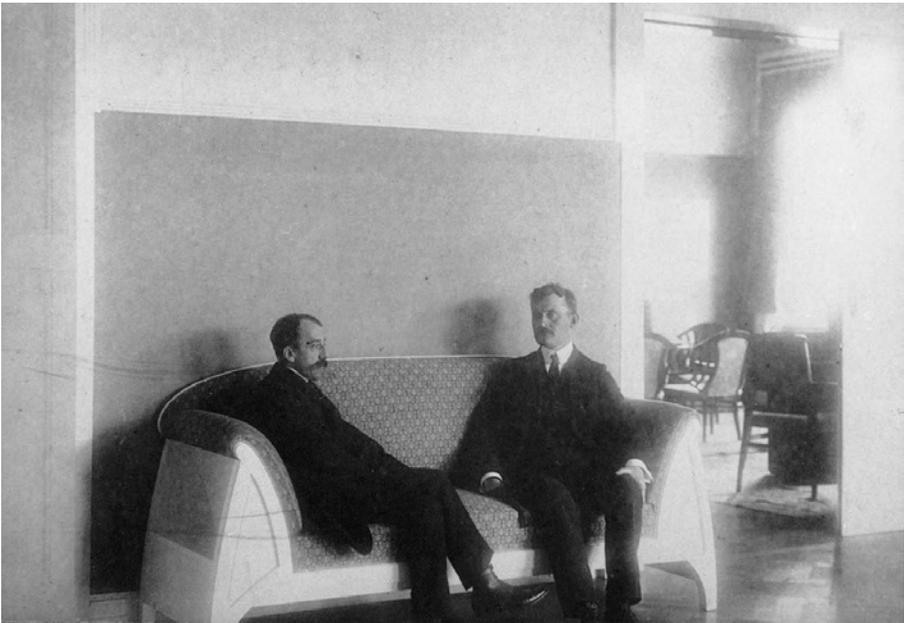
Munch's Room deals with the Norwegian artist Edvard Munch (1863–1944) and examines how the modern conception of space, which emerged in the late nineteenth century, influenced Munch's artistic practice and conception. It involves a study of Munch's paintings, exhibitions and texts and in particular at his friezes and their relationship to space. Munch's visions for a purpose built space for his painting cycle *The Frieze of Life* – he himself described it as a 'forest hall' [skovhall] – serves as a starting point for the dissertation's discussion about the relationship between art work, architectural space, and spectator, as it was conceived around 1900. Munch's friendship with the Belgian artist, architect, designer and writer Henry van de Velde (1863–1957) plays an important part of the investigation, while German 19th century aesthetics and empathy theory forms the dissertation's theoretical framework.



Edvard Munch, *Ruins in Maridalen*, 4/8 - 1878.



Leipzig 1903: Edvard Munch's exhibition at P. H. Beyer & Sohn in Leipzig in 1903.



Edvard Munch and Henry van de Velde pictured in Villa Esche, designed by van de Velde in 1904.

The rights-holder to all the work by Edvard Munch:
Munch-museet/ Munch-Ellingsen gruppen/ BONO, Oslo 2012.



POLAND



Warsaw University of Technology

The Importance of Tradition in the Vision for Future PhD Studies

Karolina TULKOWSKA

Warsaw University
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Poland

Research in the field of architecture is multithreaded -dealing with history, theory and professional practice. The role of tradition in the higher education and research can be defined in two main aspects:

1. Change of substance, nature of the problems and research tools.
2. Architect-researcher and architect-professional –a comparison of theoretical and practical approach to research in the past and today.

The evolution of doctoral studies in the history of the Faculty of Architecture at Warsaw University of Technology could be described in three stages of the process:

- The history of research at the Faculty of Architecture WUT from the very beginning in 1915;
- The transition from the routine established in the communist era –to the integration with the European academic standards;

- The change of the characteristics of architectural activity and specificity of the scientific problems in the era of Information Society;

Establishment of the Faculty of Architecture Warsaw University of Technology

The tradition of architectural education in Poland dates back to the seventeenth century, when the first Polish Department of Geodesy at the University of Krakow was launched. According to the foundation Act, the school taught also in the field of military construction. In 1632, at the same University, the Department of Geometry and Fortification was established. Studies there embraced, inter alia, the research on Vitruvius's "Architecture". In the eighteenth century elements of architectural education appeared in military engineering schools the graduation from which, however, mostly did not provide autonomy in professional practice.

Up to the middle of the nineteenth century, most European architects studied in the peon/master system, with no participation in any classes at the universities. The main method to gain proficiency in the profession was practice. In the late eighteenth and early nineteenth century in many European countries voluntary professional examinations were introduced. They were important mainly for people applying for clerical positions.

During this time, many polytechnic schools that educated also architects emerged in Europe. The first was the École Polytechnique - elite technical university in Paris, founded in 1794. Initially, the training system consisted of organising courses covering topics from various technical fields, from which students chose the most suitable.

Within the organisational structure of the universities, departments for specific teaching profile were defined in around half of the nineteenth century. Schools also introduced obligatory exams and diploma theses.

In 1826, in Warsaw, the Preparatory School of the Polytechnic Institute was established. It embraced the Civil Engineering Division, which taught, among other domains, architecture and geodesy. The dynamic development of the school, which in principle aimed to transform into a higher technical university, was stopped by the outbreak of the November Uprising (1930).

In 1898, Tsar Nicholas II established the Warsaw Polytechnic Institute with the Faculty of Engineering and Building. Studies were conducted in the Russian language and architecture was one of two specialisation defined at the stage of a diploma. After the closure of the university in 1905, the Society of Academic Courses functioned from 1907 to 1910 in Warsaw, which organised, among other things, building courses in architectural specialisation.

In 1915, after the withdrawal of tsarist authorities from Poland, Polish intellectuals started efforts to create the new Polish University and the Polytechnic in Warsaw. The initiative came to fruition thanks to the Society of Higher Academic Courses and the Association of Technicians.

Initially, they planned to initiate the architectural department within the Faculty of Engineering and Construction. Thanks to the determination of the Warsaw Architects' Circle, the independent Faculty of Architecture was formed among the first four departments of the newly established technical university.

The Faculty of Architecture curriculum developed on the assumption that the profession of the architect was characterised by the knowledge covering many different disciplines. Therefore, much attention was paid to consolidate architecture with painting, sculpture and design. Technical knowledge - as the basics for design -was taught in the form of lectures in: mathematics, mechanics, construction, structural design, installations and costing. The program also contained information about the architect's professional duties. Much space was devoted to the history of art and architecture, urban planning taught in the context of history and contemporaneity. The program outlined in 1915, was finally formed till the academic year 1920/1921.

The Organising Committee of the Faculty consisted of people of different age, experience and achievements, with different views on architecture who, furthermore, had graduated from various universities (such as the Academy of Fine Arts in St. Petersburg, Institute of Civil Engineers in St. Petersburg, the Moscow School of Arts, Polytechnics in Riga, Vienna and Karlsruhe, Universities in Darmstadt and Dresden). Hence, came the openness and diversity of the curriculum. Diversification of School's origins also influenced the development of various academic paths.

The procedure of academic promotions

At the beginning, the Dean and the Faculty Council members were titled professors only by social custom, because none of them was formally entitled. They received nominations later, after 1919 (when Poland gained its independence) and even in 1921. Only persons who were appointed for a certain chair could become Extraordinary (associate) professors. Thus, the academic staff grouped around chairs profiled according to the interests of the professor. It consisted of the professors, deputy professors, lecturers (adjuncts) and assistants. As a rule, adjuncts (*adiunctus* in Latin) had to have a doctoral degree.

Habilitation and the associated 'docent' title was popularised in the nineteenth century in Germany, especially in medicine, as the rapid development of higher education resulted in need to give more and more lectures. Giving lecturers the title of professor required expensive founding of the new chairs. In Poland, till World War II the situation was the same, so habilitation allowed to conduct lectures for those who didn't hold the Chair. The result of habilitation was the title of associate professor.

A Doctorate was treated as a higher academic degree (after lower: master degree). It did not entitle independent research, but it was a step on the way to habilitation and professorship.

The first in independent Poland Academic Schools Act¹ stipulated that the right to give lectures had professors or docents who contributed to the development of theoretical or practical sciences. According to the Academic Schools Act from 1933² academics were people who contributed to the development of science and -in artis-

tic schools (faculties)- also artists with achievements in the field of creative arts. University teaching staff included honorary professors, professors, associate professors, assistant professors and teachers of specialised subjects. Promotion procedures for professors and associate professors included several steps of the assessment of scientific achievements. In the early years of the Faculty of Architecture, professorial nominations obtained people with professional experience -treated as a sufficient basis for scientific activities.

Initially, the title of assistant professor empowered someone to deliver lectures as a substitute for the professor. Such a right (*venia legendi*) was granted by the Faculty Council to persons with PhDs or, exceptionally, to those who were particularly prominent scientific researchers.

Research activities

The Department of Polish Architecture, the first and most active centre for research work, was created in 1923, under the direction of Professor Oskar Sosnowski. Besides the inventory of historical monuments (including rural building) the Department was involved in extensive work in the field of history of art and architecture, based on the collaboration with art historians and architects. The Department issued numerous publications and was the centre for the doctoral and habilitation dissertations. At the time, the second core for scientific research was the Department of Civil Engineering -since it was taken up by Professor Stefan Bryła, in 1934. He led the staff of active engineers and established research laboratories, which became the basis for research and scientific work in the field of construction and structural mechanics. In areas related to architectural design all the efforts were devoted mostly to the practical use of design skills.

In the field of urban planning theory, research activities were closely related to the educational program of the City Building Chair. The studies of the city formation in historical and contemporary context, were carried out in the form of doctoral dissertations and papers such as Professor Tołwiński's fundamental work: "Urbanism" published in 1932 and 1934 (respectively: Volume I and II). The contribution to the development of scientific thought manifested also by developing the basic teaching methods in the new domain.

At the time, the first doctoral degrees were awarded to: Oskar Sosnowski (1930, area: history of Warsaw urban structure), Jerzy Raczynski (1930, area: Polish Architecture), Lech Niemojewski (1930, area: theory of architecture), Stanisław Hempel (1933, area: structural design), Francis Piasek (1939, area: rural settlement), Stanisław Gergovich (area: urban planning), Wenczesław Poniż (1934, area: structural design), Stefan Sienicki (1936, area: interior design), Henry Stankiewicz (1938, area: construction technology), Jan Zachwatowicz (1936, area: history of fortifications).

Increasingly a wider range of Faculty staff was involved in research activities. The number of theoretical publications raised. Further doctoral and postdoctoral works

were in preparation. Some of them were completed already in the course of secret teaching after the outbreak of World War II.

Research activities at the Faculty of Architecture and the staff's growing interest in the architectural issues opened new opportunities to develop outside the School. In 1923, on the initiative of the Faculty professors, the Association of Polish Town Planners emerged. A number of professors, lecturers, adjuncts, assistants and representatives of various disciplines and professions became members of the organisation.

To the development of progressive architectural thought Blok' group³ contributed, created in 1923. This artistic initiative was popular among students and assistants of the Faculty. In 1926, Blok', with the participation of professors of the Faculty (Karol Jankowski and Rudolf Świerczyński), organised the International Architecture Exhibition.

In 1926 the Praesens group was founded⁴. Among the creators of the movement, there were people associated with the Faculty of Architecture Warsaw University of Technology: Helena and Szymon Syrkus, Bohdan Lachert, Józef Szanajca, Józef Malinowski. The group released two issues of the magazine "Praesens". The program referred to functionalism and constructivism postulating a synthetic unity of all visual arts. Members of the group promoted a teamwork method. They realised a number of architectural projects, in which certain colors and forms supported the functional ideas. They took an active part in the works of the International Congresses of Modern Architecture. Praesens activities and publications had a major influence on the development of progressive elements in the curriculum of the Faculty.

After the outbreak of World War II and the closure of the University, official research activity was suspended. The library and the Polish Architecture Chair were formally taken over by the German authorities and were placed under the care of John Zachwatowicz, what enabled the use of the collection. After getting the permission of the authorities, the urban planning studio was established, in which -under the guise of municipal commissions- architects performed researches, studies and projects related to Warsaw. The results of the conspiratorial activities were also nine doctoral theses and eight postdoctoral dissertations (habilitations).

Among the tasks entrusted by the Faculty Council to Professor Niemojewski and Dr Zachwatowicz, there were paths of research interests for the post-war period.

A thematic structure of the research activities was developed, in groups of issues related to:

- Reconstruction of rural life;
- Problems of small towns;
- The issue of monuments destroyed during the war;
- The creation of a new expression of Polish architecture;
- Planning in a national scale.

The problems of the studies were closely linked to architectural practice and urban planning. Research in the field of architectural design became a constant element

accompanying the teaching activities. Employees of the university and its alumni undertook studies. The most active unit, leading a systematic research activity was at the time Department of Landscape Architecture.

Employees of the Town Building Chair were involved in research activities related to teaching and implementations. They participated in scientific conferences, led theoretical studies concerning, inter alia, the mechanisms of the urban structure transformations or methods for town-planning development.

The scientific work of the History of Architecture and Art Chair included a number of doctoral dissertations, papers and articles published in literature. Broader works were published as books. Since 1958, the Warsaw University and Polytechnic cooperated within the Team for Research on Polish Middle Ages, which organised scientific sessions and issued regular publications. Staff of the Chair participated actively in the reconstruction of Warsaw and restoration works by developing a series of theoretical papers and taking part in realised projects.

Directions of doctoral education have evolved with the expansion of research interests. Rapprochement to architectural practice resulted in a new trend in the education of postgraduates. Within the framework of doctoral teaching program, PhD students more often conducted research related to architectural practice. Practicing architects undertook in dissertations topics related to realised buildings (in the field of architecture) or implemented urban master plans (in town planning). However, individual architectural projects were never the sole element of the outcome, which was the basis for the PhD title.

Research work was always accompanied by educational activities. Prospective doctors conducted theoretical classes (courses of history, theory of architecture or technology) or practical projects (design classes).

Doctorates after World War II

In Poland after World War II the law precisely defined how to obtain the doctoral degree and described the procedure of carrying out doctoral studies in higher education. Architecture was treated as a domain of engineering sciences and - in terms of procedures and requirements - doctorates in architecture were similar to other areas of science.

These were carried out by the authorised Faculty Councils. The procedure embraced⁵:

- approval of the thesis subject and scientific supervisor appointment;
- development of the dissertation;
- public discussion;
- acceptance of the dissertation by Faculty Council resolution;
- submission of doctoral examinations;
- Faculty Council decision to grant a doctorate degree;
- solemn act of promotion.

Access to doctoral promotion was open to a person who had a Master's degree or Master engineer title and dealt with the scientific work for at least two years. The Faculty Council could shorten this period of time to one year. The supervisor of the doctoral dissertation could be independent researcher⁶ from the Faculty or outside. The role of the supervisor was to guide the PhD course and to advise the student during the research work. In order to obtain the doctor's degree the student had to submit a doctoral dissertation, which should be an independent scientific achievement and confirm a general theoretical knowledge in the discipline. It should also verify the student's ability to independent scientific work in the field of science corresponding to the subject of the dissertation.

The need to adapt to the general rules of the procedure resulted in a preference for the historical and theoretical works. There was no path for practicing architects to reach academic advancement based on professional achievements.

Under current regulations⁷, a doctoral dissertation should be an original solution to a scientific problem or original art achievement and it should demonstrate general theoretical knowledge in the scientific or artistic discipline as well as the ability to independently conduct research or artistic work.

The doctoral thesis may be the manuscript or published book, thematically coherent set of chapters or articles published or accepted for publication in scientific journals, defined by the minister of science. Theoretically, a dissertation is also acceptable in a form of work of design, construction, as well as technological or artistic achievement. To open up the PhD procedure, the student must have a scientific publication in a book or, at least one, reviewed publication in a scientific journal, in reviewed report of the international scientific conference or a public presentation of the work of art.

Doctoral Studies at the Faculty of Architecture WUT: Essential conditions

At the Faculty of Architecture there are currently PhD studies in the field of engineering sciences and the discipline architecture and town-planning.

Studies are conducted as:

- full-time;
- part-time in Polish;
- part-time in the English language.

Full-time studies are free for Polish citizens and overseas students who fulfill the certain conditions of admission.⁸ Recruitment for the first year of doctoral studies is held twice during the academic year. Doctoral studies last four years. In reasoned cases, the Director of Doctoral Studies may extend the studies to 2 more years. The date of graduation is a day of qualification of the third degree, i.e. the day of the Faculty Council resolution to grant the title of doctor of technical sciences. A PhD program includes, among others, seminars and lectures.

There is mandatory for the first year students to participate in a pedagogical seminar organised by the Warsaw University of Technology. The pedagogical seminar for PhD students and newly recruited assistants of WUT functions since 2007. Participation in the seminar is free of charge. The aim of the seminar is to prepare PhD students and academic assistants to teach classes. Classes within seminar last one semester. The seminar takes place in the winter and summer semester of each academic year.

From the second year, during the entire course of study, PhD students are required to participate in methodological seminars organised at the Faculty of Architecture. They may also participate in lectures organised by the University.

The framework program of doctoral studies at the FA WUT includes also:

- Individual research work carried out under the guidance of a tutor;
- Obligatory hours of teaching practice;
- Oral presentation of the completed dissertation work at the doctoral seminar.

PhD students who get a scholarship are required to attend classes as teachers at a rate of 60-90 hours per year.

Completion of the thesis embraces:

- acceptance of the dissertation, defining the scope of examinations by the Faculty Council;
- final doctoral exams of the humanities, economic, professional and foreign language;
- designation of reviewers by the Faculty Council;
- public defense of the doctoral thesis.

The nature and topics of doctoral dissertations at the Faculty of Architecture WUT

Under the current rules, it is possible to obtain the PhD title through a doctoral thesis, which is the work of design, construction, as well as technological or artistic achievement. In practice, the architectural projects are considered only as a supplement to the scientific output. This stems from a long tradition of research work at the Faculty of Architecture WUT. There are no procedures for the evaluation of possible practical achievements that could be the basis for a doctoral degree. Topics of the 77 PhDs defended at the Faculty of Architecture WUT in ten years (2003-2012) were related to:

- history of architecture and art - 40% (31 dissertations);
- selected aspects of the theory and practice of architecture - 34% (26 dissertations);
- urban and spatial planning - 23% (18 dissertations);
- structural design - 3 % (2 dissertations).

Among doctorates of a historical, architectural, technological and construction content, five were related to the issues of computer-aided design and databases or knowledge bases. All of these studies were mainly theoretical dissertations.

At the dissertation of Krzysztof Koszewski, for example, the concept of architectural and historical knowledge based on the example of *Saska Keпа Warsaw*⁹, we will try to explain the basic features of a typical research paper that meets the criteria of a dissertation at the Faculty of Architecture WUT. Generally, the subject of the work is the analysis of how to use information technology in the management of knowledge of architectural monuments. Following the conventions, the author formulated the thesis of the work: "The development of information technologies opens a new approach to the management of information about the architectural heritage. The concept of databases can be, thus, replaced by the knowledge bases formed on contextual relationships and benefiting from diffuse sources of information."

The structure of the dissertation embraced four main parts:

1. Knowledge society and cultural heritage. The introductory chapter describing the subject of the work, including a description of information technology, the discussion of cultural processes in knowledge society and notes on contemporary knowledge about architectural heritage.
2. Management of architectural heritage information. The analytical part containing information about the use of information technology in the design process, descriptions of existing databases and systems related to the architectural heritage, national and international organisations dealing with cultural heritage, monuments of architecture description standards, the characteristics of existing historical records.
3. Knowledge base of the history of architecture - model and structure. The sample application showing the framework and content of the proposed knowledge base.

In the case of *Saska Keпа* the thesis dealt with a residential district of Warsaw, typically a historical part, containing information about the history and architecture of *Saska Keпа* and a detailed description of the villa on *Elsterska Street*. The dissertation was concluded with the final remarks, summaries, lists, dictionaries and indexes. A hard copy was accompanied by a digital one, in the universal PDF format. Finally, the concept of a knowledge base proposed in the work remained a theoretical consideration (described only by a created model) and has not been implemented.

The same happened to the model of the knowledge base built within the framework of the doctoral dissertation conducted by the author of this essay in 2010¹⁰. In both cases, due to lack of financial and professional support specialists stopped the implementation of projects outlined in the works.

Hence, the intention to bind the theoretical research work with the practical implementation has not been fully realised.

PhD at the Faculty of Architecture WUT: Perspectives, Ideas

The nature of architectural education is still the subject of discussion. On the border between technology and art, architecture is a specific area requiring the special training conditions. Changes of the curriculum strive to create graduate's profile able to meet the challenges of today's complex architectural market. At the Faculty of Architecture WUT we implemented a new Master program in English ASK (Architecture for Society of Knowledge). The concept of a new PhD specialisation that we are just starting in Warsaw, is a continuation of the master's program of ASK (Architecture for the Society of Knowledge).

The vision of a modern architectural education is based on awareness of contemporary social and cultural conditions and is taking full advantage of new technologies. The ASK studies program responds to the architectural evolution from the 20th century space design towards 21st century information processing design. It reflects the shift in paradigm of the architectural practice and theory. It offers an interdisciplinary program designed to support student competence in answering crucial questions in the age of globalization such as "Can the local context present new opportunities for non-uniform global trends? Can new conditions of situated design and problem solving reveal the opportunities of previously marginalised societies, while maintaining richness and diversity? Can we aspire towards visions of architecture derived from the diverse richness of the emerging society of knowledge?"¹¹

The program aims to give young, practising architects experience in participation in the global architectural knowledge society, and critical interpretation of the creative aspects of design and design collaboration. Emphasis is placed on the co-operation and interdisciplinary practice in architecture and on the exploration of new design technology and theory in architectural research. The core of the program reflects the importance of the contemporary tendencies in design. Design studios include: CAD, modeling and simulation, distributed design collaboration (VDS), numerically controlled prototyping and design fabrication (CNC), parametric and algorithmic architectural design, the responsive architecture supported by mechatronics and robotics.

The graduates' profile is defined in the context of Information Society and its scientific, creative and social consequences. The studies aim to provide the ability to interpret and create phenomena and objects at different scales using advanced digital technology. What seems unique in this program is the integration of competencies in the area of application of modern technology as well as the utilisation of traditional, tested and true skills (embedded in the tradition of the Faculty of Architecture WUT).

Students are introduced to the basic principles of conducting scientific research, designing studies and documentation, and the presentation of results in the form of written work. They gain skills for selecting sources from literature, formulating the research problem and developing conclusions for the final master's essay.

Based on the development of the same principles we think about the creation of a new doctoral studies program. A PhD dissertation would be definitely not only a theoretical, but experimental and practical work. Important relationship between research and architectural practice would be implemented through the use of simulation techniques and modeling processes. Masters theses carried out in the framework of ASK are already characterised by the desire to innovate, both in research methods as well as in tools for concept creation.

Trends in the development of doctoral education naturally follow the changes in architectural education in general. We strive to provide the graduates of the Faculty of Architecture a comprehensive education. After finishing studies, they deal not only with the real building substance but work also on issues of architecture joint with technology, interior design, graphic design, advertising, (industrial) design, art history etc. So, directions of doctoral education follow the widespread interests of graduates. In current practice, the field of doctoral research is dominated by theoretical dissertations. In areas like history and theory of architecture it is natural. Whereas, doctoral studies related to the substance and practice of architecture should move forward in the direction of the experiment, interdisciplinarity and practical applications.

Conclusions

Research is an integral element of the school of architecture identity. As part of theoretical work, teaching but also as a force responsible for defining new directions in architecture. Intellectual experiments and practical tests always support architects' work. Experimentation is part of the creative work.

It seems that in the nearest future directions of development of doctoral studies evolve around the issues of:

- history and theory of architecture -with doctorates in the form of traditional dissertations embracing the sources research and conclusions made on the basis of the theoretical analyses;
- innovative techniques and technologies -doctorates using experimentation (physical or more often - virtual);
- architectural practice -doctorates with a direct reference to the realised objects / building or urban structures, which include the implementation of the research conclusions;

Consequently, the future researcher profile will be defined through the practical knowledge and skills to find new tools for critical interpretation of reality, abilities to analyse and explain phenomena, physical and virtual situations with the aim to create new values in architecture. Integration of traditional competencies and modern technology applications seem to be essential for effective research in the constantly changing reality.

Notes

- 1 The Act for Academic Schools from 13 July 1920, Journal of Laws No 72/1920, pos. 494
- 2 According to the Notice of the Minister of Religious Affairs and Public Education about the consolidated text of the Academic Schools, Journal of Laws 1/1937
- 3 The "Blok" Group was an avant-garde art group of Cubists, Constructivists and Suprematists active in Warsaw, 1924 - 1926, made up of artists: Henryk Berlewi, Jan Gólus, Witold Kajruk-sztis, Katarzyna Kobro, Karol Kryński, Maria Nicz-Borowiakowa, Maria Puciatycka, Aleksander Rafałowski, Henryk Stażewski, Władysław Strzemiński, Mieczysław Szczuka, Mieczysław Szulc, Teresa Żarnowerówna.
- 4 In June 1926, the artists published the first issue of its magazine, of the same title Praesens, where the programme of the group was outlined by Szymon Syrkus: "By way of experiment, the architectonic approach provides new opportunities, not only artistic as it might seem, but also social. For architecture changes the social pattern, as the social pattern changes architecture."
- 5 Regulation of Ministers of Higher Education, Health, Education, Foreign Affairs and Chairman of the Main Committee of Physical Culture dated 17.06.1959 on carrying out doctoral studies in higher education
- 6 In Poland, an independent academic staff member can be a researcher or a researcher and lecturer who runs independent research or guides independent scientific team and holds a postdoctoral degree (often in relation to the position of associate professor) or the title of professor. Becoming an independent academic staff member entitles him/her to participate in the voting of the process of doctoral and postdoctoral degrees. Equivalent to this position in Western countries is an associate professor, and a titular professor - (full) professor.
- 7 The Act from 14 March 2003 on Academic Degrees and Titles and Degrees in the field of art.
- 8 Fees in part time studies are: in Polish 6.000 PLN / per semester, in English 9000 PLN / per semester. Foreigners can take doctoral studies on the payment conditions. The annual fee is 5000 EUR, for people of Polish origin - 3500 EUR. With the payment for the first year of study candidates have to pay recruitment fee in the amount of 200 EUR.
- 9 Faculty of Architecture WUT, defence: 2006
- 10 Tulkowska Słyk Karolina "Method of recording and sharing historical knowledge on the example of the Faculty of Architecture Warsaw University of Technology", Faculty of Architecture WUT, 2010
- 11 From the ASK studies vision (www.asknow.eu)

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PORTUGAL



Universidade Lusíada de Lisboa

PhD in Architecture at Universidade Lusíada of Lisbon

Joaquim BRAZINHA
Horácio BONIFÁCIO

Universidade Lusíada
de Lisboa

Portugal

I – Approved in 2006 according to the
Bologna Legislation

Despacho 17833/06 de 3 de Agosto

Main characteristics

Study plan

1st Year

Curricular Units	Scientific Area	Duration	Working Hours	Contact Hours	ECTS
SEMINÁRIO DE DIRECÇÃO DE INVESTIGAÇÃO (PLANO E RELATÓRIO DE INVESTIGAÇÃO) Research Seminar (research plan and report)	Arq	semestral	390	OT-10;	15

SEMINÁRIO DE EPISTEMOLOGIA DA ARQUITECTURA Seminar on Architecture's Epistemology	Arq	semestral	390	S-30	15
SEMINÁRIO SOBRE FENOMENOLOGIA DA ARQUITECTURA Seminar on Architecture's Phenomenology	Arq	semestral	390	S-30	15
SEMINÁRIO E METODOLOGIA E TÉCNICAS DE INVESTIGAÇÃO Seminar on Research Methodology and Techniques	Cco	semestral	390	S-30	15

Four (4) Seminars of 30 hours and 1 seminar of 10 hours of tutorial classes

2nd Year

Curricular Units	Scientific Area	Duration	Working Hours	Contact Hours	ECTS
PREPARAÇÃO E DESENVOLVIMENTO DE DISSERTAÇÃO Preparation and Development of the Dissertation	Arq	Annual	1600	OT-20;	60

3rd Year

Curricular Units	Scientific Area	Duration	Working Hours	Contact Hours	ECTS
PREPARAÇÃO E DESENVOLVIMENTO DE DISSERTAÇÃO Preparation and Development of the Dissertation	Arq	Annual	1600	OT-20;	60

Objectives

Study cycle's generic objectives are to:

Offer education and training at the highest level, in the area of architecture, that allow students to consolidate and deepen previously acquired knowledge, in particular in the integrated master degree.

Coordinate and tutor scientific research developed by each student, done in the PhD thesis to contribute to widen the frontiers of knowledge.

Promote in academic and/or professional context technological, social and cultural progress. Develop and incentive the publication of the produced research in national or international journals.

Coherence of the study cycle's objectives and the institution's mission and strategy

According to the statutes of the institution, Order No. 24711/2009, published in Diário da Republica, 2nd Series of 9 November the mission of the institution regards the following points that coincide with the general objectives defined in the integrated masters in architecture:

- a) The high level of qualification of the Portuguese
- b) The production and dissemination of knowledge
- c) The cultural, artistic, scientific and technological education of students, within a framework of international reference, as well as their ethical and civic education
- d) Recognition of faculty, researchers and staff's activity
- g) Conduct liaison activities with the civil society, particularly the sharing and transfer of knowledge, as well as the economic value of scientific knowledge
- h) the public understanding of the humanities, arts, science and technology, carrying out actions to support the dissemination of humanistic culture, art, science and technology
- i) Participation in education policy and research. Although all of these objectives apply to the PhD in Architecture

Subparagraphs b), c), g), h), i), have a preferred application in the case of architecture.

Means by which the students and teachers involved in the study cycle are informed of its objectives

The Scientific Council, composed by Professors of the study cycle, meets regularly with the Faculty Director for discussions on pedagogical, methodological and programmatic issues. The objectives are disseminated to the students through the University's website, the Communication Office's documentation that is distributed to the students upon enrollment in the study cycle and through the programs and Syllabus of each module, that are delivered to the students at the beginning of the school year. There is also a flyer available at the Lusíada Institute of Post-graduations, distributed to students upon enrollment.

The Innovative approaches in the way doctoral education

Curricular Unit:

Seminário de Metodologia e Técnicas de Investigação

Seminar on Research Methodology and Techniques

Learning outcomes of the curricular unit

General Objectives

- Developing and structuring general approaches to the development of a PhD thesis in the area of architecture;
- Developing strategies and methodologies for the application of specific objectives related to structure, regulations and topics;
- Developing specific research;
- Setting the final options of themes for the development of the thesis.

Specific Objectives

- Defining the basic structure of a PhD thesis in the field of architecture;
- Defining the normative that should be followed;
- Developing strategies and research methodologies;
- Providing and analyzing basic bibliography support.

Skills to develop

- Ability to set a theme applied to a PhD thesis in architecture;
- Ability to structure applied research;
- Ability to process information and develop original reasoning applied to the development of a PhD thesis;
- Ability to summarize thinking

Syllabus

The contents of the seminar are diversified between theory and practical examples, but centered on the different themes applied to the development of a PhD thesis, chosen by the candidates. The main contents of the different classes will be: Setting objectives and strategic issues - Legislation and normative - Structure of a PhD thesis in architecture - Steps to follow - Select a theme - discussion and analysis of the themes suggested - Research on the State of the Art - Collection of research production related to the themes suggested - Research on peripheral issues - Finding bibliography - Finding syntheses on topics - Appendices and Attachments

Curricular Unit:
Seminário de Epistemologia da Arquitectura
Seminar on Architecture's Epistemology

Learning outcomes of the curricular unit

General Objectives

- Ability to develop a systemic and critical thinking;
- Ability to develop a spirit of synthesis of ideas and forms;
- Ability to apply knowledge in practice;
- Ability to manage creative processes that lead to innovation;
- Ability to evaluate ideas and decisions;
- Commitment to excellence.

Specific Objectives

- Ability to use research as a strategic instrument for innovation;
- Ability to design (generation of concepts) and to develop;
- Ability to integrate procedural strategies and methodologies;
- Ability to integrate conditions and projected constraints;
- Develop creative methods and ability;
- Ability to build a systemic vision.

Skills

Those acquired through the objectives.

Syllabus

Concept of Epistemology.

The two conceptual worlds, Plato and Aristotle, defining the territory of epistemology in Architecture... Vitruvius and Alberti protagonists of both worlds; Truth as analogue Thought;

Value as Systemic Thinking; Analogue Thought as vertical thinking (cumulative); Systemic Thinking as lateral thinking (interrelated); The Appearance (in truth) and Essence (Value);

The Dialectic of Imagination and its components: Rational Imagination and Creative Imagination; The Conceptual Character as structuring figures; The cycle of creativity or Analogy spectrum; The protagonist thought and act of the Conceptual Diagram; The basic organizations of space; The defining forms of order (Platonic solids); The generators of diversity and somatic markers as the Conceptual Diagram of Genetics. Examples.

Conceptual Diagram, Diversity Generator that the organizations of space provide.

Curricular Unit:
Seminário Sobre Fenomenologia da Arquitectura
Seminar on Architecture's Phenomenology

Learning outcomes of the curricular unit

General Objectives

Create awareness of the origin of knowledge in its diversity and human consistency; offer opportunity for the individual to create scientific and artistic activity based on experience of the world. Position the art and the architectonic Object in the universe of human activity, and its presence in the world.

Specific Objectives

Gain awareness on the processes of appropriation and creation of the object of Art. Develop individual methodologies in the areas of epistemology and phenomenology, and research its validation. Research the reciprocity and parallelism between the artistic activity and scientific activity. Research the specific characteristics of the artistic creation.

Skills

Ability of offering an opinion in terms of the experience of the Art Object and creation plan. Develop a self-awareness process that synthesizes a cultural activity organized by the individual for an action that is researched, stimulated, created and part of the individual, in a world where the object is unveiled and invented.

Syllabus

Know. Inquire. Think. Create; Concepts, factors and orders of cognition; Phenomenology of perception. Psychological synthesis; Mind, logos and feeling; Cultural universe and contemporary world; Research, categorical thinking and schematic thinking; Theory of value as introduction to world understanding; World of Art/Architecture. Art Object. Phenomenology and transcendental order. Communication and identification; Art classification. Instrumental dialectics; Logicity and architecture; Aesthetics and architecture; Aesthetics as a boundary setting discipline for the understanding of architecture; The Beautiful. Referential value of the arts; Phenomenology of the Beautiful. Experience. Sense. Dialectics of the Beautiful; Art; Functions of art. General Epistemology; Art mobilization. Art and technique. Art and expression; Artistic creation and architecture creation; Universe of aesthetics: categories, aesthetic value, aesthetic judgment, judgment of aesthetic value.

Curricular Unit:**Seminário de Direcção de Investigação (Plano e Relatório de Investigação)
Research Seminar (research plan and report)**

Learning outcomes of the curricular unit

Objectives

Establish scientific methodologies covering the disciplinary scope of architecture, in order to enable a particular investigation to be applied in an original thesis, with justifiable and scientific interest; Develop capacities, skills and search methods applied within the framework of Architecture in particular: Promote the development of methodologies and procedures involved in the research in the discipline of architecture.

Specific objectives

To guide and coordinate the implementation of original research in the field of architecture; Promote the establishment of a research plan by adopting methodologies in accordance with the nature of data collection and processing; Develop the ability of critical analysis and discussion of the results of the investigation.

Skills

Ability to present and defend a thesis before a jury with the purpose of their scientific evaluation.

Syllabus

Title of the work program; Identification of the work object; Explanation of the hypothesis; Choice of method; Selection of the sources; Preparation of a work plan; Bibliographical references.

Curricular Unit:**Preparação e Desenvolvimento de Dissertação
Preparation and Development of the Dissertation**

Learning outcomes of the curricular unit

Goals

Coordinate and follow the original scientific research, development and final version of each student's thesis. Make decisions based on the conciliation of theoretical, conceptual and methodological aspects, in different stages of research. Apply a methodology to a specific research problem.

Skills

Be able to formulate a pertinent research problem; Be able to elaborate a literature review that exposes the problem in a clear manner (state of art); Know how to structure a research work methodologically; Identify and execute the data analysis more ade-

quate to the research work and the collected data; Know how to discuss the results of the undertaken study and propose theoretical, methodological and applied developments; Respect the ethical issues involved in the development process of research; Be able to produce a final text, fulfilling all previous assumptions.

As can be seen on the main characteristics of the second and third year, a tutor undertakes the supervision. The students must fill a Progress Report each semester. The report will be appreciated by the Scientific Council of the Study Cycle.

About the future

Until now the main objective was to comply with the Portuguese Law and provide the “ratio” of one PhD per 30 students. In the future we aim to develop collaboration schemes with other national and international schools of architecture on doctoral education. The intention is to be part of the European network for PhD education, and we are prepared to introduce the necessary changes in the objectives and syllabus of our study plan.

About ECTS

The ECTS system is, in practice, in our University since 2006 with the Bologna Curriculum.

About Research

Recently a new Law about PhD courses provides the possibility of the “research by design”, “research through Design”, “artistic research”, or “practice-based research”,

About Expectations

Now we have 41 PhD Professors, 4 “Catedráticos” Full Professors, 5 Associated Professors and 32 “Auxiliar” Professors.

The majority of our PhD Professors has a professional office, practicing architecture. In Portugal only Professors with a PhD are able to teach in doctoral education.



Porto School of Architecture

Doctoral Programme as part of an Educational Process Driven to a Contemporary Researcher's Profile in Architecture

The Experience of Porto School of Architecture

Luís Soares CARNEIRO
Teresa CALIX
Rui Jorge Garcia RAMOS

Universidade do Porto

Portugal

Porto School of Architecture (FAUP) is known as one of the most prestigious architecture and urban studies schools in Portugal and one of the very few in the world that has as former students and current professors, two Pritzker Prize winners - Álvaro Siza and Eduardo Souto Moura - and a Sir Patrick Abercrombie Prize winner for Town Planning or Territorial Development - Nuno Portas.

This acknowledgment, largely resulting from a teaching tradition that recognizes the importance of practical experience (through drawing and design) in architectural training, faces the challenges of a higher education system each day more demanding, among which one can highlight, particularly, the need to renew and offer doctoral programmes adjusted to the academic and professional contemporary reality. The changes occurring have a significant impact in the way innovation is considered and new architectural knowledge is generated.

Forms and reforms of Doctoral education

The present situation of FAUP's Doctoral Programme in Architecture

Development and changes over time

Since the formal establishment of FAUP, in 1979, passing from the autonomy of the preceding and centenarian Porto School of Fine Arts into the more regulated University of Porto, many changes of habits and processes of teaching and ways of organization have taken place, although the essential of teaching staff has remained, as well as the best of processes, methods and learning objectives.

Originally, as was happening across all the university, there was no specific doctoral education. The young teachers –nearly the only ones interested in achieving the degree– enrolled, individually, in a doctoral process that was accompanied and supervised by a mentor, that usually resulted in the development of an extensive thesis, whose duration could vary between four and more than a dozen years, with an extension which often exceeded the 1000 pages. This process, although likely to be attended by non-academics, was carried out specifically as a way to a career in teaching and research. So, the PhD degree, unlike what currently succeeds, wasn't considered as the start of a research career but as a moment of consecration of experience and knowledge.

Bologna's effect

The Bologna Declaration has had an important influence in changing this state of affairs. But several other factors also emerged. In the 1990s, in Portugal, an exponential growth of public and private degrees of architecture generated a large demand for PhDs in order to satisfy ratios formally required by entities that supervised the academic sector. Thus, within the group of the public schools, it generated a great deal of pressure on doctoral training, individually solved through the existing process, i.e., with internal resources, while in the private sector this need was addressed by the use of an existing doctoral scheme both in public universities and abroad. Therefore, within the new Bologna framework innovative doctoral programmes in architecture emerged in many public Portuguese schools, among which was FAUP since 2008. These programmes enlisted students either internally, i.e., younger teachers who, for whatever reason, had not yet completed their PhD, or externally, teachers of private universities that needed to have the doctoral degree, or even the public in general (much of it linked to public entities of different nature) who saw in the PhD an opportunity for personal development and career growth.

The Main Characteristics of FAUP's PDA

FAUP led the way in the creation of the first third cycle programme in the field of architecture, under the conditions required by Bologna. The existence of internal and external demand, the formation of a doctoral teaching staff already with a certain dimen-

sion and the consciousness that it was the right time to organize a programme of this nature, were the main reasons to implement it.

The Architectural Doctoral Programme (PDA) was organized into three academic years, of which the 1st is a curricular year (consisting of several theoretical courses and a seminar, "Preparation of Thesis") concluded with a public trial before a jury of internal and external members, called "Evaluation Panels". This is followed by two more years of individual work supervised by a mentor. At the end of the 2nd year there is a session where the progress of each research is presented, and although the thesis should be completed and presented at the end of the 3rd year it is common to see the postponement of its conclusion for another year, especially in cases that students maintain their professional occupations or parallel activities. Also during the 2nd and 3rd year students have to carry out "Research Practices" that correspond to their participation in activities of concrete research or presentation of their work through oral communications or published articles. This requirement to report the ongoing work, regulated by a table of credits that values each type of activity, implies not only an overview on the progresses achieved on its own research as well as in its externalization, with its presentation and debate in other environments.

The curricular components of the 1st year are structured in several profiles: originally profiles A, "Projecto do Espaço Habitacional e Formas de Habitar" (Housing and Forms of Dwelling) and B, "Arquitectura: Teoria, Projecto, História" (Architecture: Theory, Design, History), to which have been added later profiles C, "Dinâmicas e Formas Urbanas" (Urban Dynamics and Forms) and D, "Património Arquitectónico" (Architectural Heritage). Each of these profiles has a core set of courses that consists of "Preparation of Thesis" – a course of tutorial nature where students gradually build the original definition and general structure of Thesis - and courses of a methodological, a theoretical, or an informative nature, which broaden the knowledge and the research skills of students. These courses are taught mostly by faculty members from FAUP, which does not prevent to consider – indeed encourages – the collaboration of the best teachers in specific areas even if they come from other schools or universities.

How the Doctoral Programme evolved considering the changes occurring in architectural thinking and creation

Only now, after the completion of the first PhDs through this programme and taking into account the sufficient number of students enrolled in the PDA since 2008 till now (140 students in 2013/2014), one is doing the assessment of six years of activity and is preparing larger-scale changes, a range of internal and external discussions to redesign, where necessary, the existing programme and move forward with internationalization processes are foreseen.

How PDA reflects the requests for innovation addressed by the society and by architectural practice

The tradition of doctoral degrees was, historically, one of an academic nature and of great autonomy and freedom. In that sense, this understanding has been pursued in

some way by ensuring that every student, motivated by concerns of a personal nature, researches the issues in which he is interested. PDA, as many other architectural doctorates, still relies on a very closed system, where the almost complete absence of interest formalized by society, industry or other external entities, added to the non-existent State and programmatic guidance and to the incipient structuring and chronic underfunding of FAUP's R&D Centre (CEAU) research lines, does not promote the convergence of themes and the development of activities complementary and in collaboration. Efforts are underway to change this situation, but the results will only become visible over time.

Implemented innovative approaches in the way PDA is structured

In this context it is worth mentioning the innovative parallelism between the Studies Profiles, in PDA, and the Research Groups, in CEAU. This synchronization has allowed the gradual articulation and transfer of knowledge and experience, both under the supervision of the doctoral process, and in the objectification of research projects. Above all, it has been building research networks around specific topics, organized in research projects, national and international, where some students from PDA have been integrated. Nevertheless, it is consensually recognized that a PhD cannot be considered by itself a research project, though it may be included in it. It also follows from this issue the fundamental debate on the overlap between the interests and objectives of a research project and a doctoral thesis: even though they share affinities, they are not entirely identical, and should therefore keep a reserve of space to be questioned. Between these two scopes of investigation there are formal and organizational differences, as well as diverse academic and scientific principles, circumstances with a strong impact on their contents. The work carried out for the completion of a doctoral thesis in architecture does not have therefore to respond in *stricto sensu* to the ordination of a scientific research project, although the first can, as we believe and mentioned above, be included in the latter. However, this issue is not linear, standing 'between the lines' important aspects to the advancement of knowledge.

Another innovative aspect arises from the collaboration of external professors and a policy of open seminars for students with architects and researchers with a great deal of influence in contemporary thought. This openness of PDA, in coordination with the partnerships developed under the scope of CEAU, has allowed for overcoming the difficulties of setting up research networks, formal and informal, extending the exchange of teachers, researchers and students. It may seem little, but the gathering of professors, researchers and also students from other institutions is an irreplaceable and invigorating experience for deepening the on-going research and for selecting the paths to be followed. The production of knowledge must be seen as part of a process of communication and, subsequently, of transmission and enlargement of that same knowledge.

Along with the standard means of publication and dissemination of the research work, taking advantage of the support from CEAU, PDA has established internal processes to disseminate the work of their students as well as to record the most signifi-

cant works carried out during the programme. Each year C+C+W (Conference, Colloquium and International Workshop) is organized in order to intersect different programmes of FAUP (Masters and PhD) with research. *Resdomus*, an online publication, with independent editorial board and peer-review, works as a privileged repository for PhD students (not just from the PDA) submit articles originated in academic assignments or in researches that are taking the first steps.

Collaboration schemes with other schools of architecture on doctoral education

From the beginning of PDA that collaboration with other Portuguese schools and universities has taken place, and even has been encouraged, either at institutional level or through specific partnerships with high-quality professors. This circumstance promoted a fairly innovative way, concerning the current practice of university teaching, enabling a wide collaboration of external professors coming, for example, from Universidade de Évora, Universidade Técnica de Lisboa, Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa, Universidade Católica, Instituto Superior das Ciências do Trabalho e Empresas, Departamento de Arquitectura da Universidade de Coimbra and from R&D centres as Instituto de Ciências Sociais.

Plans and expectations for FAUP's Doctoral Programme in Architecture

Will it remain the original individual piece of research?

As mentioned above, although the tradition is that of the individual research, one has been trying to integrate it early with the research lines of CEAU, taking advantage of the strong connection between this R&D centre and PDA. It is considered, however, that some individuality should be maintained, as a strategy for enlargement of interests and probing themes, which can either be operated in standalone mode and then submit public repercussions, or they can be collateral surveys of particular interest.

Will it be shifted into a collection of publications brought together only for final examination?

It is possible to use this evaluation model and has been tested in several cases. However, it depends on the specificity of each theme and method of approach. It is, in our view, neither a model to suggest nor a model to reject.

How will it be incorporated in the so-called "research by design", "research through design", "artistic research" or "practice-based research" in the existing doctoral education structures?

This incorporation is already foreseen in recently published legislation. In fact, DL nº 230/2009 has allowed that the artistic and architectural work, produced under certain

conditions, might be the subject of a doctoral thesis. It clarifies and justifies this specificity by stating: “although the meaning and the context of that knowledge might be described by words, its deeper understanding can only be achieved by reference to these works and achievements”.

Within the university and the disciplinary thinking this new possibility is relevant, since it assigns a specific understanding to what is meant by architectural knowledge, recognizing its instruments, ways of organization and means of communication. In the case of architecture, especially in academy, design, history and architectural project are thus confirmed as specific ways of knowing in this area of studies; i.e., the field of architecture and its systems of communication is recognized as undeniable material and process to access to knowledge, and in this sense are acknowledged as the basis of reflection leading to a doctoral work. Under the PDA, by 2013, three students concluded their PhD in accordance with this framework.

Within this perspective a new PhD profile is currently being organized, focusing on the practice of architectural design.

Has the curriculum of Bologna system and ECTS system shifted the doctoral education closer to teaching courses of the third cycle?

With the former experience with 1st and 2nd cycle programmes the incorporation of the ECTS logic was fairly simple. Many of the practices at FAUP, in any cycle, approached or even exceeded the recommendations of Bologna that is why the coordination around the notion of learning rather than teaching and concerning the student-centred approach was particularly smooth.

We could also affirm, radicalizing for clarity, that the rearrangement of the model and teaching practices of FAUP –from the courses of Advanced Studies, the Integrated Master in Architecture, to the R&D Centre, particularly shifting to teaching / research and research / communication– was strongly driven with determination to create in 2008, a PhD programme (PDA).

The curricular component of PDA, depending on an academic environment (unlike the previous strong isolation), resulted mainly in a paradigm shift that encourages the creation of a research environment enhanced by all PhD students in their relationship with the structures and the research groups, breaking the researcher previous isolation, ending its excessive reliance on a supervisor, and promoting the development of crossed skills and interdisciplinary competences. As a result, although still in its first steps, it can already be observed in the renewed dynamics of CEAU research groups, in the increased participation in conferences, in publishing articles and organizing scientific events, issues appreciated for capturing funding and personal and institutional academic presentation at different venues.

What are the basic rules and criteria for the supervision of a PhD at FAUP?

The supervision of the doctoral programme is framed by the Scientific Commission of the PDA, which runs the programme and is composed of professors, by the Moni-

toring Commission, consisting of faculty members and students. Besides these two commissions, the overall activity of the programme is hierarchically supervised by the FAUP's Scientific Council. In this organization the Profiles coordinators have particular relevance, once in a daily basis they are responsible to organize, direct and supervise the conduct of the development of the curricular year (1st year) and subsequent years. By their nature they are a central interlocutor ensuring the quality maintenance and its evaluation.

What are the basic rules and criteria for the evaluation of PDA?

The evaluation of PDA is part of the mandatory assessment of Portuguese university programmes, and the accreditation process is carried out by AE3S, an independent agency. Since its establishment, PDA was first reported until the academic year of 2012/2013. However, this evaluation also follows the implementation of rules and clear and transparent criteria for all participants in this process, from the University of Porto, to FAUP, its professors, students and staff. In this framework a system of self-assessment of all actors involved is being enhanced in its different phases: from planning the school year, the admission of new students, the opening of new Studies Profiles, the recruitment of external collaborators, the functioning of courses and their evaluation, up to the delivery of the doctoral thesis and its acceptance, followed by the jury's composition and PhD public examination.

In this long cycle bureaucratic organization is particularly important and the information provided to all participants through the University of Porto's centralized information system (SIGARRA). This system is particularly relevant in respect of the relation course / teacher / student by allowing the provision and control of information on (1) courses detailed programme, (2) on summaries, (3) on evaluations, (4) on educational surveys, (4) on final grades, (5) on the courses activity reports, among many other aspects. As a whole this information is particularly important to monitor and evaluate the performance of the programme, daily or in its training cycle of 3-4 years, allowing the development of measures to improve the processes of teaching and learning.

The main characteristics of the researcher's profile that FAUP wants to generate

The outcomes of doctoral education in terms of the profile of the graduate and the impact of the work generated

How has architectural practice benefitted from the doctoral education offered by FAUP?

Since the PDA is a very recent PhD programme and the students who completed it were, until now, too focused on meeting the requirements of their academic career – in fact, so far all those who completed the degree are part of FAUP's teaching staff – it's not possible to verify by now its effects on the architectural practice. However it

seems clear that the methodological tools acquired to question the reality on a theoretical basis will necessarily be valid for evaluating and thus transform the same reality when working on it at a practical level.

Are there any practitioners involved in doctoral education at FAUP?

FAUP has a long tradition of involving practitioners in its graduation programmes. Architectural practice focused on project and drawing courses that depend on a heavy workload is the main subject of FAUP 1st cycle and 2nd cycle programmes. In fact it is a trademark of Porto School. For this reason practitioners have always had an important presence at FAUP and an important role to accomplish. Many of them have also joined the academic career fulfilling the requirements to become professors. Some of them are involved in present doctoral education at FAUP.

However, since the requirements for teaching in Portuguese universities are increasingly demanding, it is expected that the majority of the practitioners without PhD who remain teaching at FAUP feel compelled to complete their PhD in the next few years. Within this perspective, for the expected increase in the number of professors who will find themselves in these circumstances, as mentioned before, a new PhD profile is being organized, which focuses on the practice of architectural design.

Which are the main characteristics of the profile of a doctoral student that FAUP wants to create?

The “research environment” formally enhanced by the PDA and the wider change of structural teaching paradigms in FAUP, without meaning the abandonment of the traditional teaching practice –focused on project and drawing, as mentioned before– allows to achieve the learning objectives at this level of training and the learning results consistent with the criteria listed below. This means that, bearing in mind the student profile of an architect/researcher, the PhD should increasingly enable its holder to a professional performance outside the university. This implies the development of scientific expertise at the academic level, but also transferable skills for professional life¹. From this perspective FAUP’s training offer should be observed as a whole; i.e., from the 2nd cycle, with the Integrated Master, to studies of 3rd cycle, with Advanced Studies Programmes that correspond to advanced technical training (with an academic year and final dissertation) that open the possibility of further studying and researching through equivalences and transfer of credits for the PhD program in architecture (PDA). This formative grading is also the result of integrated adequacy of programmes to the scaling proposed by Bologna.

Under this approach the student profile corresponds to the graded training offer provided by FAUP, i.e., an architect and an architect/researcher. However, it would not be useful to ignore the arguments that training at doctoral level should be understood first and foremost as a process of development of intellectual skills, an aspect that can not be misused by simply adding “professional outputs”, sometimes referred to by the tutelary entities which are not involved in doctoral processes².

Estrutura do PDA - Structure of PDA

		1.º ano 60 ECTS					
		1.º semestre 30 ECTS (frequência obrigatório de 5 unidades curriculares)			2.º semestre 30 ECTS (frequência obrigatório de 5 unidades curriculares)		
perfil A	projecto de tese A1 10 ECTS	teoria A 1 5 ECTS	optativa A1 5 ECTS	projecto de tese A2 10 ECTS	teoria A2 5 ECTS	optativa A3 5 ECTS	[defesa pelo candidato e apreciação por um painel com participação externa de avaliadores do projecto de tese]
			optativa A2 5 ECTS			optativa A4 5 ECTS	
		métodos de investigação A 1 5 ECTS			métodos de investigação A2 ou teoria A3 5 ECTS		
perfil B	projecto de tese B1 10 ECTS	teoria B1 5 ECTS	optativa B1 5 ECTS	projecto de tese B2 seminário 10 ECTS	teoria B2 5 ECTS	optativa B3 5 ECTS	[defesa pelo candidato e apreciação por um painel com participação externa de avaliadores do projecto de tese]
			optativa B2 5 ECTS			optativa B4 5 ECTS	
		métodos de investigação B1 5 ECTS			métodos de investigação B2 ou teoria B3 5 ECTS		
perfil C (etc.)	projecto de tese C1 10 ECTS	teoria C1 5 ECTS	optativa C1 5 ECTS	projecto de tese C2 10 ECTS	teoria C2 10 ECTS	optativa C3 5 ECTS	[defesa pelo candidato e apreciação por um painel com participação externa de avaliadores do projecto de tese]
			optativa C2 5 ECTS			optativa C4 5 ECTS	
		métodos de investigação C1 5 ECTS			métodos de investigação C2 ou teoria C3 10 ECTS		
diploma de curso de doutoramento							

2.º ano 60 ECTS		3.º ano 60 ECTS	
3.º e 4.º semestres		5.º e 6.º semestres	
orientação 50 ECTS + práticas de investigação 10 ECTS	relatório de progresso + debate	orientação 50 ECTS + práticas de investigação 10 ECTS	parecer do orientador Prova pública + Júri
orientação 50 ECTS + práticas de investigação 10 ECTS	relatório de progresso + debate	orientação 50 ECTS + práticas de investigação 10 ECTS	parecer do orientador Prova pública + Júri
orientação 50 ECTS + práticas de investigação 10 ECTS	relatório de progresso + debate	orientação 50 ECTS + práticas de investigação 10 ECTS	parecer do orientador Prova pública + Júri
orientador + inscrição definitiva como aluno de doutoramento			

Which competences and skills must each student fulfil beyond the specialised knowledge?

To explain the skills and abilities that each student must have it can be assumed that the general criteria set out in Article 28 of DL 74/2006, properly adjusted to a doctoral student profile that FAUP expects to create: (a) ability to systematic understanding in the scientific field of architecture; (b) research skills, abilities and methods associated with that scientific domain; (c) ability to conceive, design, adapt and perform a significant research respecting the requirements imposed by the quality standards and academic integrity; (d) having accomplished a significant number of research work that has contributed to the extension of knowledge in the field of architecture, part of which deserves national or international dissemination; (e) being able to critically analyse, evaluate and synthesise new and complex ideas; (f) being able to communicate with his peers, the academic community and society at large about architecture and his field of research; (g) being able, in a knowledge based society, to promote, in academic or professional context, the technological, social or cultural progress.

Notes

- 1 “Programas doutorais da U.Porto Notas para uma reflexão”, Formação e Organização Académica da U.Porto – Reitoria, Porto, Julho, 2012
- 2 MOWBRAY, Susan, HALSE, Chritine, “The purpose of the PhD: theorising the skills acquired by students”, *Higher Education Research & Development*, vol. 29, nº 6, 2010, p. 653-664



ROMANIA



IOSUD - UAUIM, Bucharest

The Future of Research in European Architectural Education

Cristina OCHINCIUC
Cristina Olga GOCIMAN

IOSUD - UAUIM, Bucharest

Romania

Which are the forms and reforms of Doctoral education in our Doctoral School?

In the near future we shall enter the third year of the implementation of the new Education Act no. 1/2011. This Act has the vision to promote a value-oriented education, including creativity, cognitive capacities, volitional and actional capacities, capabilities, fundamental knowledge skills and abilities of direct use and benefit to profession and society.

The Doctoral studies belong to the third cycle of our university aiming at acquiring level 8 of the EQF / CEC and that of the National Qualifications Framework. These are undertaken based on a Code of Doctoral Studies, approved by a Government Decision. "Ion Mincu" University of Architecture and Urbanism is an Institution that organizes Doctoral Studies. IOSUD-UAUIM initiates Doctoral Studies (Bologna third cycle) in architecture and urbanism. IOSUD - UAUIM organizes only science doctorates.

According to the provisions of the Education Act, the articles of the Code of Implementation and the Regulation for the Organization and Operation of the Doctoral SchoolsITT – Space, Image, Text, Territory – within UAUIM, the doctoral programme includes the following:

- a) a training programme based on advanced university studies;
- b) an individual programme of scientific research.

Advanced university studies / Data on possibilities regarding optional subjects

Modular Doctoral Program

General Module - generic knowledge (5 ECTS)

Introduction to Scientific Research

The best method to show research results

Architectural Module - specific fundamentals (5 ECTS)

Scientific Approaches to Research in Architecture

Scientific Research Subjects / modules of other Programs

Interdisciplinary Modules (10 ECTS)

Architecture and Humanities - **Architectural Theory and Critique**

Architecture and social sciences - **Theory and Methodology of Urbanism**

Architecture and technology / biotechnology - **Architectural Design Theory**

- Understanding Historic Buildings and past environmental technologies
- Principles of Environmental Design / Principles of Integrated Design

Monitoring and Modeling of Environmental Performance of Buildings - **Digital Design Methods and Control**

Other programs related to assuring quality of the built space

The diversification of the thematic modules within the School of Advanced Studies (organized for a period of three months, in one of the two semesters of the first year of doctoral research) and the setting up of the guiding team, formed of three specialists (academics or researchers, Dr/PhD) can be considered the decisive problems in the organization of doctoral research. The Regulation also stipulates that doctoral studies can be conducted by doctoral supervisors jointly at national or international level. In these cases, the doctoral - student works under the guidance of a leader who is the doctorate supervisor from IOSUD-UAUIM and a doctoral supervisor from another country or simultaneously by two doctoral supervisors from Romania, based on a written agreement between those institutions and IOSUD - UAUIM.

Specialists who have acquired the legal right to conduct doctorates in institutions of higher education or R&D from abroad in the field of architecture and urban planning, can acquire upon request the quality of doctoral supervisor affiliated to the doctoral

school from IOSUD - UAUIM. Another important asset of the new Regulation is the emphasis on the intrinsic link between the doctoral supervisor and doctoral student, which develops through the doctoral research.

The doctoral supervisor guides and evaluates the student's doctoral work in the context of the doctoral studies programme according to the professional autonomy and academic requirements which follow the exigencies of the doctoral studies program while respecting the professional interests of the doctoral-student.

Some examples of the recent transformations in research at doctoral level and more generally in architectural research and innovation

*University of Bucharest - Centre of Excellence in Studies of Image (CESI) /
University of Architecture and Urbanism - Doctoral School (SITT)*

European Doctoral scholarships in the fields "Humanities" and "Architecture and Urbanism"

European Doctoral Scholarships (POSDRU):

- EDUCATED 1 Humane Excellence in Doctoral Research: Interdisciplinary Theories and Applications - October 2008 - September 2011
- EDUCATED 2 Humane Excellence in Doctoral Research: Applications and Interdisciplinary Theories 2 - October 2009 - September 2012
- Excellence and interdisciplinarity for Information Society in doctoral studies - October 2010 - September 2013

The subsidized places from the budget for the Doctoral School "Space, Image, Text, Territory" SD-SITT, European doctoral scholarships, series 2008-2011, were allocated through a 3-year project, financed by the Structural Funds, Sectorial Operational Programme Human Resources Development 2007-2013. Beneficiaries: University of Bucharest (UB). Lead Partner: "Ion Mincu" University of Architecture and Urbanism (UAUIM).

The project is carried on currently entitled "Excellence in Humanist Doctoral Research: Interdisciplinary Applications and Theories " - Educated, and is supporting 19 young researchers humanities, architects and planners in the DS -SITT.

Doctoral students were able to meet with foreign teachers, invited in Bucharest as short-term experts who presented lectures, workshops and tutorials. In this period events were also organized: national communication sessions with specialists from Romania, international symposia involving several European universities. Scholars wrote studies and articles that were published in volumes by Educators' projects; specialist teams were directly responsible for the performance of their doctoral schools monitored research and activity reports. The doctoral research was relat-

ed methodologically and generally-theoretically and the concrete analysis, to the study of society and culture, the arts and the evolution of the image, be it mental or material.

Some of the benefits of such scholarship are: monthly amounts received by the student, about 3 times higher than those allocated in the past, which give autonomy and help to the student to devote more time to research in the field in archives and libraries in Romania and abroad and publish his/her research. The aim is to train students in project management, and to integrate them faster in the international science networks. Last but not least, the acquisition of specialized papers, magazines and subscriptions to international databases facilitate them access, right from Romania to the latest bibliographies.

Very important were the internships research abroad in year II of the programme. For two semesters they were affiliated with universities in the European Union, where they studied in departments and specialized laboratories, together with research teams. After their return to Romania in May 2010, they presented the results of their scientific experiences in the context of the specially organized colloquia.

Doctoral students from Doctoral School, IOSUD - UAUIM involved in UAUIM research

In UAUIM there are 4 research centers:

- Center for Research, Design, Building Evaluation and Consulting (CCPEC)
- Research Center and Data Bank in Construction, Architecture and Urbanism (BICAU)
- Center for Architectural and Urban Studies (CSAU)
- Study Centre for Vernacular Architecture (CSAV)

These centres offer the academic staff and the qualified doctoral supervisors the institutional framework in which research can apply and develop. These centres also perform research activities addressing the evolution of urban and rural territories in the context of historical and cultural development or with special focus on research on building technologies, systems, products and services, or research projects in restoration and vernacular architecture. These research projects are really incubators for the future doctoral-students or become very important for doctoral students in the second year, dedicated to individual scientific exploration.

Some examples of research by Master students or future doctoral students below demonstrate the activity taking place.

1. The project consists of the *design and construction* of two semi-detached family houses according to the *Passive House concept, adapted to the Romanian climate conditions*.

The project is developed under the National R&D project INOVARE 2008.



Fig. 1

Passive House concept, adapted to the Romanian climate conditions.

The results are validated by using Passive House Planning Package tools and is finally sent to PassivHaus Institute Darmstadt for certification.

Building owner

Architect / Planner

Architecture / design: "Ion Mincu" University of Architecture and Urbanism Bucharest
www.uauim.ro

Building service planning: Technical University of Construction, Bucharest- www.utcb.ro

Statics planning: Institute for Studies and Power Engineering, ISPE - www.ispe.ro

Two doctoral students were involved, and another one became student at the doctoral school after his participation in the project and its construction.

2. Urban Blocks in protected central areas exposed to multiple hazards. Assessment, mapping and mitigation strategy. Case study: Bucharest - decomposed zone demolished by the communist regime, acronym URBASRISK

Research projects funded by UEFISCDI (Executive Agency for Higher Education, Research, Development and Innovation Funding)

Coordinating Organization

"Ion Mincu" University of Architecture and Urbanism, Bucharest

Partner (P1): The National Institute of Research and Development in Construction, Urbanism and Sustainable Territorial Development “URBAN-INCERC”.

The research is proposes the scientific substantiation of some management operations for the reduction of disaster risk of the built space and the space under post-disaster reconstruction by maintaining the continuity and specificity of the urban habitat, in order to preserve the feeling of civic affiliation. A number of doctoral students were involved in this project managed by their doctoral supervisor.

3. Research to estimate and increase the performance of urban traffic networks intrinsic safety, acronym SafeNet

Research projects are funded by UEFISCDI (Executive Agency for Higher Education, Research, Development and Innovation Funding). This project is financed by Partnerships Program in priority areas, research director 7.5. Innovative products and technologies for the transport and production of cars, CACM Type 2 code PN-II-PT-PCCA-2011-3.2-1439

Period of the project: July 2012 - September 2014
<http://ingtrans.pub.ro/content/SAFENET.html>.

Partners

Coordinating: Polytechnic University of Bucharest <http://ingtrans.pub.ro/>

Partner 1: S.C. Metroul S.A. <http://www.metroul.ro/>

Partner 2: “Ion Mincu” University of Architecture and Urbanism <http://www.uauim.ro/>

Partner 3: General Association of Engineers in Romania <http://www.agir.ro/>

The theme of the “Research for forecasting and improving the efficiency of urban traffic networks intrinsically safe” (SafeNet) includes specific research on traffic safety in urban space, customized for Bucharest. Also a number of doctoral students were involved in the research. Chapters of thesis were parts of their research.

4. Study of Urban Regeneration and Impact on Environment and Society Concerning the Conversion of Buildings In Romania

An exploratory research program
Partnership UAUIM / CCPEC financed by CNCISIS

Potential Sites of Urban Regeneration -a Tool for Urban and Cultural Development
Two doctoral research studies that served to the research project:

- a) Language of surface. Intersections between architecture, art and technology, and
- b) The study of urban regeneration and environmental and social impact on reconversion of Buildings in Romania.



Fig. 2
Urban regeneration - Architectural aspects.

The collaboration with private sector has been and may be salutary in the year dedicated to the individual research, as can be exemplified by the doctoral research "Re-inventing of Glass Facade ". The prototype module that generates building envelope awaits certification.



Fig. 3
Glass facade with multiple functions. Simulations.

From Passive House-innovative buildings in specific climatic conditions to innovative detailing, constitute a technological module that generates the building envelope and that can offer a wide range of approaches to which the doctoral research in architec-

ture and urbanism must respond. These are examples of how “research through design” or the active research can be defined.

Which are the main plans and expectations for the future of doctoral education in your School of Architecture?

Romania is presented in the first report by the European Commission regarding research, development and innovation as a country with few researchers, reduced economic impacts on innovation, too many theoretical theses and too little investment in this area which could increase the competitiveness of domestic firms.

“Research through the project” appears to be the appropriate and useful approach given that adaptation and mitigation are, for architecture and urbanism, two ways of intervention in the face of climate change. Moreover we can invoke, to support this type of research, the short time (three years with possible extension of a further 2 years) for doctoral students to the completion of doctoral research and theses. Definitions given to such kind of research by EAAE / AEEA Research Charter / C. Research by Design reinforce this assertion.

Causal chain: professionalism (training young researchers who wish to pursue a teaching career) - quality of research (defined by timeliness and importance of doctoral research themes and scientific rigor) - recognition (by internationally recognized publications) there is very important to the pathway of a young researcher who is preparing the doctoral thesis and is defining the strategy of the doctoral supervisor; for example, efficient use of resources and tools offered by the extremely rapid progress of information technology and communications. This goal determines the strategy of creating computer-training programs for the preparation of highly qualified scientific personnel. This goal led to the strategy to propose a module for advanced studies in computer science.

Regarding ECTS

ECTS are necessary as long as the mobility of doctoral students is encouraged.

The first year (second semester of studies) ends with a “report” which aims to define the research project, on which doctoral-student intends to continue working all the way into the doctoral research (thesis proposal). Doctoral students must demonstrate mastery of the subject research thesis and structure characterization of the state of the art in the chosen research area, to identify existing literature and annotated bibliography, the sequencing, methods, and research methods in relation to similar experiences in the world, towards systematizing information. Doctoral students can pass the first year provided they accumulate 60 ECTS after the completion of the final report of evaluation made by the commission of guidance and other credits obtained from other activities, corresponding to the two semesters of 30 credits each.

The second year of doctoral training emphasizes specialized training in doctoral research. For purposes of maintaining scientifically coherent doctoral research, doctoral students submit a report per semester, showing progress, with the committee of

guidance and doctoral supervisor or a wider group with the role to guide, correct and support. Evaluation of reports and related credits with credits from other activities allow the promotion to the second-year provided that the doctoral student has accumulated in total 60 ECTS, corresponding to the two semesters of 30 credits each.

In the course of the sixth semester preliminary support of the doctoral thesis takes place in the presence of the doctoral supervisor and of the guidance committee. Favorable Evaluation with related credits allows for the public presentation of the dissertation provided that the doctoral student has accumulated a total of 150 ECTS (total 180 ECTS, 30 ECTS are according for thesis writing).

Regarding basic rules and criteria for evaluation

The accreditation of doctoral schools is made through the evaluation at intervals that do not exceed 5 years for re-accreditation on the basis of their performance and institutional capacity. Evaluation can be internal (internal evaluation of the doctoral supervisor every two years) or external.

External evaluation of doctoral schools, temporary authorization, accreditation or reaccreditation, focus mainly on the following aspects:

- a) extent to which the doctoral school meets the criteria, standards and performance indicators established in the methodology for external evaluation for temporary authorization, accreditation and periodic assessment of doctoral schools in specific domains;
- b) respect the relevance of studies and publications carried out within the doctoral school for research and human quality resources involved for scientific and transversal skills training;
- c) observing the provisions regulations on the organization of doctoral studies in Romanian, in one of the languages of national minorities or in a foreign language;
- d) observing the provisions regulations concerning the organization of the competition for admission to doctoral studies;
- e) compliance with the requirement to conduct research projects involving doctoral students and are finalized by publications;
- f) compliance with the requirement that the program of doctoral studies courses does not repeat the cycle of undergraduate studies and master.

Which are the main characteristics of the researcher's profile that your school wants to generate?

Doctoral study programs provide professional competences training, and content, cognition and research in specialized fields and of transversal competences.

The following competences specific to the domain are qualified as professional competences:

- a) advanced knowledge in the field;
- b) ability to identify, formulate and solve research problems;
- c) mastery of advanced research methods and techniques;
- d) knowledge of project management research;
- e) mastery of processes and new solutions in research;
- f) skills in research, development and exploitation of scientific work;
- g) academic language skills in foreign languages necessary in documentation and in preparation of scientific papers; understanding and ability to apply the principles and values of ethics of scientific research in the field.

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SPAIN



Barcelona School
of Architecture

Doctoral Studies in the Barcelona School of Architecture

**Cristina
GASTÓN GUIRAO**

Barcelona School
of Architecture

Spain

A Brief history of the doctorate in the School of Architecture of Barcelona (ETSAB)

A few brief precedents of the evolution of the doctorate in Barcelona will help to understand the State of the current situation. The Architectural School in Barcelona is nearly 140 years old; however, the doctoral studies –understood as a field of study within itself for research in architecture– have existed for little more than thirty years¹.

While Oriol Bohigas was director of the School between 1977 and 1980, Helio Piñón, deputy director at the time, was in charge of establishing and organizing a few specific doctorate courses for the first time, differentiated from fields related to engineering, arts or social sciences. Piñón explained those moments highlighting the previous years, between 1971 and 1977, as decisive for the beginning of the educational progress in Barcelona by incorporating Rafael Moneo as Chair Professor of Architectural Design. He introduced a way of approaching architecture “as a cultural



Comic strip of the act of reading a PhD thesis in Barcelona. Illustrated by Pedro Strukelj, doctorate student of ETSAB.

1. DOCTORAL PROGRAMMES AND RELATED OFFICIAL DEGREES IN ARCHITECTURE, URBANISM AND CONSTRUCTION _ETSAB UPC-BARCELONA TECH_ 2013 DECEMBER

DOCTORAL PROGRAMMES	OFFICIAL DEGREES AND DEPARTMENTS RELATED	INTENSIFICATION LINES	RESEARCH GROUPS INVOLVED
ARCHITECTURE, ENERGY AND ENVIRONMENT	Master in Architecture, Energy and Environment CA17 EEU/FA/PE		AIEM: Architecture, Energy and Environment
VISUAL COMMUNICATION IN ARCHITECTURE AND DESIGN			AR&M: Architectural Representation and Modelling
URBAN AND ARCHITECTONIC MANAGEMENT AND VALUATIONS	Master in Urban Management and Valuation CA1		CPSV: Centre of Land Policy and Valuations
ARCHITECTURAL DESIGN	Master in Theory and Practice of Architectural Design PA	1. Modern Form 2. Environmental and Historical Design approaches to Architecture 3. Project and Analysis 4. Architecture in mass society	FORM: Modern Form GIRAS: Architecture: Project, Territory and Society HABITAR: Inhabiting CERCLE: Architecture Circle PAB: Architectural Pretexts: Barcelona ARCHT: Present architecture, to construct today, to learn today
ARCHITECTURE TECHNOLOGY, CONSTRUCTION AND URBANISM	Master in Architectural Technology CA1	1. Construction 2. Facilities 3. Restoration 4. Structures	DITEC: Diagnosis and intervention techniques in the restoration and rehabilitation of buildings GAT: Group of Architecture and Technology GICITED: Interdisciplinary Group on Building Science and Technology LITA: Architecture Innovation and Technology Laboratory
THEORY AND HISTORY OF ARCHITECTURE	Master in Theory and History of Architecture CA		AEA: Art, Aesthetics and Anthropology of Space HAA: History of Art and Architecture PUPP: Urban Perspectives: Processes and Projects
URBANISM	Master in Urbanism UOT		GRU: Urbanism Research Group LUB: Urbanism Laboratory PUPP: Urban Perspectives: Processes and Projects
DEPARTMENT CODES:			
CA1: Architectural Technology 1; EGA1: Department of Architectural Representation and Visual Analysis 1; PA: Architectural Design; UOT: Urbanism and Regional Planning; EA: Structural Architecture; CA: History and Theory of Architecture; EEL: Electronics Engineering; FA: Applied Physics; PE: Engineering Projects			

Chart 1

Doctoral programmes and related official degrees in Architecture, Urbanism and Construction. December 2013.

historical fact, beyond professional empiricism (...) in which professional expertise did not impede posing education as a problem of understanding in which reflection plays a decisive role"². Since then doctoral studies have suffered, at least two major changes, due to legislative reforms that have affected the entire Spanish University sector.

In the 1986-87 course the administrative structure of the Universities was modified and the organization in departments was adopted. This led to the division of the doctoral programme into the new departmental units and even within these departments to distinguish different lines of research called *Intensifications*.

Ten years later, during the 2006-2007 academic year, a new reform was initiated in response to the advances in the establishment of the European Higher (Architectural) Education Area agreed in Bologna. As a consequence of this, the teaching of the doctorate was substituted by the follow-up of postgraduate programmes with a master level which supposed an authentic re-foundation of the postgraduate. The creation and implementation of new Master programmes meant that by passing with a level of excellence enabled one for the admission to the doctorate³. To summarize, the evolution in the organization of the doctoral studies has depended on laws impelled by the governments of Spain and Europe rather than the evolution of architecture itself.

The current situation, derived from that mentioned, implies that the field of Architecture, Urbanism and Construction –this is how the Polytechnic University of Catalonia defines it– is served by seven doctoral programmes that to this day are: *Architecture, Energy and Environment; Visual Communication in Architecture and Design; Urban and Architectonic Management and Valuation; Architectural Design; Architecture Technology, Construction and Urbanism; Theory and History of Architecture; and Urbanism* (See chart 1). The academic management of these programmes depends on the Polytechnic University of Catalonia (UPC) and their respective departments, not on the School –although this situation might be inverted in short⁴. All the postgraduate programmes, masters and doctorates, are strongly internationalized: due both to the origin of the students– globally considered that the UPC is made up of 52% Spanish students and 48% overseas, in the field of architecture the percentage of overseas students is even greater– as for the collaborations with other countries.

In the near future, during 2014, the ETSAB will have the opportunity to resolve its place in the UPC –which is highly questioned because Engineering and Sciences impose scientific criteria of evaluation on the research activity which prejudices that of the architects. This is a status reform that will only affect the School of Architecture and consequently may govern specific disciplinary criteria.

The overall progress of society and of all sciences leads to an increase and improvement in the control of the factors of habitability, energy expenditure and protection of the building. This implies more and more the competence of specialized technical knowledge. The objectives of a doctorate programme of technology are very clear. A society's expectations with respect to construction, what politicians, citizens and enterprises want has to be found in what finances the programmes for research project calls, national or international⁵.

It presents the opportunity to reflect on whether the segmentation of the doctoral programmes in partial technical views is in favour or against the understanding of the

DOCTORAL PROGRAMMES	*Enrolled students	Defended thesis	RELATED OFFICIAL DEGREES	*Enrolled students
ARCHITECTURE, ENERGY AND ENVIRONMENT	49	6	Master in Architecture, Energy and Environment	18
VISUAL COMMUNICATION IN ARCHITECTURE AND DESIGN	61	9		
URBAN AND ARCHITECTONIC MANAGEMENT AND VALUATIONS	61	3	Master in Urban Management and Valuation	36
ARCHITECTURAL DESIGN	265	13	Master in Theory and Practice of Architectural Design	60
ARCHITECTURE TECHNOLOGY, CONSTRUCTION AND URBANISM	105	15	Master in Architectural Technology	131
THEORY AND HISTORY OF ARCHITECTURE	97	8	Master in Theory and History of Architecture	30
URBANISM	64	8	Master in Urbanism	77
			Master in Landscaping	77
	702	62		429
Total number of students enrolled: 702 (doctorate) + 429 (master) = 1131 students				
*Data obtained from the Postgraduate Office. ETSAB. Academic course 2011-12				

Chart 2

Number of students enrolled in postgraduate programmes. Academic course: 2011-12.

architectural fact. Although recognizing to begin with the difficulty of establishing a stable and systematic understanding of the architectural project, one would have to seize the moment to promote a coordinated functioning and favour a greater awareness of the unity of the project. A collaborative commitment capable of integrating science and disciplines in an articulating and totalizing practice becomes increasingly more essential.

Given this state of affairs, and from the existing departments' point of view, that of Architectural Design (DPA) would be the one that would have the major responsibility in placing to the fore the work of architecture and its project, as the centre and axis of education and training activities. Architectural design should be the action framework of any subject in which the study of architecture is integrated. In contrast, in reality one observes the progressive loss of its importance in front of the scientific specializations when it should be gaining it as the only ordering activity that transcends the mere accumulation of technical skills and humanistic knowledge.

The doctorate in the Department of Architectural Design (DPA)

The official Master, "Theory and Practice of architectural design" that has been taught since the 2006-07 course, is the foundation of the training activities of the doctoral programme and has the consideration of a master in research. Its main objective is to deeply delve into those theoretical and methodological questions which allow the development of a thoughtful and rigorous practice of the architectural design project and at the same time promote the training of research personnel involved in the project that could be incorporated into the university teaching structure in the future.

The Department of Architectural Design (DPA) is integrated by 140 professors of which 32 are doctors who work in postgraduate training activities⁶. During the academic year 2011-2012 sixty-two doctoral theses were read in the field of Architecture,

Urbanism and Construction of which thirteen belonged to the DPA programme⁷ (See chart 2).

The educational training given in the Master is organized on the basis of four intensification lines: *L1 - Modern Form*; *L2 - Environment and Historical Design*; *L3 - Project and Analysis*; *L4 - Architecture in mass society*⁸. They all state that to advance in the understanding of the project's tools it is necessary to acknowledge architecture in depth by carefully studying its historical and contemporary examples. This will be the main activity that the students will develop for the master: analyse architecture to understand the sense of its form.

The Master's Course is divided into two parts: In the first part the student courses all of the intensifications in a transversal manner and in the second the student opts for one in particular in order to follow a research seminar in which methods and guidelines are provided for a rigorous study in order to elaborate the thesis. His/her contribution to knowledge should be the basis for an article in an indexed journal, be the germ of a doctoral thesis or provide teaching materials for an architectural design workshop. Once surpassed the master with high marks s/he can request access to the doctorate. The development of thesis work progresses through tutoring which is either individualized or in group, with the director.

In order to support the dissemination of their research a few intensification lines publish their own collections, but there are also several institutional supports: the digital deposit of doctoral theses and the deposit of theses, direct access portals in UPC Commons⁹.

Carlos Martí Arís has, among his many merits, that of having encouraged, coordinated and directed two initiatives since 1997 which have had great impact on the production of knowledge and the dissemination of the doctorate: the academic journal DPA gathers reflection on architecture and includes reviews of the Department's most outstanding thesis and the doctoral thesis contest of the "Caja de Arquitectos" Foundation (FCA)¹⁰. FCA is an institution with headquarters in Barcelona, which promotes amongst other activities a biannual contest of the doctoral thesis of Spanish Universities - regardless of the nationality of the doctor- of which eight editions have taken place. The rewarded Theses are published in a collection called ARQUITESIS which has become a reference in Iberoamerica¹¹.

A coordinated degree, master and doctorate experience

Architectural Design as an educational area in ETSAB constitutes a core subject and is present in all graduate and postgraduate courses; however, a better relationship between the two academic levels would be desirable. Perhaps an example would clarify a way in which one could take pedagogical advantage of architecture and at the same time advance in its understanding. It is not a generalized case, but a possible milestone to aim for. The following experience took place between 2006 and 2012 and kept on moving forward without premeditation to form a perfect circle. The work on a same architectural reference linked all levels of architectural training: degree, master and doctorate. The process was sparked off by the teachings of Helio Piñón - as coor-

dinator of the *Architectural Design III- IV* course and as head of L1- Form- and backed up by professors like him¹².

The home of the American architect Gordon Bunshaft in Long Island (1963) served as a reference to pose a project's exercise to students in the second year of the degree; this later became the subject of a master's thesis and finally a doctoral thesis. This is an exemplary project that allows appreciating the formal and architectural possibilities of the use of prefabricated elements, in this case, ribbed floor slabs of a catalogue of reinforced concrete.

During the 2005-2006 course, the second year students were provided with a dossier containing the floor plan, photographs and basic bibliographical references of this example. The choice reinforced the lessons on prefabrication which were being given at the same time in the construction course. The objective was to initiate students on the rising technological issues within our context but mainly to teach how to look for the aesthetic basis in either of the constructive aspects of the building. Helio Piñón distinguished between *building material* and *architectural design material* - and it is the latter that interested us-. As a form of an alibi for the exercise a reconversion of the architect's house into a foundation dedicated to the study of his work was proposed. Starting from here the students were guided in the appreciation of architecture. They were obliged to draw the original project in order to proceed with their intervention in a very similar graphic restitution and the benefits of this task are uncountable.

In the research Seminar of the Master's Degree in 2007-08, this house project was put forward as a subject for study. This time, the aim was to explore the house's formal system: studying the changes of use and scale of the constructive system, the spatial and distributional repercussions, and relating it to other buildings that used the same pre-cast piece, the ribbed Pi slab. The author of the thesis conducted an exhaustive bibliographical search by collecting data from publications of the period and carrying out a meticulous graphical restitution of the comparison of two buildings which served as the basis for his/her doctoral proposal¹³.

In November 2012, a thesis titled *Form and Tectonics: Structure and Prefabrication in the work of Gordon Bunshaft* was defended. The study had extended to the entire architectural production with precast concrete elements of that architect to explore its spatial and aesthetic sense compared to that of metallic systems, as well as the meaning and convenience of the choice of the pieces in relation to space and the building. The author extended the bibliographical information of the dissertation with the consultation of the architect's original files in New York, obtaining material from executive projects and visits to the original buildings. The author produced a comprehensive graphic edition comparing building systems and showing their architectural impact¹⁴.

The material collected and edited in these works is intensely used as teaching material in the degree workshops. At the moment, the public works sector in Spain promotes the intensive use of industrialized and prefabricated systems and funds research.

Ultimately, this is to promote a type of access to understanding in which reflection and conception become facets of the same activity in order to comprehend the judgment criteria that favours a responsible creative practice.

The programme's new challenges: changes in society and in the way of producing and thinking about architecture

The academic structures “of research” in architecture are very recent compared to both the school itself and the tradition of the discipline and, of course, to science research. The building technology sector adapts very well to the scientific model. But there is evidence of a clear mismatch between the research procedures carried out by the engineering branches and the manner in which the study of architecture is approached, both as a development problem and as an architectural design form. The low esteem that the scientific production's valuation tables show for books by architects and the little sympathy that the indexed publications or the peer review have among architects are also clear signs of divergence.

In the 2011-2012 course 702 doctorate candidates enrolled in all the doctoral programmes in the field of *Architecture, Urbanism and Construction* of the UPC and 62 theses were read. The data shows a clear inflation of architects enrolled in the tutorial of thesis, who we can assume both the willingness to learn as the lack of encouragement, incentive or competence to finish. Many architects pay the tutorials annually but they do not progress or complete their doctoral theses. Besides thinking about academic or economic sanctions, we need to rethink what would be necessary to make those enrolled, new and veteran, feel the urge to finish what they started off. Possibly the selection of candidates and themes will have to improve, pre-selected by the research groups, so that the study supposes an inescapable challenge, vital, of life or death.

In a society in which continuous updating has become a necessity: studies never end. The demand for postgraduate specialization programmes increases according to the job market, but in relation to this lifelong learning what role does the doctorate fulfil. Traditionally the doctorate was an accreditation in order to dedicate oneself to teaching but rather a hassle, an incompatibility, to work in the profession. The offer of professionalizing Masters is inserted at an intermediate level, but it would be positive both for the society as for the discipline to take up the indications of Rafael Moneo regarding unifying professional competence and reflection.

And beyond that, regarding the possibility of learning and teaching Architecture there are divergent opinions. Some say that everything that can be taught is not worth being learned or that everything that has an explanation is not important. Regardless of whether a professor can effectively teach architectural design or if it is the student who learns by himself/herself, it is unquestionable that the desire to understand can teach more than what the professor knows himself/herself. Therefore, even when being on the educational side, the professor should not abandon his/her vocation to study. This undeniable link between teaching classes and research in university classrooms should serve to keep the degree and postgraduate programmes together. In a delightful essay titled *Musical Poetics*, Igor Stravinski, the musical composer, states that the study of the art form is a creative act¹⁵.

Some additional data: What do the charts explain?

The doctorate in architecture compared to PhD in engineering at the UPC

In both there are more men (60%) than women (40%). During the academic year 2011-12, 354 theses were read in the UPC of which 62 belonged to the field of architecture (18%). In engineering there are more Spaniards (56%) than foreigners (44%), however, in architecture there are more foreign students (52%) than Spanish ones (48%). The engineers finished their doctoral studies aged between 25 and 35 years old, the architects between 35 and 44 years old.

Doctorate and Masters in architecture

In the academic year 2011-12, there were 1131 students enrolled in the postgraduate level (702 in the doctoral level and 429 in the master level).

Master in Architecture

The Master programmes have even more international enrolment than the doctorate: 17% European and 83% from the rest of the world (75% students from Latin America, 6% Asia, 1% USA/Canada, 1% Africa). The Master with the largest number of entries is Architectural Technology -131 students (30%)-. Last year the enrolment declined in all masters.

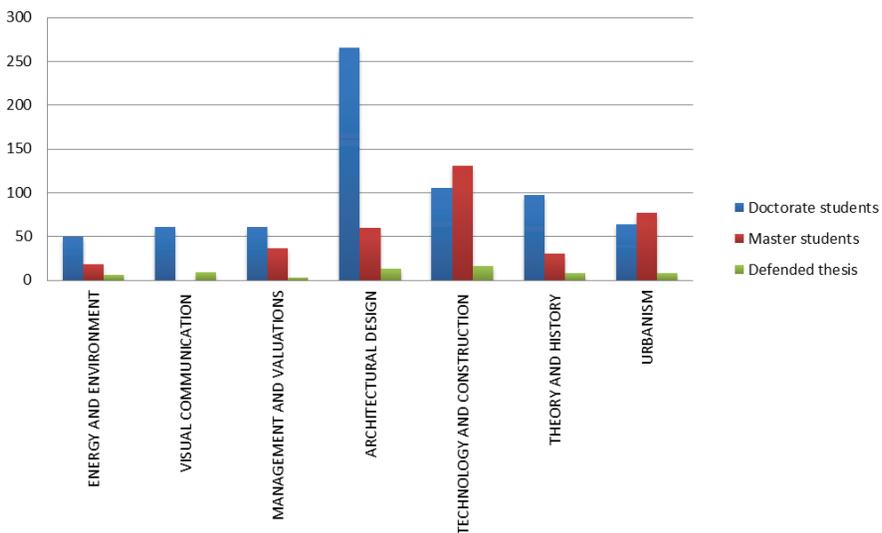


Chart 3

Number of students enrolled in doctorate and master programmes. Academic course: 2011-12.

PhD in Architecture

The doctoral programme with the largest number of entries is Architectural Design -265 students (37%)-. The evolution of the ratio between foreign and Spanish students tends to equal: 54% versus 46%. Poor performance of the index between students enrolled and the number of read thesis. The best ratio corresponds to the Urban Planning programme.

Notes

- 1 The ETSAB was founded in 1875. In 1973 the School became integrated with that of the School of Industrial Engineering to form the nucleus of what is now the Polytechnic University of Catalonia. Look at: <http://www.etsab.upc.edu>
- 2 "In this period there was a general regeneration that addressed teaching, administration and facilities at the same time, the entire plan of studies was revised and a third cycle was organized – a coherent doctorate". Helio Piñón: "Two recent references" and "A generalist career" in the *Basic Course of Architectural Design*. Collection: Subjects of modern architecture, No.2. Barcelona: UPC Editions, 1998, p.143-147

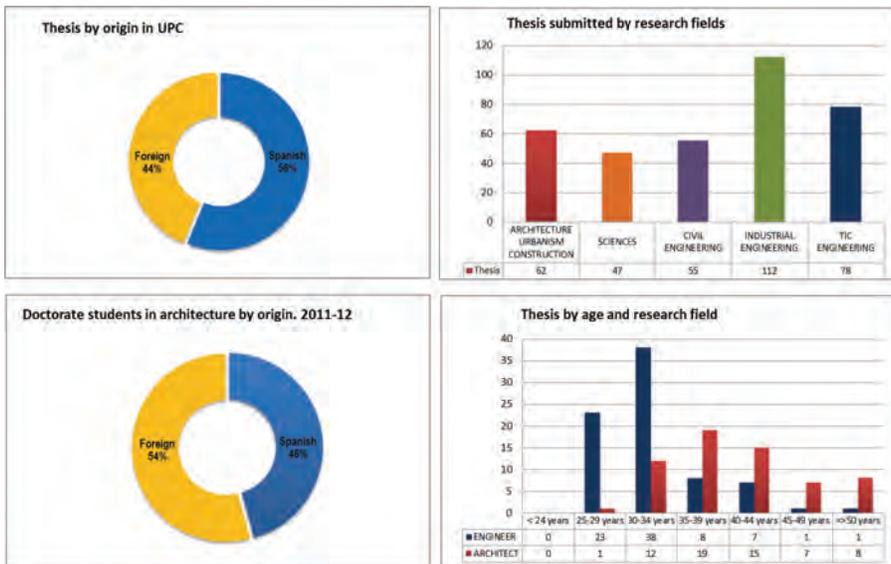


Chart 4

Doctorate in Architecture and its relationship with the UPC. Academic course: 2011-12

- a. Thesis by origin in the UPC. Academic course: 2011-12
- b. Thesis by origin and in Architecture. Academic course: 2011-12
- c. Thesis submitted by research fields. Academic course: 2011-12
- d. Thesis by age and research fields. Academic course 2011-12

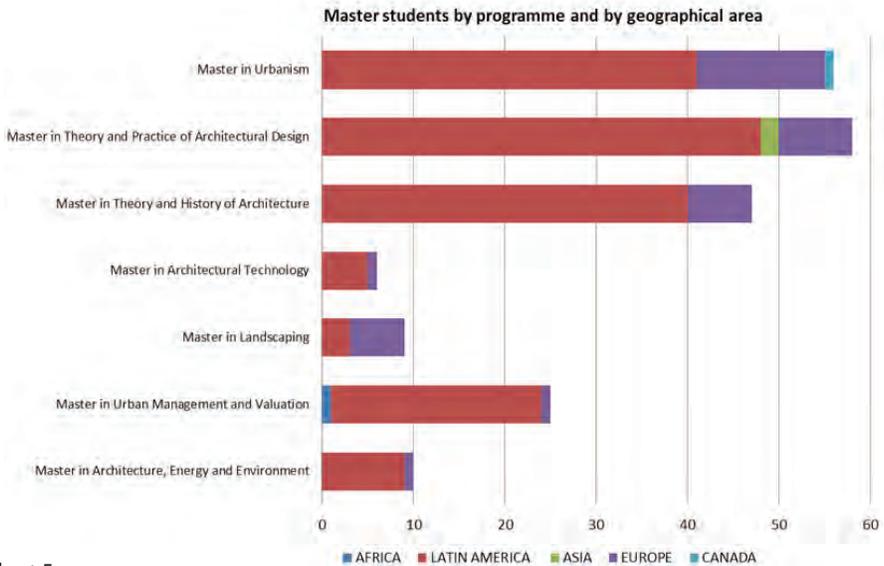
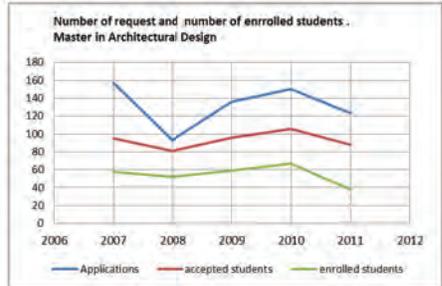
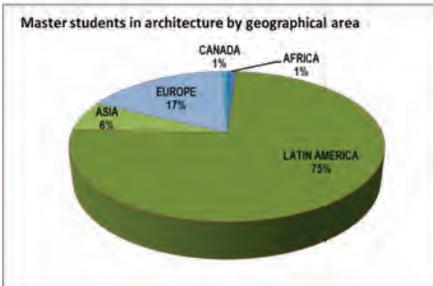
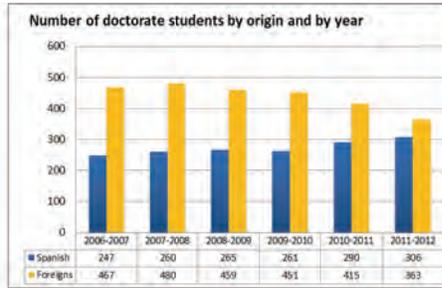
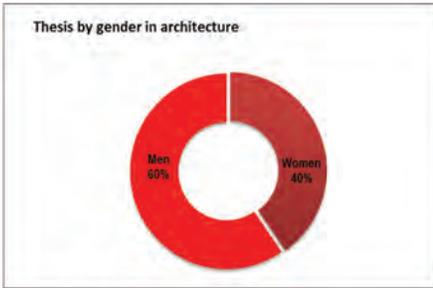


Chart 5.

Doctorate and Master in Architecture

- Doctorate students by genre.
- Evolution of doctoral students by origin
- Master students by geographical area.
- Evolution of the number of requests and the number of enrolled students in master programmes in Architecture. Academic courses: 2007-11
- Master students by programme and by geographical area. Academic course 2011-12

- 3 Look at the organization chart of the Master's programmes connected to the doctoral programme in the field of *Architecture, Urbanism and Construction* in the attached table. The doctoral programme in Visual Communication is the only one that does not have a directly linked master. In order to consult the doctoral programmes look at: <http://doctorat.upc.edu>. In order to consult the master programmes look at: http://mastersuniversitaris.upc.edu/projectes_arq
- 4 In the "Report of the Doctoral School of the Polytechnic University of Catalonia-Barcelona Tech (UPC). 2011-2012 Academic year". The administrative procedures for admission, reading, defense, etc, can also be consulted on the following website: <http://doctorat.upc.edu>
- 5 At a European level one would have to consult the recent document proposed Horizon 2020: The Framework Programme for Research and Innovation. Look at in: <http://ec.europa.eu/programmes/horizon2020/en/h2020-sections>
- 6 Look at information relating to the department at: <http://www.pa.upc.edu/presentacio>
- 7 Data obtained from the "Report of the Doctoral School of the Polytechnic University of Catalonia -Barcelona Tech (UPC). 2011-2012 Course". Ibidem. 4
- 8 The research groups linked to the intensifications are: FORM, GIRAS, HABITAR, CERCLE, PAB
- 9 Deposit of Master Thesis: <http://upcommons.upc.edu/pfc/handle/2099.1/4239>. Deposit of doctoral Thesis: <http://tdx.cat/>
- 10 Look at information of the journal at: <http://revista.dpa.upc.edu/>
- 11 On the Internet site of the FCA one can download copies of the ARQUITESIS collection sold out in its printed version. See them at: <http://fundacion.arquia.es/es/fundacion>
- 12 The research line "Form" has formed 49 doctors in three decades. It maintains intense research activity on architecture in Latin America in collaboration with research groups in Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Portugal, Uruguay and Venezuela
- 13 Master Thesis published in UPC Commons: <http://hdl.handle.net/2099.1/8354>
- 14 Thesis available digitally in <http://tdx.cat/handle/10803/113783>
- 15 The text originally published in French corresponds to the Charles Eliot Norton Lectures entitled "Poétique musical sous forme de sis leçons", taught at the Harvard University in 1939-1940



Polytechnic University
of Catalonia

Thirty Years of Archidoctoralia Universalis: Past, Present and Future of the GIRAS Group in Barcelona

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Spain

Thirty years of a PhD Program in Architecture

Thirty years ago the Spanish Government, at the beginning of a democratic regime, approved a new law in order to organize PhD programs in all Spanish universities.

Hundreds of programs arose and three different programs started in the School of Architecture in Barcelona, namely: Theory and Practices of Architectural Design, Urban Planning and Technology and Architecture.

Ten years ago, with a political move inspired by the Bologna Declaration, the Spanish Government had a brilliant idea to transform all these PhD Programs into Masters Degrees, and to organize the PhD students in Doctorate Schools, without courses, and with the PhD dissertations as the only academic work.

This brilliant idea pushed back twenty years the PhD programs in Spain and hundreds of PhD Spanish and foreign students, never finished their dissertations, without seminars, without academic help and without money.

In our case, the research group GIRAS (Research Group on Architecture and Social Sciences) survived, and, in thirty years, we have achieved 100 dissertations, published in the International Journal, ARQUITECTONICS, and a web www.arquitectonics.com.

Findings and Keepings

The basic assumption that gives our PhD program theoretical energy is to consider architecture and urban design knowledge as “Phronesis”, that is, as a special kind of virtuosity defined by Aristotle as: “practical wisdom”, common to architects, teachers and legislators.

In this way the work of architects is not only technical, but social and cultural, and the works by Paul Ricoeur, Joanni Pallasmaa or Mikhail Bakhtin are very relevant for this same reason.

We think that the PhD dissertations in architecture fail as they remain at the surface of the object of study as Jeremy Till has clearly shown; only the physical dimensions of the buildings are taken into account. In these circumstances, the theoretical frame of the dissertations is weak or often, inexistent, and architects keep attached to old philosophical paradigms without a deep understanding of them. Then, abstract art loses its power, buildings have no social meanings for users and geometry is a mathematical strategy without phenomenological energy. And finally architecture exists without context and without meanings.

Some Ideas for the Future

In diagram I and II we have organized the different branches analyzed in the group GIRAS as a framework for research.

In diagram III we uncovered a very strange quality of the profession of architecture. In contrast with other professions with a similar “practical wisdom” our profession has not a basic “OATH”, where our research is rooted.

In fact, in order to develop PhD dissertation in architecture today we must have a worldwide network of experts, as a consequence of the extreme variety of topics in diagram I and II.

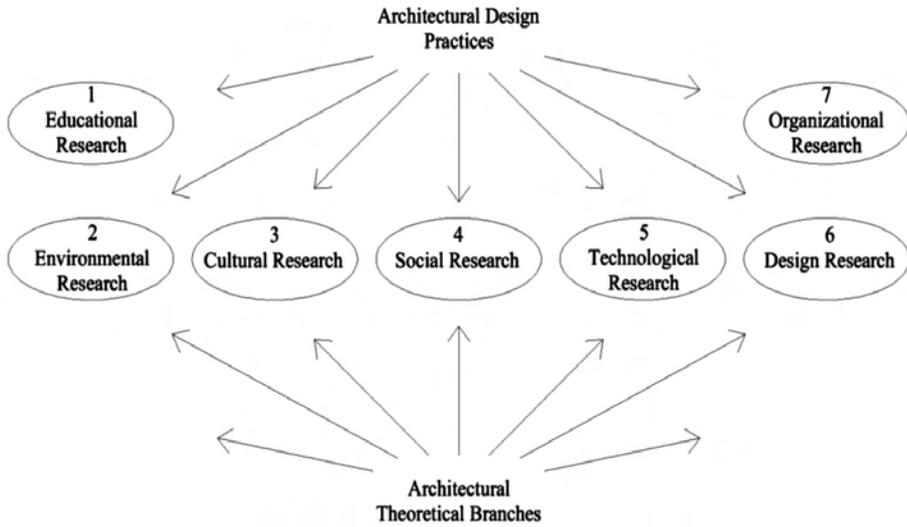


Diagram 1
Architecture and Research.
Basic Branches.

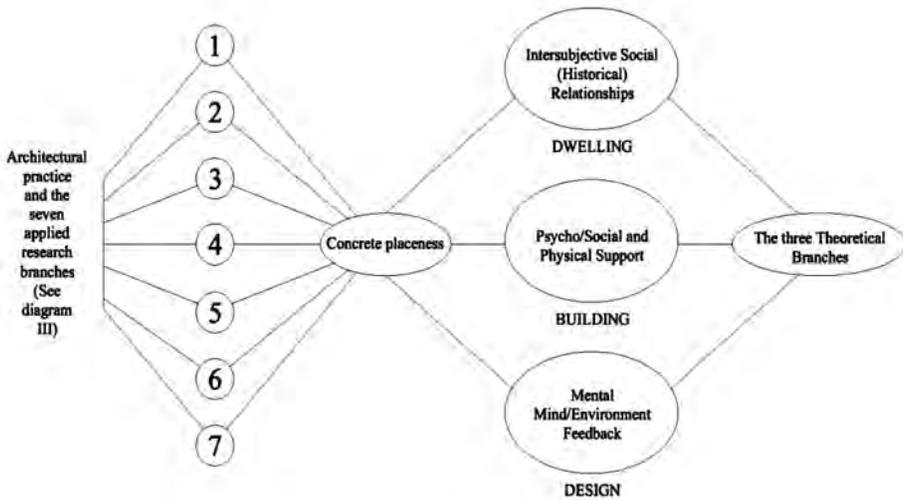


Diagram 2
Architecture and Research.
The Dialogical Structures.

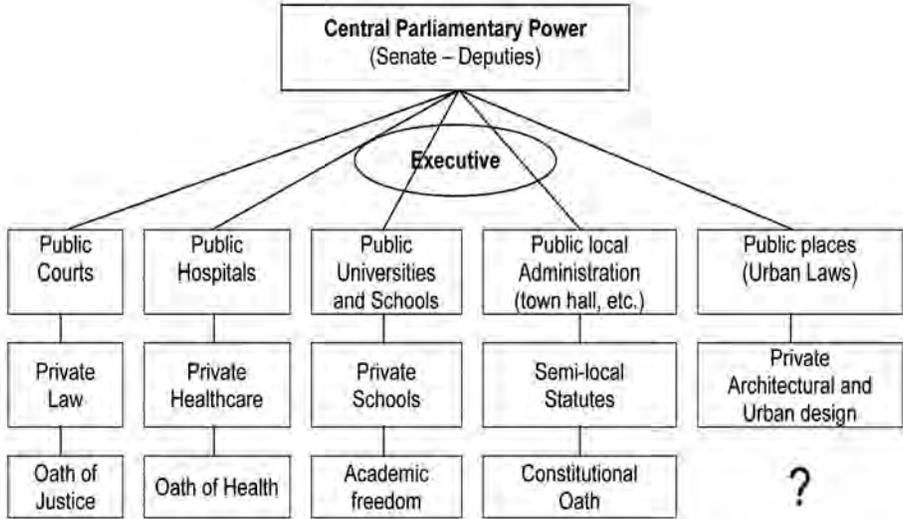


Diagram 3

The Inexistent Oath of the Architects.



SWEDEN



Chalmers University
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Cross- and Transdisciplinary Challenges: Doctoral education at Chalmers Architecture

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Academic research and doctoral education undergo considerable changes as part of 'knowledge society', and emerge as a key political and economic matter of national competition. The aim of this essay is to discuss how this affects architectural research education in Sweden and to present the structure of PhD studies at the Department of Architecture at Chalmers University of Technology, Gothenburg.

Chalmers Architecture - central aims and features

Chalmers Architecture (the Department of Architecture at Chalmers University of Technology) educates professional architects, architectural engineers and design-based urban planners. At large we define architecture as the formation of a sustainable built environment which includes: to handle complex problems and project contexts of the built environment; to interpret historical, environmental, social, cultural, economic and material conditions; to explore, rethink, develop, visualise and communicate images and syntheses for

the future; to form and lead design processes concerning buildings, urban space and landscapes. The department conducts research and research education in the corresponding fields of knowledge (see Chalmers Architecture website: www.chalmers.se/arch/).

The strengths of the academic environment at Chalmers Architecture are its practice oriented research and education, its long tradition of addressing sustainable development challenges, the capacity to integrate practice-based methods with scientific approaches, to explore architecture by closely linking building and urban formation, and the open and collaborative working climate. We have extensive inter- and transdisciplinary exchange with several research areas at Chalmers, such as material studies, building technology, transport, ICT, economy and management, as well as with national and international partner universities, with the Mistra Centre for Urban Futures, and with stakeholders in society and industry. Our strongest research areas are found within design for sustainable development (integrating buildings, processes and urban landscapes), housing, health and care architecture, Nordic architecture, visualization, spatial experience and collaborative processes. Of additional importance are the strong national research programmes Architecture in Effect and Architecture in the Making, focusing architectural theory and methods (see further below).

Areas for improvement concern how to integrate more artistic and explorative approaches into our practice relevance, to enhance critical and speculative thinking, and expand the realm of basic research in architecture, including advanced theory and method development, in order to expand architectural research on its own terms.

Architectural research in the ‘knowledge economy’

Architectural research in Sweden recognises a turning point with new possibilities generated by the integration of research through the making. This may benefit from the artistic and practice-oriented involvement with matter and complex architectural and urban problems, the designer’s competences to work in transdisciplinary teams and the capacities for future oriented rethinking of existing conditions in the built environment (Doucet & Janssens 2011).

In the strongly marketed ‘knowledge economy’, the Swedish government aims at positioning the Nation at the international research forefront, especially emphasising Medicine, Technology and Sustainable Development as designated key areas of interest. However, even though being profoundly engaged in sustainable development, architecture is still not visible as a research field in the national funding system, which is a symptom of the ambivalent and vulnerable situation for our discipline.

On the positive side we see the general interest of research in society, especially on sustainable development, which has made our profession more open to research. Larger architectural and engineering firms, design and cross-disciplinary studios, competition teams, sustainable development research institutes, municipalities, public planning institutions, developers etc. are more willing to incorporate architectural research competence. The National Architectural Museum and The Swedish Associa-

tion of Architects both have research and education units and seek various collaborations with the academy. Today, the profession simply needs not only the expertise in design, but also the competence to systematise knowledge, incorporate reliable surveys, problematise situations, to judge the quality of former studies and to set up coherent investigations and advanced problem approaches related to the often 'wicked' problems approached through design. This merging between researching and design practices means that practice is willing to invest in research competence: to employ people with a PhD degree, to support doctoral education of their own staff, and co-finance research projects, leading, in turn, to a rapid increase in collaborative transdisciplinary studies.

We also see a still small, but encouraging, increase from other fields of academic research to involve architecture in cross-disciplinary studies e.g. within health and care science, extreme environments, building performance, housing and urban studies. Architectural competence is needed here to analyse spatial situations and human-environment interaction as well as to contribute with design thinking and making (research-by-design) to tackle 'wicked problems'. Thus, for instance, Chalmers Architecture has architectural researchers and PhD students involved in programmes like 'Homes for Tomorrow' and 'Positive Footprint Housing', 'Visions of Residential Futures', spaces for extended health care and living conditions for elderly, urban games and visualisation, and regional transformation.

However, even if architectural research is propelled by a 'transdisciplinary turn' in the knowledge economy, the situation implies a threefold challenge for architectural research and research education, all three of which relate to autonomy: First, it is uncertain whether increasing transdisciplinarity and a larger bulk of private-public, practice-related funding will enhance the academic status of architectural research, i.e. if it will affect how architecture is visible in the national funding systems and international research society, thereby influencing conditions for long-term basic research in architecture and the strengthening of architecture as a discipline. Second, the survival of architectural research cannot solely depend on a collection of highly competent persons who take part in cross-disciplinary endeavours. The field needs to feed from its own disciplinary discourse; there must be a (multinuclear) core and a critical mass of basic research that stabilizes and 'fertilizes' architecture as a discipline. This aspect has been recognised by funding councils (Formas 2006) and will be discussed further below. Third, in order to be an attractive collaboration partner in international research contexts as well as in relation to practice, academic research in architecture must maintain a high quality standard. While continuing to learn from practice, the academy must be more advanced and specialised in the practice of research, the doctoral education forming a key link in this interchange.

Hence, architectural research needs a considerable degree of autonomy and integrity, both as a discipline in relation to academic and knowledge society at large, and in relation to practice. Architectural academic institutions cannot turn altogether transdisciplinary. Neither should they be just an extension of professional practice. Research has its own dynamics, its developed forms of problematising conditions in society, and what John Ziman refers to as post-academic science with increasing influence

from industry demands 'strong and healthy institutions undertaking disinterested research', that is, research which is not undertaken in the service of special interests (Ziman 2002).

Within the academic system, our field still has to fight strongly to become recognised as a discipline that can take its own critical stance and develop long-term values and strategies on its own premises, with enough body and diversity, and in active relationships with both practice and education. The integration of research in society needs the dynamics created by the differences, especially within a making discipline such as architecture, developing shifting and flexible tensions and balance between practice relevance, practice integration, basic research autonomy, cross-disciplinary engagements and the recognition of relevance for research society and for society at large.

Educating for a larger work market

The schools of architecture in Sweden have conducted research since the 1950s, reaching a quantitative peak in the 1980s, falling desperately low in the 1990s and early 2000s, after which we see a certain expansion again, not the least promoted by an increase in cross- and transdisciplinary enquiry described above. Directly supportive was also the considerably large funding from The National Research Council Formas 2011-2015/16 for two strong national research environments on architectural theory and methods which will be discussed later.

Doctoral studies have been conducted systematically in Sweden since the 1960s, and practice relevance has always been an ambition for Architecture at Chalmers. But if this relevance was earlier a research for practice, driven mainly through theories and methods of humanities, social sciences or technology, today we see a shift towards investigation through architectural and urban design methods, and increased collaboration with practice.

Only 20% of Swedish PhDs today are expected to have future academic positions, mainly in quite uncertain employment conditions relying on external project funding. Approximately 80% are expected to find jobs within professional practice. This reorientation of the work market for architectural researchers means that we must educate the doctoral students to achieve broad researching competence within a field rather than to become highly specialized academic scholars.

There are no fees for doctoral education in Sweden, and due to general regulations, doctoral students are always employed during their studies, thus considered as junior academic staff at the department for a period of four, possibly five years. The downside of this is that we cannot admit PhD candidates if full funding (salary and supervision costs) is not assured, resulting in a rather slowly growing critical mass of doctoral students. But the advantage is a gradual evolvement of the research and teaching environment as a whole, where the doctoral students are truly integrated. Many PhD students have several years of practice experience and contribute profoundly to undergraduate teaching.

The costs for the doctoral employments increasingly imply co-funding with various combinations of public and private support, or as 'industrial doctorates' employed

within practice during the studies. Such public-private co-funding sometimes causes a strain in different expectations on outcomes. While practice often anticipates quick answers to certain problems we, as an academic institution, claim the long-term research competence as the objective. Practice seldom appreciates ‘too much theory making’ and advanced problematisation while we emphasise the creative scholarly reflection and rigour as part of the researching expertise. It is often also a language dilemma, as practice generally prefers communication in Swedish while the international academic community requires speaking and writing in English. These are some of the mechanisms —formal and informal— that frame the doctoral education.

In the last decade, we have also seen a shift in the architectural research culture from more individual work towards a stronger formation of research teams where doctoral students are involved in co-work with senior researchers, although to a large extent still with their independent project, or where two or more doctoral students share similar topics for investigation. The teams around the PhD student may also involve professionals or representatives from practice, in active collaborations, as co-supervisors or as members of advisory groups (Dunin-Woyseth and Nilsson 2012). Being positive to teamwork, we try to encourage the co-production of articles and papers with supervisors and fellow doctorates. Collaboration is simply seen as an adequate mode to deal with the complex issues addressed by research, and an important part of preparing the doctoral student for future practice engagement. But the period of doctoral studies is also a unique time to enter deeply into a subject, and the thesis work can open up for radical rethinking of a field and trigger a new direction of studies for several years ahead. Due to funding situations, however, these ‘free’ spaces for exploration are very limited, propelling the tendency towards research competence and applied studies rather than excellence and originality as driving forces.

In this context, we would claim that Bologna has had limited influence on architectural doctoral education in Sweden, mainly due to the fact that this training was already well established in the Swedish higher education system. We experience important effects that have more to do with increasing internationalisation than with Bologna itself, for example the exchange between architectural schools in Europe that have increased and inspired ideas on design and practice based research as well as the importance to promote architectural research on its own premises. The European exchange of experience has also raised the issue of research and leadership competence in master studies, influencing our structure for master theses work, e.g. by preparation courses.

Negative aspects of the Bologna system—not to be blamed on the architectural education community—appear on a more general level; we see a growing amount of indicator driven evaluations that characterise today’s research culture at large, which drive creative practices towards responding to measurable criteria and mainstreaming instead of original or future oriented, speculative explorations into the thinking-making of architecture. This problem reconnects to the fragile position that architecture has in contemporary research society discussed in the beginning of this article. We may, however, be optimistic here and believe that artistic and architectural think-

ing can maintain and enhance a certain critical-creative resistance to conventions, and strongly argue for the transformative values that art, design and architecture can produce.

Developing critical mass: Swedish Schools of Architecture

The Swedish Schools of Architecture (SSA), or the Swedish Architectural Academy, was established in 2009 and is an association between the four main education and research environments of architecture, located in the north, east, west and south of Sweden: UMA in Umeå, KTH in Stockholm, Chalmers in Gothenburg and LTH in Lund. (see Swedish Schools of Architecture website) Inspired by the Nordic Architectural Academy as a contact forum between rectors and heads of education, the substantial formation of SSA began in 2007 as a response to the Formas Research Council evaluation on the status of architectural research. This described architecture as “a weak but for society important research field” (Formas 2006) and stressed a number of issues that needed to be addressed:

- Weak critical mass
- Fragmented research environments
- Important but invisible in research society
- Need for theoretical and methodological articulation
- Need to bridge the generation gap in research
- Strengthen continued practice relevance
- Strengthen national collaboration
- Strengthen international impact

Hence, when the Formas announced a call for the funding of two strong research environments in the theory and methods of architectural research (2010), it confronted us with the choice of either competing with one another or joining forces. We decided for the latter, thus formalising the collaboration, and were eventually lucky to receive funding 2011-2015/16 for both *Architecture in Effect* and *Architecture in the Making*, complemented by a national research school in architecture, ResArc.

Focusing Architecture in the Making

Chalmers Architecture hosts the strong national research programme *Architecture in the Making: Architecture as a making discipline and material practice*. It aims to develop theory and methods in practice oriented research through four subthemes: 1. *Material making* – analyses of the material in architecture; 2. *History* – as built environment and tradition; 3. *Investigative modeling* – explorative, digital and “hands on” modeling; 4. *Alteration* – conservation, cultural values and transformation (see Chalmers Architecture website).

Emphasising architectural research through the making and as a material practice opens up for increased collaboration with actors in society, and for the education of doctorates also preparing them for qualified work outside (or in collaboration with) academy. Another step in this direction is the partnership with LUCA, former Sint Lucas School of Architecture in Brussels, which started more formally in 2006 with Chalmers Architecture providing supervision competence and examination connected to the impressive, practice-based Research Training Sessions (RTS-sessions) initiated in Brussels (Reflections+). This collaboration, now extended within KU Leuven, has also generated the EU Marie Curie programme TRADERS (from 2014), the training of early stage researchers working through design and architecture in participatory processes of public space (see TRADERS website).

Architecture in the Making, with making through the material as a central research approach, also opens for building theory through practice. An interesting example of this is the thesis by Nel Janssens, *Utopian-driven Projective Research* (Janssens 2012). This mode to develop theory requires deep artistic and architectural insight, and a mode of working that oscillates between involvement in situations of practice and an evolving, critical composition-construction and analysis-development of relations between central concepts and the design-driven approaches to practice.

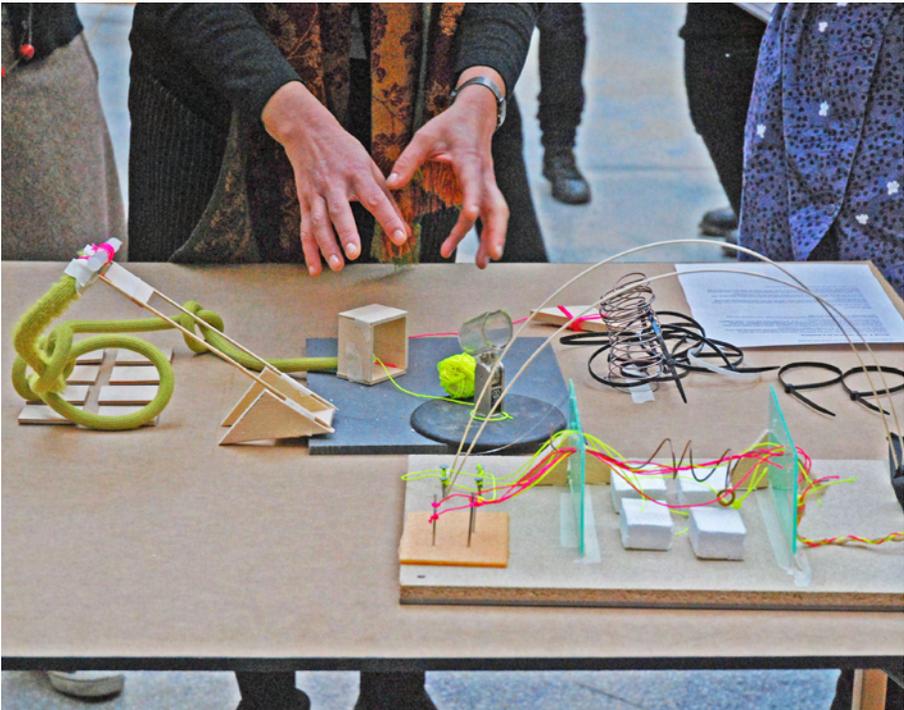
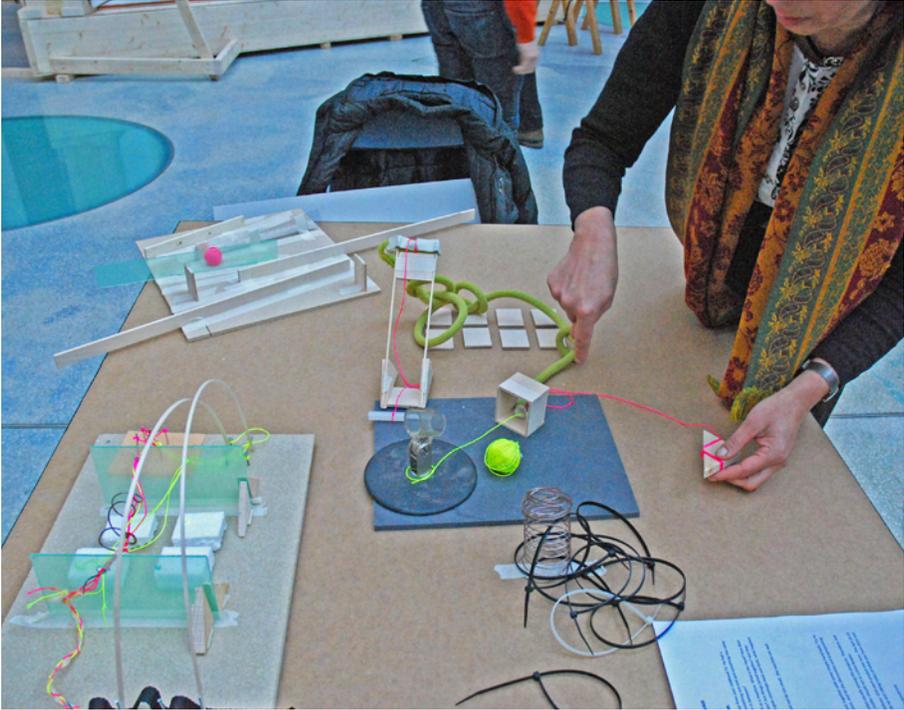
Knowledge generation through the making also increases the possibilities of art and architecture —and architectural research— to enhance transformative values, that is, values that may not be measurable but will lead to significant change. Operating through transformation, being the essence of architecture, and with sustainable development as a leading principle, the possibilities of creative, artistic, action-oriented inquiry should be further stimulated in research.

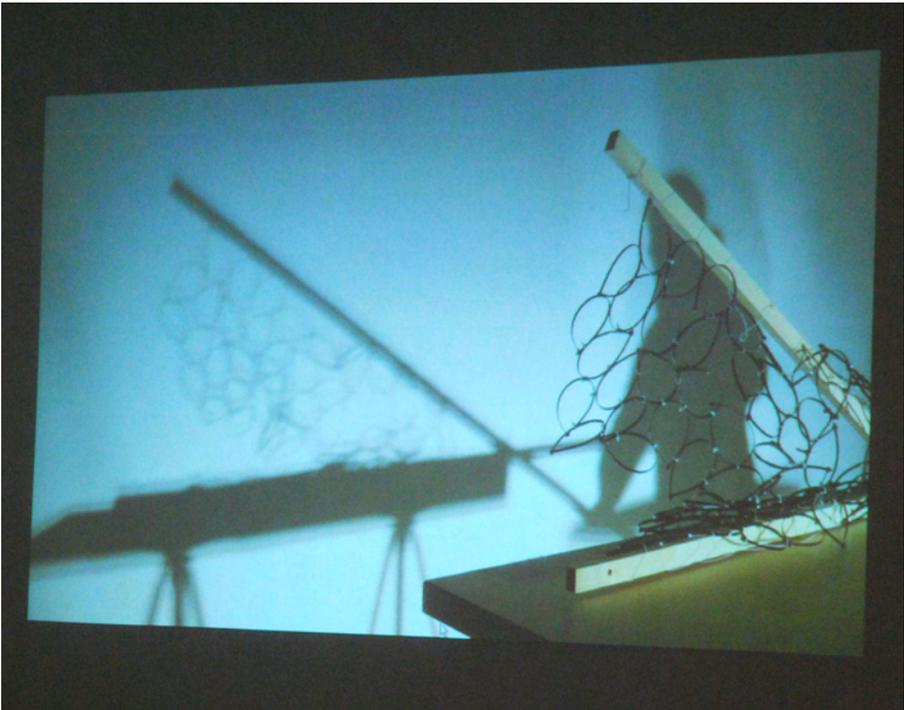
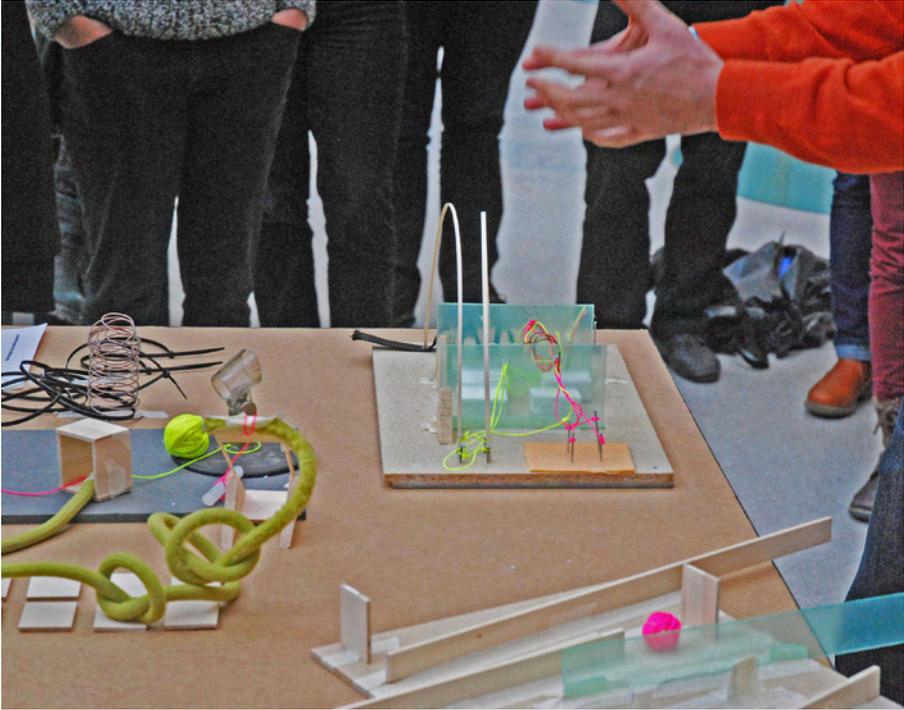
ResArc — The Swedish Research School in Architecture

The establishment of ResArc, The Swedish Research School in Architecture, from 2011 meant that the four schools could have a sufficient critical mass of doctoral students, both to generate a thriving dialogue between individual PhDs in different parts of the country and to be able to provide a learning arena specially designed for the field of architecture. Thus, there are four basic, recurrent courses, run in a sequence of about one and a half year: *Tendencies* (LTH, Lund), an introduction to important and challenging issues with an overview of trends, approaches and practices in contemporary architecture research; *Approaches* (Chalmers, Gothenburg) on transferable research skills specific for Architecture, and the construction and combinatory use of methods and research designs; *Philosophies* (KTH, Stockholm) investigating theoretical tools for a critical and projective societal analysis of architecture, planning and design, by matching key texts from philosophy with architectural theoretical material; and *Communication* (UMA, Umea) on the architecture of communication, and how image and text production can communicate cultural values and develop a dialogical, professional and political understanding of different communication devices.



ResArc PhD course 'Approaches' at Chalmers Architecture, autumn 2012: Quick exercise to demonstrate the research problem through models, film and haiku poems.
(Photos: Catharina Dyrssen)





Within ResArc we also develop complementary profile courses that are more specialised and have extended international outreach. One such course is *Transvaluation: Challenging the formation of knowledge*, an investigative space for PhD students, post docs and senior researchers that aims to contest the norms of indicator and evaluation research as amplified by the Bologna system, instead unfolding the possibilities of learning through speculative thinking and the making of values in art and architecture. The first step, in spring 2014, will be followed by a conference and a book production.

ResArc also hosts national and international symposia and seminars to strengthen the community of PhD students at different locations, encourage the students to form groups and initiate activities of common interest, increase the exchange of supervision between the schools, and to establish closer connections between ResArc and the national research environments, thereby supporting links between senior researchers and doctoral students. While contacts amongst the PhD students seem to have rapidly developed in positive direction, exchange of supervision is still rudimentary, but as we intensify concrete activities in the national collaboration, we believe that the ResArc — strong environments configuration will evolve as a geographically distributed but academically united, flexible and expanded setting for architectural research and doctoral education in Sweden (see ResArc website).

Doctoral studies at Chalmers Architecture - frames and syllabus

Doctoral studies at Chalmers Architecture form an integrated part of the department profile and are seen as an important link between research, undergraduate education and society in the research-integrated architectural pedagogy which the department promotes. The education is also influenced by the knowledge and working context, as described above. It keeps active contact with essential regional and international building and planning issues, and aims at an active exchange of knowledge with connected research fields at Chalmers and Göteborg University, as well as to stimulate collaboration with the Nordic and international research community (Chalmers Architecture syllabus 2013).

The time for a doctorate in Sweden is 4 years of full time studies, with an additional recommended amount of one year for teaching or other department work integrated in the time frame. The objective of the doctoral programme at Chalmers Architecture is to educate architects and other professionals within the field of architecture to become qualified in research. The contemporary practice-oriented researching competence for a PhD student should include, as we see it, not just a more profound design competence but a broad range of researching capabilities. Thus, according to the syllabus, the programme is founded on technical, humanistic, social and design-based frames of research. It aims to give highly qualified architectural research competence, training abilities to:

- develop innovation of ideas, design strategies and artifacts within the field of architecture;

- independently carry through and present research and advanced development work within the field of architecture;
- formulate research problems;
- develop theories, methods and analyses;
- compile, analyse, systematise, critically examine and produce knowledge supporting architectural professionals and actors within architecture and planning in a long-term sustainable development

According to the syllabus, the doctoral studies shall be executed with high demands on historical and theoretical awareness, relevance for problems at stake in contemporary society, and with a strong perspective towards the future. In addition, it shall give insight into research ethics, pedagogy and sustainable development, and provide experience of teaching and leadership.

This includes, as we see it, the ability to problematise a situation or phenomenon, to stage and contextualise a problem in a relevant mode, acquire sufficient overview of the state of the art in research, academic discourse and examples of practice related to their research topic, and develop an investigative process that may include experimentation and constructions of suitable approaches, theory and methods. It also implies that the PhD shall have sufficient knowledge on how to make relevant claims and judgements, handle basics in academic writing and develop a consistent argumentation in text, images or other modes of communication. This scope must be achieved for a doctoral degree, regardless of whether this is made through design or using more scientific modes of investigation, and the complexity emphasises the need to work with the research design as composition and navigation (Dyrssen 2010).

To be accepted for the doctoral programme at the Department of Architecture, the applicant shall have a professional degree in Architecture according to requirements of the EU Directive (85/384/EEG). Applicants with other Master degrees must prove to have qualifications and degrees with a close connection to the doctoral research subject; we have had students coming, for example, from landscape architecture, history of philosophy, art history, social sciences, design, engineering, and health and care science. In these cases, the research subject shall be given an appropriate designation.

The education is divided into two parts. The first is completed with a licentiate degree (120 credits), and the second with a doctoral degree (240 credits, equal to four years of full time studies) according to the Chalmers rules of procedure. The doctoral programme is constituted by department based courses, faculty courses, individual courses and research work with supervision, resulting in a text for licentiate examination and a doctoral thesis with a dissertation. The subject of the dissertation can be of theoretical and/or experimental character with a basis in architectural design methodology. The doctoral thesis (minimum 165 credits) may be constituted as a monograph or, preferably, as a thesis with a collection of peer reviewed articles and conference papers. The licentiate may be integrated in the doctoral thesis and the licentiate ex-

amination may be replaced by a 50% seminar with external examination. The licentiate and doctoral theses may be written in Swedish but should preferably be in English.

No later than five months before the estimated doctoral thesis disputation date, there shall be a final seminar (80-90%) where an external, independent and highly qualified opponent will review the thesis work and give advice for the completion of the thesis.

For the doctoral thesis defense the department research board will appoint an external, highly qualified faculty opponent and an evaluation committee of three or possibly five members. The reviewer at the final seminar may be included in the evaluation committee. At the latest three months before the planned disputation date, the thesis manuscript is sent to the evaluation committee to be approved for further process towards the public disputation, or stopped if found not sufficiently qualified. The thesis shall be published at least three weeks before the defense. At the disputation, the opponent conducts the discussion, and the evaluation committee will judge the thesis and the defense with the mark passed or not passed.

Supervision and courses

Supervision includes consulting connected to the thesis work or to courses, and general supervision concerning planning, organization etc. of the research process. The main supervisor shall have academic competence of associate professor (docent) and be employed at, or closely connected to the department. Exceptions may be admitted by the director of studies.

A suitable combination of courses is decided together with the examiner and main supervisor. For the licentiate degree courses are required to an extent of minimum 45 credits, and for the doctoral degree courses are required to an extent of minimum 60 credits. Courses are interspersed with the thesis work but with a stronger emphasis on courses during the first half of the doctoral studies.

Basic and complementary courses given by ResArc, as described above, constitute an important part both of the learning process and the formation of an emerging research culture for our discipline. Another necessary part here are the doctoral students' research seminars within the department, for the approximate stages at 10, 25, 50, 75 and 90 percent of thesis work. The aim is to also strengthen thematic seminars on topics of common interest at the department as well as peer groups that the students can conduct on their own.

Also, Chalmers University has a set of common faculty courses on Generic and Transferrable Skills (GTS) aiming to give doctoral students professional and individual development, regardless of areas of research. Out of the 60 course credits in total for a PhD degree, the graduate student must take at least 15 credits out of the GTS program. The GTS includes a compulsory package (9 credits) of Teaching, Learning and Evaluation; Research Ethics and Sustainable Development; and Career Planning and Personal Leadership. In addition it provides elective courses such as Academic Writing, Applied Project Management and Advanced Communication. Most of the GTS courses are relevant to architecture, and our students often appreciate these cross-disciplinary encounters, but if not suitable, the elective faculty courses can be re-

placed by department or ResArc courses or courses at other university faculties, such as within Landscape Architecture, Fine Arts, Cultural Studies or the Humanities.

The programme also requires that the doctoral student attends guest lecturers etc relevant for the subject and actively participates in seminars at the department, international conferences etc. In dialogue with main supervisor and examiner each doctoral student compiles an individual syllabus. The examiner has the overall responsibility for the doctoral programme in a specific subject and shall ensure that the work of the doctoral student satisfies the quality requirements with regard to research tasks and other elements. Within the four years assignment doctoral students may also do minor pedagogical and corresponding work relevant for the personal pedagogical and research development. This will be considered as courses and can be given a maximum of 7,5 credits in the research education, while more extensive teaching will be referred to the additional quota of the fifth year that the employment may include. Course credits are also given for individual reading assignments and participation in conferences and workshops. All this shall be approved by the main supervisor and documented in the study plan. Examination of courses shall be specified in the course brief and results shall be given the marks of Passed or Not Passed.

Doctoral courses - overview

Chalmers University, common faculty courses, Generic and Transferrable Skills, GTS (9 cts)	<ul style="list-style-type: none"> • Teaching, Learning and Evaluation • Research Ethics and Sustainable Development • Career Planning and Personal Leadership
Chalmers University, other common faculty courses	<ul style="list-style-type: none"> • Academic Writing • Applied Project Management • Advanced Communication
Chalmers Architecture courses	<ul style="list-style-type: none"> • Doctoral seminars, including public thesis defenses • Reading courses • Attending conferences • Courses given by the department within ResArc (see below)
ResArc courses (also see the ResArc website)	<ul style="list-style-type: none"> • Tendencies (LTH, Lund) - recurrent • Approaches (Chalmers, Gothenburg) - recurrent • Philosophies (KTH, Stockholm) - recurrent • Communication (UMA, Umea) - recurrent • Transvaluation (Chalmers, Gothenburg) - profile course, 2014

Concluding remarks

We see a promising development of architectural research in the increasing interest from practice, through transdisciplinary collaboration and co-funding, and from other disciplines in involving architectural researchers in thematic studies. However, there is a risk that architectural research will be reduced to participating with competence in an expanded but vague and 'diluted' area of cross-disciplinary endeavours. Hence, it is necessary to enhance a discipline specific discourse with enough critical mass and focus, and to develop theory and research methods in architectural research on its own terms. We believe that academic knowledge production will be enhanced by practice but we also argue that doctoral education is not an extension of practice; it must contain other forms and format of knowledge production that will be needed for future senior research in society and that calls for evolving high standards of PhD education. Fruitful future development, we believe, will depend on the creative and flexible tensions between academic inquiry and practice, where the academy can secure the long-term, transferrable values of knowledge production, and not be driven hard into indicator-driven premises. These are some of the challenge for the future.

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- TRADERS website (January 2014): <http://tr-aders.eu/>



Ecole Polytechnique Fédérale
de Lausanne

Doctoral Program Architecture and Sciences of the City

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The Doctoral Program Architecture and Sciences of the City (EDAR) is part of the Doctoral School of EPFL (EDOC). It brings together in one doctoral program, the world of architecture and that of social sciences concerned with the inhabited space and combines basic and applied research in an interdisciplinary perspective. Comprised of faculty members active within twenty laboratories of EPFL, the EDAR program receives three times a year new doctoral students interested in its scientific orientations which encompass four research areas across the researches conducted in the laboratories.

The EDAR program is based on two fundamental principles: the strong and varied relationship between basic and applied research and interdisciplinary approach.

The link between theory and practice enables students to treat the project –regardless of its subject (architecture, urbanism, spatial development) and its actors (from individual residents to the local community as a whole) –both as an object of

study and as a research challenge. Today, reflexivity on action proves to be inseparable from action itself; if this is disregarded, the result is very likely to be inefficiency and failure. An approach to the great theoretical and epistemological questions is therefore of crucial necessity for everyone. This method is intended to enable students to master the dual complexity of intellectual construction and of action in one single movement. This is the challenge that the EDAR program helps its doctoral students to take up.

Interdisciplinary approach, as conceived of in the EDAR program, is multidimensional. It is situated inside architecture (history, theory, projects) and in the urban sciences (geography, urban sociology, environmental economics, housing and networking, urbanism and spatial planning), but also between the two fields in that it is based on the role of a mediator between the problems of the city, of mobility, of space, and of inhabiting it. Finally, the openness of the EDAR program to mathematics, the sciences of matter and life and the science of engineering are part of its essential choice. The program also maintains particularly close relations with the School of Architecture, Civil and Environmental Engineering (ENAC), which regards interdisciplinary and cross-disciplinary approaches as fundamental and is the origin of a large part of the faculty and doctoral students of EDAR.

The main research areas are:

Sciences of the City

History, Theory, Heritage

Doc of design

Integrated Design, Architecture, Sustainability

Sciences of the City

The research area of Sciences of the City is aimed at students of social sciences (Sociology, Geography, Economics, Political science, Anthropology, History), but also architects and engineers wishing to pursue a thesis on urbanization, urbanity, mobility and habitat. It concerns, primarily, an understanding of the contemporary urban world in all its aspects as a fundamental dimension of inhabiting and, even more generally, of social life. This requires a reflection on epistemological and theoretical tools that allow thinking of space of societies, fixed and mobile lifestyles and urbanization as a long-term historical process. It is also essential to analyze, with renewed tools, components of contemporary urbanity: ways of living, mobility, public space, productivity and creativity, for which the contributions of the humanities and social sciences are mobilized, both about countries already completely urbanized and those that experience an accelerated process of urbanization in the context of the globalized world. Finally, urban action, whether in the usual form of urban planning or other less conventional expressions (sectorial policies, urban social movements, etc.), will be questioned. One unique feature of urbanism is indeed in complex relationships of mutual interpenetration of observation and action, analysis and project, experts and inhabitants.

History, Theory, Heritage

This research area is open to any proposed research topic likely to provide a deeper understanding of the questions inherent in the fields of history and theory, from the vantage point of process of architectural project, in particular from the point of view of construction and composition.

The terms construction and composition are intended in the broad sense from the materials and their nature, the structures and statics, the project criteria established by architectural treaties and texts and even the non-compositional creations of contemporary art and architecture. The choice of the construction and composition as the privileged framework of various researches reflects the conviction that the two disciplines constitute the poles, often conflicting, upon which the creative process in architecture is based.

Doc of design

The questions raised by the massive urbanization of the territory entail, in terms of sustainable development, increasingly complex project strategies in architecture and urbanism. At an intermediate scale between the city fragment and the building, control of the territorial reach demands solutions that integrate very specific infrastructures and equipment. Indeed, many examples show that from a critical area of over 100,000 m², the energy problem, as well as constructive and programmatic issues change radically.

The need to construct large, dense and mixed, in order to construct sustainable, having to confront architectural and urban issues of the new scale requires appropriate approaches and methodologies. This is what a doctorate of design intends to offer to PhD students. It also aims to meet a growing demand for academic and professional plans in highly qualified and complex projects.

Integrated Design, Architecture, Sustainability

This area of research meets the objective of further integration of sustainability issues in architecture, as well as the wish to reinforce the exchange and the synergies with different institutes of l'ENAC. To this end, developed as IDEAS (Integrated Design, Architecture, Sustainability) this theme is partly based on an interdisciplinary teaching within EDAR doctoral school, in the form of seminars and workshops, and secondly on a structured network of EPFL PhD students whose thesis contributes to this theme. Besides, it is in line with a Minor which has been developed for the Master cycle on the same subject. More information about laboratories and specific research topics is available here.

Several laboratories are associated with the EDAR Program, providing expertise in their specific research domain. The exhaustive list of potential thesis directors is available at <http://phd.epfl.ch/page-109198-en.html>

See also the interactive map at <http://phd.epfl.ch/page-109200-en.html>

More information at <http://phd.epfl.ch/op/edit/page-63551.html>

Concerning the capacity of following “the changes occurring in architectural thinking and creating” – as it is addressed in the guidelines for the present contribution – the program aims to produce new knowledge influencing both thinking and creating instead of following them. This position could appear quite arrogant, but it is fundamental to bring back to schools the capacity of producing new and original visions –and this should be the main attitude of any doctoral program.

The main strength of EDAR doctoral program is its interdisciplinary approach –an intellectual attitude characterizing EPFL as well as the ENAC Faculty (School of Architecture, Civil and Environmental Engineering), which is one of the closest faculties to our program. Interdisciplinary exchanges and collaborations are current in ENAC Faculty for teachers, researchers -and for undergraduate students since the very first years of their curriculum.

Collaborations with other doctoral programs within EPFL are also possible and encouraged, depending on the particular topics and subjects of the candidates’ research.

An original initiative

The Swiss Cooperation Programme in Architecture has been recently put into practice, involving at national level the three Schools of Architecture (EPF Lausanne, ETH Zurich, Università della Svizzera Italiana), as well as one Applied Science University (SUPSI Ticino).

The principal objective of the Swiss Cooperation Programme in Architecture (SCPA) is to promote and establish the cooperation between the Swiss higher education architectural schools as regards research and teaching, the latter on an undergraduate as well as postgraduate level. Thus, it is in line with the main strategic objectives of the Swiss research and higher education policy, where the cooperation in the field of architecture is explicitly requested by the BFI message 2008-2011.

The programme focuses on four main areas inside architecture research and education:

- urban studies, urban design, environment and landscape.
- theory and history of architecture.
- renovation and restoration, construction and building technologies. Programme activities are developed through specific research projects which have been selected through an internal call for proposals and will last until 2012.

For more information about this initiative, see also: <http://www.swiss-architecture.ch>

The initiative aimed to reinforce collaboration among the Swiss schools of architecture in a strong relationship between research and teaching activities. The Programme provided grants for the development of the best projects submitted to an international panel of experts.

Five projects have been funded, covering different topics from cultural heritage to landscape, from new teaching methods in architectural design to urban and territorial planning.

The Swiss Cooperation Programme in Architecture was very well received by researchers and by different academic authorities. It also demonstrated the potential produced by a large-scale collaboration. For this reason, the schools involved look forward to renewing such an initiative.

Research by design

As previously indicated, the EDAR program offers a “Doc of design” module. This initiative is quite recent and for this reason it is not yet possible to outline a final statement. Nevertheless, it is important to mention that such a program is actually funded by the Swiss National Science Foundation, meaning that “Research by Design” is recognized as a scientific practice.



TURKEY



Istanbul Kemerburgaz University

The Growing Significance of Research as Part of Architectural Education and the Doctoral Programmes in Architecture

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Background: Doctoral Education in the 21st Century- the European Context

In academic circles it is underlined that doctoral education is the least developed and discussed phase of higher education after the Bologna Declaration. While two main cycles are emphasized in the Bologna Declaration, a third cycle is elaborated in the Communiqué of the Conference of Ministers Responsible for Higher Education, Berlin, September 2003.¹ The Berlin Communiqué initiated reorganization in the field of higher education in Europe by defining the doctoral degree as the third cycle of higher education.² In recognition of the need to enhance research as an integral part of higher education across Europe, related parties of the Berlin Communiqué met on the common ground that “research and research training and the promotion of interdisciplinarity” is very important for “maintaining and improving the quality of higher education and in enhancing the competitiveness of European higher education more generally.”³ In Joint

Quality Initiative (JQI) meeting, March 2004, the Dublin Descriptors for Bachelor and Masters, defined by JQI group, were accepted as a framework also for doctoral education, giving special emphasis on “knowledge and understanding”, “applying knowledge and understanding”, “making judgments”, “communication”, and, “learning skill” as major competences defined in a doctoral program.⁴

The 2004 report by JQI informal group, entitled “Shared ‘Dublin’ descriptors for Short Cycle, First Cycle, Second Cycle and Third Cycle Awards,” mentions that graduates of a doctoral program are expected to:

- “have demonstrated a systematic understanding of a field of study and mastery of the skills and methods of research associated with that field”;
- “have demonstrated the ability to conceive, design, implement and adapt a substantial process of research with scholarly integrity”;
- “have made a contribution through original research that extends the frontier of knowledge by developing a substantial body of work, some of which merits national or international refereed publication”;
- “are capable of critical analysis, evaluation and synthesis of new and complex ideas”;
- “can communicate with their peers, the larger scholarly community and with society in general about their areas of expertise”;
- “can be expected to be able to promote, within academic and professional contexts, technological, social or cultural advancement in a knowledge based society.”⁵

The learning outcomes and competences related with the doctoral cycle were addressed in two European frameworks that inform the ongoing initiatives to restructure doctoral education in the member countries of the Bologna Process: (1) Bologna Working Group on Qualifications, Frameworks: A Framework for Qualifications of the European Higher Education Area of 2005 (QF-EHEA)⁶, and (2) the “European Qualifications Framework for lifelong learning of 2007 (EQF-LLL).”⁷ While in the QF-EHEA reference is made to a doctoral level as the third cycle in the Bologna Process, in the EQF-LLL Level 8 of education and training refers to “Doctorates.”

In this context, the initiatives of the European University Association (EUA) on doctoral education within the Bologna Process should be addressed. EUA executed Doctoral Programmes Project in 2005 that aimed to “contribute to the debate on research training in the European Higher Education and Research Areas by demonstrating examples of good practice and preparing recommendations for action based upon the pooling of experience of its members.”⁸ Two conferences as part of EUA’s Doctoral Programmes Project addressing the challenges ahead doctoral education were organized; the first in Maastricht in October 2004, and the second in Salzburg in February 2005. The Salzburg Conference deserves a special attention. This conference was concluded with the identification of “ten basic principles” for the future development of doctoral programmes.⁹ Additionally, several workshops and seminars that took place as part of

this project are: the first workshop in Brussels (23-24 March 2006), the second workshop in Brussels (26-27 October 2006), and a final Bologna Seminar on doctoral programmes at the University of Nice (7-8 December 2006).¹⁰

These institutional initiatives on doctoral education had an impact on wider academic communities across Europe. The problems and future expectations of doctoral education are at the center of academic debates in the field of architectural education as well. The Network for Theory and History of Architecture (NETHCA) together with the School of Architecture Sint-Lucas organized an international conference, from 14-16 April 2005, entitled the "Unthinkable Doctorate" as a problematic theme in the field of architectural education. In the Proceedings of this conference, Halina Dunin-Woyseth argues that in the line of Dublin Descriptors, doctoral programs in architecture are responsible to "clearly define it [architecture] as an autonomous field of study and present an overview of methods of research being applied in this field."¹¹ The concept of research that is emphasized in the Dublin Descriptors, Dunin-Woyseth underlines, is "inclusive" in nature signifying "a careful study or investigation based on a systematic understanding and critical awareness of knowledge" that can be covered through a variety of "original and innovative" activities ranging from academic, professional and technological fields.¹²

A recent International Forum on Doctoral Education in Europe, organized with the contribution of the European Network of Heads of Schools of Architecture (ENHSA) in 2013, entitled "RESEARCH 2013: Archidoctor Universalis: Future of Research in European Architectural Education", opened into the discussion the persistent problems of research and of the profile of the researcher in architecture.¹³ One of the main arguments of this conference is that not enough "innovative" architectural knowledge is generated in/by schools of architecture. Schools of architecture are criticized to get behind the emergence of innovation in other fields like technology or profession, and to generate "only a small part of this innovation across Europe."

The subject of research in architecture and doctoral education were topics of debates in academic circles earlier in the 1990s. A 1996 conference realized through the joint efforts of the European Association for Architectural Education (EAAE) Charter for Architectural Research, and Delft University of Technology, Faculty of Architecture is a good example. This international conference entitled "Doctorates in Design+Architecture" was realized at Delft University of Technology Faculty of Architecture from 8-10 February 1996. One of the main topics addressed was the responsibility of schools of architecture for the development of a body of creative and critical knowledge, and the key role that doctoral education in architecture can play in this process of knowledge creation. Herman Neuckermans, in "Doctorates in Architecture-Architecture in Doctorates," highlights that "a body of knowledge has to be developed and accumulated in architecture through research and through a steady production of doctorates as the highest emanation of research."¹⁴ Neuckermans defines the major goal of a doctoral program as "widening the scientific culture of the doctoral student and provide him with the epistemological and methodological tools for doing

research.”¹⁵ TheoJM van der Voordt and Herman BR van Wegen, in “Doctorates in Design and Architecture: An Outline of Issues,” raise the criticism that “the object of architectural research, its methodology and theoretical base, the required skills of the researcher, and the criteria for evaluating the products of research” are not well-defined in most of the schools of architecture.¹⁶

A similar criticism was under discussion in a book entitled *Envisioning the Future of Doctoral Education: Preparing Stewards of the Discipline*, 2006, as a collection of essays commissioned for the Carnegie Initiative on the Doctorate (CID)- a five-year project undertaken by the Carnegie Foundation for the Advancement of Teaching. In his essay “Preparing Stewards of the Discipline” Chris M. Golde argues that “[w]e often do not deliberately consider or explicitly articulate our theories and strategies on the pedagogy of research for developing excellent researchers,” further mentioning that the “development of the skills, knowledge, habits, and abilities or conservation and transformation is even less systematic.”¹⁷

Not only the nature of architectural research, but also the qualifications in terms of the profile of researcher are redefined. Doctoral education in architecture as a process of developing researchers in architecture is subject to discussions about the profile of researchers in architecture. An important point that should be underlined here is the interdependence between research and learning. An attempt to define the profile of ‘researcher’ in a doctoral education can hardly be dissociated from an attempt to define the profile of ‘learner’ that develops through the former stages of architectural education, namely the bachelor’s degree programmes and master’s level programmes in architecture.

The competences necessary to undertake research is re-situated within the broader context the EQF-LLL framework as a coherent strategy envisioned in the Bologna Process. Starting from the consideration that learning is a continuous process, and there are specific competences that individuals should possess in order to continue the act of learning in different stages of their lives, the EQF-LLL framework puts a special emphasis in research as an essential tool of learning how to learn. To be competent in research and critical inquiry is seen as the common goal of different professional and disciplinary programs of higher education that aim at preparing their students for life.¹⁸

Within this framework, the question of a greater general importance is how to integrate research into the bachelor’s level of architectural education? EAAE Charter for Architectural Research makes a valuable contribution to the recognition of research as a qualification acquired in architectural education. In “Charter for Architectural Research: A Declaration and a Framework on Architectural Research”, prepared by EAAE-Research Committee in September 2011, an attempt is made to specify “the character and objectives of architectural research.”¹⁹ Architectural research is defined as the “original investigation undertaken in order to generate knowledge, insights and understanding based on competencies, methods and tools proper to the discipline of architecture.”²⁰ In this declaration emphasis is placed on direct and indirect support

of architectural research to education through “research training of future architects”, and through “the continual advancement of the discipline”:

“... The aim of architectural higher education is to develop *a research disposition* in students. As future architects they need to be able to *establish basic premises, perform critical analysis, conduct intensive research and propose syntheses independently*. The architectural school as a whole and the design studio in particular are places for research practice par excellence.”²¹

The Tunning-HUMART project entitled “Tuning Sectoral Qualifications Frameworks for the Humanities and the Arts”, in which architecture as a subject area is categorized under the “Creative and Performing Disciplines,” addresses research as a competence that should be acquired at the bachelor’s level of architectural education.²² At the “Competence Based Level Descriptors for Architecture” part of the project’s final report, research competence find space at the level 6 of EQF and it is mentioned that graduates in architecture at level 6 are expected “to be aware of the research and experimentation dimension inherent in the architectural practice and creation relevant to architecture as creative discipline.”²³

After briefly mapping the discussions that address the notion of research in higher education within the Bologna Process and numerous academic communities across Europe, it becomes evident that this broader context set up a basis for the issue doctoral education in architecture. The problems and criteria concerning doctoral education in architecture can better be evaluated within the comprehensive issue of the role of research in architectural education. When the issue is approached from this perspective, some challenging questions arise:

- How can discussions about the conception of research as part of architectural education in general become a catalyst for a new definition of the objectives of doctoral education in architecture?
- Can the problems regarding the definition of profile of a Ph.D. candidate in architecture be re-evaluated within the framework of the problems in undergraduate architectural education?
- Does cultivating a research mind and attitude in students of architecture at the bachelor’s level offer opportunity for doctoral level? How?
- Can introducing the principles and practices of research methodology into undergraduate studies improve the development of the profile of Ph.D. researcher?

The Turkish Context: the Establishment of Ph.D. Programs at METU Department of Architecture

Defining the profile of a researcher in doctoral education is a challenge confronting Turkey as a member country of the Bologna Process. As it is the case in other member

countries associated with the Bologna Process, in Turkey the field of higher education is undergoing drastic changes at legislative and institutional levels necessitated by the European Union (EU) harmonization. This process brings forth curricular restructuring initiatives for all stages of higher education. The overarching objective is the development of National Qualifications Framework (NQF) in Turkish higher education by defining “the knowledge, skills and competencies to be gained minimally at the end of each degree of higher education (associate’s, bachelor’s, master’s and doctoral degrees) mostly using the level descriptors within Qualifications Framework for European Higher Education Area (QF-EHEA).”²⁴

The Council of Higher Education in Turkey (CoHE), which plays key role on the educational structure of higher education institutions, is a major actor in the development of a NQF for the country. The initiatives of the CoHE for the development of qualifications framework for higher education congruent with the Bologna Process were highlighted in the “Higher Education Strategy of Turkey” final report published by the CoHE in February 2007.²⁵ The CoHE adopted the National Qualifications Framework for Higher Education in Turkey (NQF-HETR) in May 2009 and the implementation of the NQF-HETR in higher education programs was to be completed till December 2012.²⁶ Two European frameworks, namely QF-EHEA (2005) and EQF-LLL (2008), have been the reference points of CoHE’s initiatives to develop NQF-HETR.

The ongoing change process in Turkish higher education in relation to educational developments in Europe and of the initiative of CoHE for the preparation of the NQF-HETR foster changes in the field of architectural education as well. In the “National Qualifications Framework for Higher Education in Turkey (NQF-HETR), the Major Subject Area Qualifications” report published in January 2011, associate’s, undergraduate, graduate and post-graduate levels of architectural education are elaborated under the category of the “Architecture and Building.”²⁷ The “Architecture and Building” qualifications (vocational and academic) are envisioned to be reference points through the implementation of National Qualifications Framework for Higher Education in Turkey (NQF-HETR) on architectural programmes.

As part of the initiatives to develop NQF-HETR along with the principles claimed in QF-EHEA (2005) and EQF-LLL (2008), the regulations concerning the field of architectural education have been under discussion by representatives of Faculties and Departments of Architecture in Turkey on various platforms, such as the Council of Deans of Faculties of Architecture (MIDEKON), the Communication Network of Heads of Department of Architecture (MOBBIG), and the Architecture and Education Congresses annually organized by the Chamber of Architects of Turkey (CAT). Along with the official initiatives by the CoHE, research projects at institutions of higher education make valuable contribution to the attempts to define a National Qualifications Framework for Architectural Education.²⁸

The Middle East Technical University (METU) has a distinguished position within the context of ongoing change process in the field of Turkish higher education in general

and in architectural education in particular. In this paper this distinguished position of the METU is examined through the lens of the progressive ideas and ideals that informed the establishment of Ph.D. degree programs at the METU Department of Architecture. The following part of the paper starts with a brief review of the foundation of METU Faculty of Architecture. Special emphasis is placed on two figures, Charles Abrams and G. Holmes Perkins, who actively contributed to the foundation process. The paper re-contextualizes the founding ideas and ideals of the METU Faculty of Architecture to the debates on the role of research as part of architectural education taking place in America in the mid-twentieth century.

The Faculty of Architecture is the first faculty of METU. A report prepared by Abrams, who was appointed by the United Nations (UN) Technical Assistance Administration (TAA) to advise the Government of Turkey on the manifold problems of “housing and planning” in the 1954, is the first official document to mention the proposal for the foundation of a new “school of architecture and community planning” in Ankara.²⁹ This report, entitled “The Need for Training and Education for Housing and Planning” (1955) prepared for the Government of Turkey, played a key role in the foundation of the METU Faculty of Architecture.³⁰ Following the terms of reference of Abrams’s report, another UN TAA team came to Ankara in 1955. Perkins, the Dean of the Graduate School of Fine Arts (GSFA) of the University of Pennsylvania (Penn) headed this team with the participation of Leon Loschetter and Wilhelm V. von Moltke from the same university. Their mission was to advise the Government of Turkey on the foundation of a school of architecture and community planning and the “organization, policy, and curriculum” with regard to the school. “Report on the Establishment of a School for the Teaching of Architecture and Community Planning in Turkey” (1955) is the second key document in the history of the foundation of the METU Faculty of Architecture.³¹ This report is also important because of the fact that it reveals the contribution of the GSFA of Penn to the foundation of the METU Faculty of Architecture. Abrams’s and Perkins’s reports portrayed their ideas on architectural education and research as the frame of reference for the establishment of Ph.D. degree programs at the METU Department of Architecture.

Abrams based his report on his critical re-evaluation of the problems in the areas of urbanization, housing and planning, the shortage of well-equipped professionals, and the challenges facing architectural and planning education in Turkey in the 1950s. In Abrams’s view, “a revolution in design and structure” was pressing, and also training and education should be improved for the solution of problems in the fields of housing and planning, and for the enhancement of urban development in the long-term.³² Not only the dearth of architects, but also the quality of their professional competence was under discussion by Abrams. He underscored the problems in architectural education in existing schools of architecture in Turkey, which were few in number in the 1950s.³³ Pointing to the “imperative need for a school of architecture and community planning in Ankara as a basic element of a programme of training and education,” Abrams maintained that this school should have a mission to train “experts”:

“Such a school is important for reasons more than mere training of architects and planners, though this is indeed a part of the programme. It will also produce a group of experts who can remain for an extended period and who will stay until they have helped develop a Turkish competence to succeed them...”³⁴

The need for research on urbanization and built environment for the advancement of knowledge basis of the profession was a major concern addressed in Abrams’s report. His commitment to the significance of establishing strong links between education and research was also on the agenda of his project.

The key issues related with education and research that were raised in Abrams’s report constituted the background principles of the report prepared by Perkins, Loschetter and von Moltke:

- a) “there is an imperative need for an additional School of Architecture and Community Planning (of University rank) in Turkey.
- b) “the country is in a period of rapid industrial expansion, of urbanization, and of a changing rural pattern; ... the physical patterns be created will be a lasting influence upon the country’s future regions, cities, and villages, and . . . the proper development of the country cannot be assured through the aid of foreign experts alone.”
- c) “foreign experts are needed to advise on the creation of the institution, to staff it with competent teachers during the early years and to prepare Turkish architects and city planners to assume leadership in the school and in the profession over the long term.”
- d) “the institution be authorized to grant degrees of Yüksek Mimar (Master of Architecture), Yüksek Mühendis (M.S. in Engineering), Yüksek Şehirçi (Master of City and Regional Planning), Doktor Mimar, Şehircilik Doktoru and Doktor Mühendis, to establish the requirements for the respective degrees and to set the terms and conditions for faculty appointment and tenure.”³⁵

In the Perkins, Loschetter and von Moltke report, the scholarly qualifications for teaching was addressed along with the nature of education in this institution. In the “Curricula and Admission Requirements” part of their report, they defined the profile of instructors that will be charged at the METU Faculty of Architecture as follows: “... advanced work in architecture and city planning should be offered by the professors in charge, for which a doctor’s degree will be given upon completion of an original, published doctoral thesis.”³⁶

From the inception of the University, emphasis was placed on academic standards in teaching and research programs along with professional and communal objectives. It was underlined that the development of advanced study and research would make a vital contribution to the academic advancement of the University. The conception of education as an overall process of learning combining professional and intellectual

development of students was evident in Perkins's recommendation for the establishment of graduate and post graduate programs leading to the M.Arch., M.Sc., and Ph.D. degrees. Scholarship in teaching was considered highly relational with scholarship in research. Faculty members were expected to contribute to the formation of an academic community of scholars at the METU Faculty of Architecture. It is important to mention that at a time when "organized research" was not yet established in the majority of schools of architecture in America, a claim for fulfilling the requisites of a research university of an international character was evident in the METU project. METU was to be a research center that could make valuable contribution to the advancement and dissemination of knowledge needed for the development of a "newer, more practical and modern approach to architecture and urban planning" in Turkey.³⁷ The proposal for the establishment of two research institutes -- "Research Institute for the Modernization of Construction and Materials" and "Research Institute for Housing, Regional, City and Village Planning" -- along with the establishment of "Faculty of Architecture" and "Faculty of City and Regional Planning" was in support of this concern.

The instruction in architecture was initiated on 1 November 1956, with a group of 50 students and the school was officially opened on 15 November 1956 under the title of "Middle East Institute of Technology." As it was firstly declared in the related article of the basic law of the METU, No. 7307, the goals of Middle East Technical University were:

- a) "to provide technical and professional education in English language for a large number of Turkish students";
- b) "to carry out research in economical, technical and other areas having critical significance for Turkey";
- c) "to welcome students especially from countries of Middle East and to help advance the international agreement to educate all students in accordance with the same vision of a liberated humanity";
- d) "to carry out research to advance scientific knowledge, as in all universities."³⁸

Evidently, the notion of research had a central role at the METU Faculty of Architecture from its inception. Emphasis was placed on research both as part of professional education at undergraduate level, and also as advanced research at graduate and post-graduate levels. The establishment of organized research units as part of the Faculty of Architecture was seen as a prerequisite for the development and dissemination of scientific knowledge on manifold aspects of urbanization and the built environment, and for the development of modern architectural practice.

Perkins was known as "the leader in modern housing pedagogy" and "a pedagogical leader and innovator" in America in the mid-twentieth century.³⁹ This paper puts a special emphasis on Perkins's scholarly position in architectural education since he paved the way for progressive educational principles and values of the mid-twentieth century to enter into the foundation of a technical university in Ankara and for the inauguration of a modern approach to architectural education in Turkey. These princi-

ples and values informed the establishment of graduate and postgraduate programs at the METU Faculty of Architecture.⁴⁰ In the following part of the paper, an attempt is made to delineate a map of debates related with the change processes in architectural education in America in the mid-twentieth century, by bringing into attention the institutionalization of research as part of architectural education in that period.

Re-construction of the Intellectual Context: The Growing Emphasis on Research in Architectural Education in the mid-century America

In the mid-twentieth century, architectural profession was in urge of a rational scientific knowledge basis for the development of “modern architectural practice and the future of the architectural profession in the United States,” as Avigail Sachs defines it.⁴¹ Sachs points to a growing commitment to the idea that “the products of research ... would place architectural practice on a shared and proven basis from which a truly modern architecture could emerge.”⁴² To generate new knowledge that will inform professional practice necessitated disciplining the mind towards scientific thinking. Confronted by emerging problems and needs of the postwar period, the profession not only searched for a new knowledge base in architecture, but also for a new profile of architect. At the center of discussions in professional circles, like the American Institute of Architects (AIA) Department of Education and Research, was a profile of architect as a practitioner well equipped to make contribution to knowledge needed for the advancement of architectural profession. It is at this point that the profession turned its attention to the schools of architecture.

The growing significance of scientific research in/by schools of architecture in the university context can be explained in relation to three issues: (1) the conception of “total environment” and the widening responsibilities of the architect⁴³, (2) the emerging need for collaborative research, and, (3) research conceived as a pedagogical concept. Schools’ approach to research was informed by new perspective towards architecture and the responsibilities of the architect. The conception of “total environment,” emphasized by Perkins in his numerous writings, depicted a comprehensive grasp of the built environment in which the architect is expected to develop “a better understanding of all the forces of nature and of man which mold our environment.”⁴⁴ In recognition of the widening scope of architecture, the modern architect was to be “conscious of urban and regional problems”, and “design buildings, not as independent units, but as components of a community.”⁴⁵ Phillip N. Youtz stated: “to carry out this social responsibility, we need more architectural research on planning, on city, suburban, and regional development...”⁴⁶ This understanding brought into discussion the imperative need for a collaborative approach to research. Research into the problems of the built environment, varying in scale from a regional or urban context to a single component of a building, was reconsidered as a collaborative task of specialists from allied fields in which the manifold aspects of the “total environment” would be examined. “The architects must welcome research specialists as fellow contributors,” Perkins argued, “just as generations ago the doctors brought the biologists into their search for answers in the

endless battle to improve human health.”⁴⁷ The integration of education and research for the development of a “research mind” was a challenge for bringing a critical-methodological approach to architectural problems through systematic investigation.⁴⁸ Research was important also as an educational tool that “introduces the student to the adventure of testing and extending knowledge”, “deals with uncertainties and unknowns”, “initiates the student into the adult responsibility for doubting, probing, and checking current preconceptions” and, thus, “attempts to widen our intellectual horizon.”⁴⁹ Consequently, integrating education and research by encouraging freedom of thought and experimentation would lead to a change in the profile of architect from the “artist-designer” to the “investigator, the intellectual.”⁵⁰

The attempts to integrate education and research at schools of architecture established a fertile ground for the institutionalization of research in the university context. This atmosphere paved the way for the formation of graduate and postgraduate programs. A pioneering example was the Harvard Graduate School of Design (GSD) established as the initiative of Joseph Hudnut, the Dean of the Faculty of Architecture, who proposed to integrate the schools of architecture, landscape architecture and city and regional planning into the Graduate School of Design.⁵¹ In 1958 the programs in design at the University of Pennsylvania were reorganized under the umbrella of the Graduate School of Fine Arts (GSFA), and also doctoral programs were approved and the school became a graduate division.⁵²

The changing profile of the twentieth century architect and his/her responsibility for the “total environment” brought about the need for specialization and for the training of specialists. Perkins maintained that “the demands of the profession are rapidly forcing a significantly greater number of men into advanced study beyond a first professional degree,” and “a major challenge facing the schools is the development of programs capable of producing a significant proportion of the specialists who will be members of profession tomorrow.”⁵³ Perkins explains that the establishment of graduate programs at the GSFA of the Penn aimed at responding to the changing responsibilities of the architect and the pressing need for specialization through following initiatives:

- a) “the close contact and sympathetic understanding of the three professional faculties of architecture (including architectural engineering), city planning and landscape architecture that are housed within a single school”;
- b) “the effective tapping of university-wider resources in such joint programs as city planning and regional sciences, urban design, regional planning and the doctorates in architecture and city planning”;
- c) “curricula capable of simple adjustment to the needs of the individual at both master’s and doctoral levels which make research an inseparable part of professional education”;
- d) “and the creation of well-financed research institutes both in urban studies and in architecture in which the teaching faculty plays the major role.”⁵⁴

In the history of doctoral education in architecture in America, there are particular examples in which singular candidates were granted Ph.D. degree. Gary T. Moore refers to Harvard in which the “first non-history architectural Ph.D.” was granted in 1956, and the Doctoral Program in Architecture established in 1964 at the University of Pennsylvania by Perkins as the “oldest continually operating doctoral program in architecture.”⁵⁵ Perkins explained that the educational orientation of the Ph.D. Program in Architecture at Penn was “part of the University’s response to the needs of a profession which has become painfully aware of its wider responsibilities and of the fact that too few of its members are prepared to offer these expanded services.”⁵⁶ In Perkins’s view, the challenges facing the twentieth century architect entailed a growing emphasis on the “sincere and undivided dedication to creative design” that was seen as the “essence of architect’s contribution to the city and to society.”⁵⁷

Penn’s Ph.D. Program in Architecture was part of the University’s continuing efforts to improve doctoral education not only for the training of future teachers and the production of knowledge but also for generating an intellectual community through the active involvement of academics and students. The quality of scholarly research developed through graduate and postgraduate programs was seen to have a great impact on the advancement of the faculty and students. Within this framework, in the 1960 report of The Survey Committee the profile of a Ph.D. candidate at the University of Pennsylvania was explained as follows:

“A sustained concept of the Ph.D. as a degree demonstrating not only that an individual has achieved *a mature understanding of a field of knowledge* but also that he has *a broad understanding of other fields* so as to assure him *a sense of the unity of learning*. Further, that he has, through his research, acquired the methods of science and scholarship.”⁵⁸

The conception of university as a center for research and scholarly inquiry brings into focus the profile of academics as teacher-researcher-practitioner. That profile matched well with the faculty Perkins recruited at the Ph.D. Program in Architecture that he started at the GSFA of the Penn.⁵⁹ This was a natural outcome of the emphasis Perkins placed on the close relationship between professional and academic interests.

The understanding of research in architecture as part of design process was at the center of the educational orientation of Penn’s Ph.D. Program in Architecture. The program was expected to make a vital contribution to the improvement of the design quality of architecture. By asking “[w]hat kind of research and study would help advance architectural creativity?” and “[h]ow can critical thought, disciplined by theoretical and historical study, contribute to design while challenging it?” Leatherbarrow directs our attention to the nature of “productive knowledge” that was envisioned by Perkins to be generated through advanced study.⁶⁰ That was envisioned as a contribution to knowledge that will have direct impact on the improvement of architectural practice. This conception finds reflection on the description of the profile of graduates

from the Ph.D. Program in Architecture at Penn as “a body of graduates who will act as a reflective leaven to the architectural profession, providing an historical and/or theoretical context for current practice.”⁶¹

Conclusive Remarks: The Profile of Research and of Researcher Instilled to the Establishment of Ph.D. Degree Programs at the METU Department of Architecture

In his article “Universities in Turkey,” 1968, Osman Okyar underlines the main problematic in Turkish higher education as “the disparity between the requirements of a rapidly developing society for highly trained manpower of all kinds”, and “the limited supply of graduates from higher educational institutions.”⁶² The deficiency of graduates was related more to the academic standards of higher education institutions, concerning the content of programs and pedagogical practice, than the number of graduates. For Howard Reed, 1975, primarily, the conception of education that predominated higher education programs was problematic: “the continuing tendency to look at education as the mastery of fixed body of knowledge, rather than as the learning of basic principles and data and the technique of formation of hypothesis and experimentation in order to apply one’s learning, principles and imagination to the solution of new problems.”⁶³ The influence of such a conception of education on graduate and post-graduate programs was problematic in Turkish universities. Reed stresses on “the lack of agreement on the content and organization of graduate study to prepare the teachers of teachers and specialists who, it is thought, are urgently required in the universities and by Turkish society.”⁶⁴ Similarly, Okyar directs our attention to “the lack of systematic training and other deficient arrangements at the Ph.D. level.”⁶⁵ An improvement in the scholarship of teaching was seen as crucial. Accordingly, higher education in Turkey in the second half of the twentieth century faced fundamental challenges of “meeting the future needs of the country for graduates of higher educational institutions,” the demand for raising “standards of teaching and research”, and the training of researchers who can “devote themselves to discovering and solving important practical problems.”⁶⁶ Okyar maintains that there was an imperative need to develop “new vigor and changed training methods at the postgraduate level of university studies” in order to “improve the form and content of teaching” and fulfill the country’s demand for “more and better research in all fields.”⁶⁷ Reed’s and Okyar’s above mentioned ideas on the expectations from higher education institutions found reflection on the following description by Kemal Kurdaş, the rector of METU from 1961 to 1969, about the education and research ideals of a university in Turkey:

- 1) “Universities are primarily expected to make their students aware of contemporary technical and scientific developments; educate them as individuals who read, do research, think independently, and put into practice what he/she thinks in the service of the demands of their country”;
- 2) “Universities are also expected do research, in depth and breadth, on basic sciences, technological matters, and on subjects related with the cultural, economic and social development of their country; to disseminate the results of their research

through original publications for public good, and put their findings into practice in real life situations. It is essential to examine universities in Turkey within this perspective and such an examination will result in striking observations.”⁶⁸

As afore mentioned, the establishment of the METU Faculty of Architecture in 1956 was fostered by the UN expert Abrams's idea of the need for a school of architecture and community planning in Ankara, in which education and research programs in interrelated disciplines addressing the problems entailed by rapid urbanization and industrialization will be put into operation and a body of professionally competent and open-minded individuals will be trained. This was followed by the UN expert Perkins's assistance for the Government of Turkey on “the creation of a Faculty of Architecture, a Faculty of City and Regional Planning” and two research institutes, as a first step towards an institution of university rank, and with a view to promoting “a newer, more practical and modern approach to architecture and urban planning” in Turkey. Joseph S. Szylowicz, 1973, re-contextualizes the foundation of the METU into the framework of the attempts to create a modern educational system in Turkey that resulted with the realization of new institutions serving as “models of reform and change for established universities.”⁶⁹ Reed reiterates the same line of thought when he aligns the METU and Hacettepe University with these new institutions. In Reed's view, the characteristics of these two universities that help distinguish them from existing universities in Turkey primarily derive from “their interest in attempting to meet the urgent and reasonable public need for certain kinds of professional training”, “the quality and vigor of their academic staff”, “their initiative in devising curriculum”, “their provision for research facilities including well-staffed and well-equipped libraries and laboratories” and “their promotion of research.”⁷⁰

In his 1960 report “A New Middle Eastern University with Modern Western World Objectives” W. R. Woolrich, who was METU's first Consultant President and subsequently the first Interim President, 1959-1960, points to METU's premise of maintaining high academic standards through teaching and research facilities:

“The teaching program of the institution is well-supported by four Research Bureaus-Building and Planning, Engineering and Science, Business and Economics, and Test and Development. It is anticipated that for balance about one-third of the amount of the University budget normally devoted to teaching will be assigned to fundamental and applied research for the development of Turkey. It is expected that most full-time men and women of the teaching staff devote a reasonable amount of time to creative research... A climate of active research is in the making for all academic departments.”⁷¹

The METU projects envisioned by Abrams and Perkins stressed on the problems existing in Turkey's built environment. Both Abrams and Perkins strive to find practical solutions to these problems through education and research. To develop competence in architecture, to train well-equipped architects, to foster research for the development

of a knowledge base -professional and disciplinary--, and to educate future researchers constituted the grounding rationale of their educational approach. It would not be a misinterpretation to say that underneath this approach laid commitment to the service to society. The ever-growing demand for solving the problems entailed by rapid urbanization and industrialization engendered the need to develop scientific, innovative, critical and creative knowledge. Knowledge created through research should not be confined to theoretical level, but lead to contribution to the field of architecture. Researcher should be aware of the significance of linking scholarship with practice, and be endowed with social responsibility along with professional and academic ones. Thus, the broader goal of architecture programs should be cultivating pattern of attitudes and the qualities of mind that will help students to become professionally competent and open-minded individuals. As underlined by Aközer, the "ideal of socially responsive, progressive 'practitioner as scholar'" constituted the basis of the conception of research and of researcher that informed the establishment of postgraduate education in architecture at the METU Faculty of Architecture.⁷² The graduate education at METU Faculty of Architecture started in 1960. The first Ph.D. Program in Architecture was established at METU in 1973.⁷³ Currently, there are 4 Ph.D. programs at METU Department of Architecture are in the fields of: (1) Architecture, (2) Building Science, (3) History of Architecture (4) Restoration.⁷⁴

The grounding principles of Ph.D. degree programs at the METU Department of Architecture have much in common with the qualifications to be developed through doctoral level education envisioned in directives and declarations that inform ongoing initiatives for the development of a National Qualifications Framework for Higher Education in Turkey and in many other member countries of the Bologna Process. The doctoral qualifications delineated in internationally agreed documents on architectural education aim at achieving original contribution to the profession, to the discipline, and eventually, to the society. This can be re-interpreted in the context of the broader field of debates on the overarching objectives of higher education programs envisioned in the Bologna Process: "preparation for the labour market"; "preparation for life as active citizens in a democratic society"; "personal development"; "the development and maintenance of a broad, advanced knowledge base."⁷⁵ The ongoing change process in Turkish higher education is informed by the educational vision, recognized in the "Higher Education Strategy of Turkey" final report, 2007, in which education aims "to equipped individuals with the knowledge, skills and potentials needed for a successful implementation of their private and public life projects fully and in equal opportunities," and "to guide them in their development as active citizens not afraid of attempting and taking responsibilities, installed with critical thinking abilities, sensitive in matters of human rights and democracy, environmental, cultural and aesthetic values."⁷⁶

Consequently, it can be maintained that the graduates that can be awarded by a Ph.D. degree in architecture is expected to be the "steward" of their disciplines: he/she is to be "capable of *generating* new knowledge and defending knowledge claims against challenges and criticism, *conserving* the most important ideas and findings that are a

legacy of past and current work, and *transforming* knowledge that has been generated and conserved by explaining and connecting it to ideas from other fields."⁷⁷

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Notes

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- 29 Charles Abrams was a UN expert involved in technical assistance projects to developing countries. He was also actively involved in policy making in the fields of housing and planning in America. A commitment to democracy and civil rights constituted the basis of his activities as a lawyer, planner and urban reformer. For a detailed examination of Abrams's ideas and practices, see Allen Scott Henderson, *Housing and the Democratic Ideal: The Life and Thought of Charles Abrams* (New York: Columbia University Press, 2000).
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- 36 Ibid., 8.
- 37 Ibid., 5.
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- 52 David Leatherbarrow, "Squaring the Circle: or, Building the Ph.D. in Architecture Program at the University of Pennsylvania." Unpublished manuscript. I want to express my gratitude to David Leatherbarrow for sharing his study with me.
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UNITED KINGDOM



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New Developments in Doctoral Research at the Welsh School of Architecture

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There are two common views on the purpose of a research doctorate. First, there is a requirement that the doctoral thesis makes a significant original contribution to a body of knowledge. The second viewpoint, which may be at odds with the first, is that undertaking a doctorate is a form of research training, with the implication that the knowledge (as findings) resulting from the study is subordinate to the learning gained from undertaking the research. The two positions may be characterised as leaning alternatively towards product (knowledge) and process (learning). In our post-postmodern era it is not surprising that knowledge claims and questions about epistemology should emerge from architecture's uneasy relationship with conventional academic education. Schön and others studying design activity sparked a debate on the types of knowledge that are routinely used in design and the potential benefits a deeper understanding of these could bring not just to architecture. Of course, the dominant *knowing-that* has long been a staple of doctoral research, but the introduction of *knowing-how* in its vari-

ous manifestations creates new opportunities for research that places architecture in a key role. There are close affinities between Schön's differentiation and the focus of John Dewey who saw no hard distinction between means and ends. The aim of this paper, therefore, is to trace the development of doctoral research at the Welsh School of Architecture (WSA) over the past forty years through to current debates about new forms of doctorate and the kind of topics we are investigating.

Research at the Welsh School of Architecture

Research in the WSA is organised across three groups: Architectural Science Group; Architectural History and Theory Group; Design and Practice Research Group. These groups provide an intellectual base for all academic staff in the School many of whom are also affiliated to research centres in the School that serve as the main points of contact between the School and external organisations. The centres are:

- Low Carbon Research Institute (LCRI);
- BRE (Building Research Establishment) Centre for Sustainable Design of the Built Environment (SuDoBE), which specialises in research concerning people and the built environment;
- Design Research Unit Wales (DRUw), which engages in architectural design projects that address key topics in contemporary architecture, including low carbon design, landscape and place-making; and
- Practice, Research and Advancement in South Asian Design and Architecture (PRASADA), which focuses on historical traditions of the Indian subcontinent.

The relationship between the different centres is shown in Figure 1.

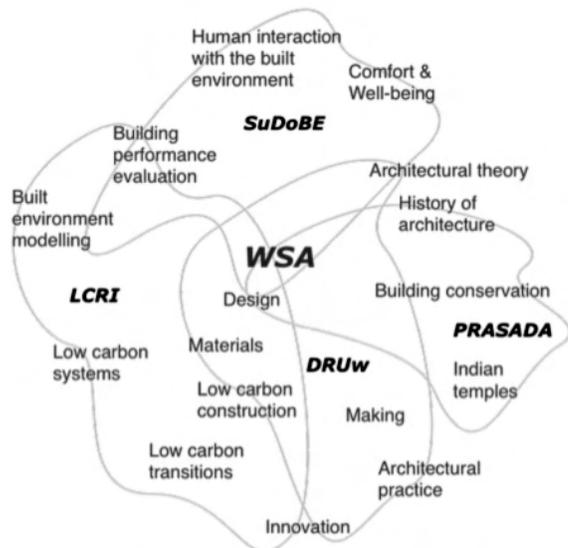


Figure 1.
Research centres and subject areas in the WSA.

From an early emphasis on architectural science, the WSA has grown to embrace a range of research paradigms that include investigative methods from the natural sciences, computer modelling, in situ measurement and monitoring, design research, environmental psychology, social sciences, qualitative methods, ethnography, participant observation. The relatively small size of the School (80-100 staff) means staff know each other and are familiar with the interests of others. Many of the current projects, therefore, are interdisciplinary and use multiple methods.

Development of PhD research in the WSA

In the late 1950s, the amount of research being undertaken in schools of architecture was insignificant and it was extremely rare for their graduates to proceed to research degrees. The 1958 Oxford Conference, masterminded by Martin and Richard Llewelyn-Davies (soon after to become a Professor at the Bartlett School) changed all that. And, when it came, change was nowhere faster than at WSA.

The trajectory of PhD education and research in the Welsh School of Architecture begins with architectural science. The WSA, as with many other schools of architecture in the UK, embraced the recommendations of the 1958 Oxford conference by bringing a generation of building scientists into architectural education from long established disciplines such as physics, engineering and mathematics. This was reflected in the Conference Chairman's report:

*"If architecture is to take its proper place in the University and if the knowledge which it entails is to be taught at the highest standard, it will be necessary to establish a bridge between faculties: between the Arts and the Sciences, the Engineering Sciences, Sociology and Economics. Furthermore, the universities will require something more than a study of techniques and parcels of this or that form of knowledge. They will expect, and have a right to expect, that knowledge will be guided and developed by principles; that is, by theory."*¹

As Forster et al note: "'Theory', as one speaker said, 'is the body of principles that explains and inter-relates all the facts of a subject. Research is the tool by which theory is advanced. Without this, teaching can have no direction, and thought, no cutting edge.'"²

This is the way research was developed in many UK schools of architecture and the Welsh School of Architecture was and remains no exception. Indeed, the WSA was one of the schools cited by Hawkes which, having successfully followed the Leslie Martin path, receives a large proportion of its funding as a result of peer assessment of the quality of its research through the UK's nationwide Research Assessment Exercise, now replaced by the Research Excellence Framework. However, while acknowledging the benefits, Hawkes thought this peculiarly British emphasis on 'scholarship', could diminish the role and status of the academic practitioner and thereby jeopardise the quality of UK architectural education, both intellectually and practically, and ultimately diminish the standing and relevance of the discipline.

As documented by Powell,³ Professor Patrick O’Sullivan was appointed as the first Chair of Architectural Science at the WSA in 1970. Alan Lipman, who had joined the School in 1963, succeeded in developing research on human studies to secure promotion first to Reader and subsequently to a Personal Chair in 1970. Around the same time, Jeremy Lowe, another lecturer, was conducting recognised research on industrial housing history. These three areas of research coexisted with the level of competition and rivalry that is common in academia. O’Sullivan’s research in science flourished not just because it was easier to attract external funding, but also because of his ebullient personality. There are stories of PhD students receiving their supervision from Professor O’Sullivan on the train between Cardiff and London Paddington, and returning on the next train. From this colourful start, architectural science at the WSA has grown to dominate the portfolio of research, attracting the largest sums of funding from government and industry and so able to bring more people to the School than any other area.

One characteristic of the School at this time was that the majority of staff were research and not practice focused unlike other schools (Cambridge, for one) where it was de rigeur for the majority of staff to conduct some form of practice in parallel with teaching. Paradoxically, Leslie Martin’s own PhD, gained at Manchester in 1936 and one of the earliest in Architecture, was on the Architecture of the Spanish Baroque. At about the same time the first candidate at Cambridge, Raymond McGrath failed to complete “distracted from his research by his celebrated remodeling of Finella, a house in Queens Road”⁴ –setting a familiar precedent of distracted architect PhD researchers. On the whole, the PhD in architecture up until the end of the Second World War was extremely rare and research, commented a survey of schools, “tends to be looked down on.”⁵

The dominance of architectural science in the WSA has continued to this day. The current Low Carbon Research Institute (LCRI) employs more than 20 researchers. However, there has been a gradual recognition of different approaches to the architectural doctorate that has emerged over the past decade, recognising the validity of alternative types of knowledge that deserve investigation.

The Changing Landscape of Research in Architecture

PhD research on the topics outlined above, using methods and tools drawn from the physical and social sciences remain central to the WSA’s research activity. However, it sits alongside new themes and research paradigms that have emerged over the past decade. In science studies, Kuhn,⁶ Latour⁷ and Geertz⁸ have established the importance of social context. The same applies, though there are significant differences, in other disciplines. Architecture could benefit from similar rigorous scrutiny. New directions in research originate in the hiring of new people as much as in carefully devised rational plans. In the idealised version, a school or university identifies the type of skills and knowledge they need in the pursuit of a strategy for development of the discipline, a job specification is prepared, candidates apply and from those shortlisted based on the selection criteria, staff are appointed. Suppose, however, a school wishes to develop a particular area of research in which there are few

available potential candidates. In that case, the School may appoint someone who does not fit the bill precisely, but is still recognised as a highly competent teacher and researcher. As the anthropologist Clifford Geertz reminds us: "... most effective academic communities are not much larger than peasant villages and just about as ingrown."⁹ It may be no surprise, therefore, that research in disciplines without the disruptive influence of those working outside the academic community, such as practitioners, is likely to evolve more slowly. As a corollary, one might expect research in architecture to embrace non-academic approaches more readily through engagement with practitioners working outside the restrictions of the academy. Architectural design research provides a major challenge to existing research paradigms.

The growing contribution of design to research

Design research is a fairly recent development in the School. The first MPhil's were awarded in 2002 but it was not until 2012 that the first fully fledged PhD by Design was completed. The idea that design can provide a vehicle for discovering new knowledge is not unique to the School, having been explored through developments at other schools in the UK, notably the University of East London (UEL), Sheffield and University College London. The UK's Design Research Society (DRS) was founded in 1966 following the Conference on Design Methods held in London in 1962. From the outset the DRS embraced different applications of design research "The purpose of the DRS, as embodied in its first statement of rules, was to promote 'the study of and research into the process of designing in all its many fields'" stretching beyond the particular interest of architecture.

The potential for design to contribute to knowledge was recognised many years ago. Buchanan¹⁰ locates the origins of design research in Galileo's Dialogues Concerning Two New Sciences, which begins with a discussion of the Venetian Arsenale rather than of physics. Salgado, one of the protagonists, highlights the learning he gains from the craftsmen:

*"[I] frequently visit this place for the mere pleasure of observing the work of those who, on account of their superiority over other artisans, we call 'first rank men.' Conference with them has often helped me in the investigation of certain effects including not only those which are striking, but also those which are recondite and almost incredible."*¹¹

The fall (some may say failure) of the Project Office in UK schools of architecture was paralleled by the rise of the subject specialist over the architect generalist as the demands of returnable 'outputs' pressured research based schools of architecture to 'academise' the discipline. All this took place as Hawkes, quoted elsewhere in this paper, took up his role as Professor of Design at the Welsh School of Architecture. He maintained that the "physical and pedagogical heart of all schools of architecture is the design studio. It is in the studio that the lessons of scholarship, in history, theory

and architectural science are, or should be, brought to bear on the conception and development of designs.” (8)

Returning to the outcomes of the 1958 Conference at Oxford, this was also on the agenda on the subject of advanced training the connection between knowledge and the studio was emphasised: ‘Inadequate knowledge handicaps and trammels the architect, limits the achievements of even the most creative and depresses the general level of design.’

Having argued for research based practice, the question arises not whether ‘can design be research?’ but rather what lies at the heart of the academic discipline of architecture and how does each school and those who teach within define this?

The difficulty for design based research today is that it must take its place alongside the dominant models of research that have undergone years of refinement and reification in the natural sciences. The lack of authority accredited to design is underlined even within the architectural profession, as this example of the systematisation of inquiry shows.

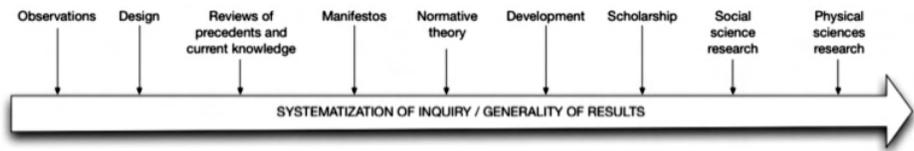


Fig. 2

A framework for architectural research.¹²

The privileging of established modes of inquiry is evident in this early attempt to locate various research paradigms in architecture. As Doloughan notes: “... ways of thinking about and attitudes towards language and the acquisition of knowledge in many institutions of higher education today have remained defiantly rooted in notions of realism, empiricism, and a belief in the scientific method.”¹³ However, there is a growing momentum for change of status of design knowledge: “The UK Council for Graduate Education states that “It is no longer possible to polarize subjects as conforming -or not- to the ‘scientific method.’”¹⁴

Plans and expectations for future doctoral education at the WSA

The Welsh School of Architecture has too much invested in the conventional routes of doctoral research to abandon these overnight. There is a history of success and widespread recognition in established science and humanities based research for an abrupt switch to a different paradigm. However, the value of ‘knowing that’ alongside rather than separate from ‘knowing how’ is at the core of the School’s praxis. Increasingly, the School recognises the value in broader conceptions of knowledge that are less easily demonstrated through conventional models of research. The strong com-

mitment to pragmatism runs deep and is more than a superficial tip of the hat towards architectural practice. It is informed by the philosophical pragmatism of William James and John Dewey that remains open to the idea of value outside of commerce and engineering. For the future, we envisage PhD research evolving in two ways: the topics of investigation; and how they are investigated.

The evolving PhD thesis in architecture

It was clear to Hawkes and others that general or ordinary practice would not do, as the process and outputs from such an organisation as the Design Research Unit (DRUw) would have to meet the RAE definition of research in that it should involve original investigation to gain knowledge and understanding... Hawkes, referring to a number of notable architect teachers, such as Kahn and Zumthor, classified this as 'critical' practise. The quality of the outputs (designs) 'implicitly represent a critical commentary on the production of ordinary practice.' (10)

The members of the DRUw have striven to understand the notion of critical in the context of architectural practice. After nearly a decade of activity, during which, schemes and projects have been evaluated and re-evaluated in the light of Hawkes' lucid observations, we were anxious that the critical act (in our case design and construction) would and should not become abstracted from its real situation and circumstances. For us, this would mean to adopt critical judgement, including as Raymond Williams defined 'necessarily, positive or negative, responses, a definite practice, in active and complex relations with its whole situation and context.' (11).

The crucial aspect about the value of design as research lies in Hawkes' argument that practice and theory are interlinked and that theory develops from critical reflection on practice. In rephrasing Leslie Martin's Conference declaration 'Theory is the body of principles which explains and interrelates all the facts of a discipline. Critical practice is the tool by which theory is advanced. Without theory and critical practice teaching can have no direction and thought, no cutting edge' (15). This turns the idea of research and theory in schools of architecture on its head and suggests a new model for the role of the architect in the academy.

Main characteristics of researcher profile we wish to generate

No single profile for a PhD in architecture can apply. Instead, we expect increasing diversity in the forms of doctoral research as a recognition of the validity of different types of knowledge. However, it will take time for these to become widely accepted by fellow academics, and by the profession. There is no guarantee that the more esoteric will ever be fully endorsed outside architecture although there is potential for inter-disciplinary research through creative practice with other disciplines, such as Engineering, Social Sciences and even Music in the University.

We envisage the following types of doctorate supplementing the established forms found in the physical and social sciences, and humanities.

The professional doctorate

The idea of the professional doctorate in the WSA has been prompted by some of the frustrations that spurred on the development of the PhD by design. The length of study of architecture, its associated cost and lack of funding for doctoral study within the discipline of architecture and the problem of an interruption to career whilst an orthodox PhD is pursued all add up to barriers to study at this level for the practitioner and suggests that these are reasons behind the 'void' of doctoral level practitioners. Green and Powell¹⁵ suggest that the professional doctorate has its origins in dissatisfaction with the PhD as a qualification appropriate for advanced professional work outside of academia and in an increasingly complex and interrelated world it may be argued that a doctoral level of study is a prerequisite for those working at senior levels within the professions. This could be a critical move as currently mainstream CPD activities are reduced to online 'Webinars' provided by component manufacturers plugging the technical benefits of a plethora of products.

A professional doctorate may be described as "one where the field of study is a professional discipline and where students are supervised within professional contexts and/or within the university but in relation to that context."¹⁶

This opens up a range of possibilities for a work or practice-based context for study and the production of new knowledge and forces a re-consideration doctoral research. Cardiff University states that professional doctorates need to be seen and treated as research degrees that produce doctoral thinkers and doers in specified areas of professional practice and by different means. This seems to suit architecture well and the idea of the 'reflective practitioner' is an appealing one as the integration of theory and practice, the cyclic pattern of experience and the conscious application of that learning experience are central to the development of reflective theory. This of course brings us back to Dewey¹⁷ with his exploration of experience, interaction and reflection and Schön's notions of reflection-on-action, reflection-in-action, responding to problematic situations, problem framing, problem solving, and the priority of practical knowledge over abstract theory. For the WSA, however, it is the melding of theory with practice rather than the primacy of one over the other that encourages our moves in this direction. If professional doctorates are to be valued and encouraged and seen as a viable and equitable part of doctoral education then clearly they need to be treated with parity when it comes to quality issues, though the submission is likely to be presented as a portfolio and the viva voce may need to take into account the candidate's progress through a whole programme of study.

The next challenge for us in the development of the professional doctorates is to win the confidence of academia on the one hand and of the profession on the other in establishing the same level of achievement as the PhD and the same advanced level of study and 'contribution'.

The craft/maker doctorate

Although practice-based research has become widespread in the visual arts, it was a completely new concept within Cardiff University when introduced in WSA from

around 2002. The first candidates were graduates from our MArch who embarked upon MPhil studies. In these early studies, the nature of design-led research was not fully defined. Traditionally in design research, when the nature of practice is a major research topic, the study was conducted by research specialists rather than design practitioners. Much of this was in the field of sustainable or low energy design, and the emphasis had been on achieving new knowledge about the nature of practice and how to improve it. Now for the first time young designers were encouraged to produce designs and reflect on them and move on to the next design. Importantly, the works that were generated from that process were to play a vital part, in their own right, in the new understandings that emanated from this design praxis. The residue of designs, models, devices were often referenced as precedent for studio.

At the time the terms 'practice-based' and 'practice-led' were often used interchangeably. As we debated the precise nature of these nascent studies we were drawn to the distinction given by Candy¹⁸ summarised here as follows:

- If a creative artefact is the basis of the contribution to knowledge, the research is practice-based.
- If the research leads primarily to new understandings about practice, it is practice-led.

This distinction seemed clear to us and led to the adoption in the WSA of the following definitions also given by Candy:

- Practice-based Research is an original investigation undertaken in order to gain new knowledge partly by means of practice and the outcomes of that practice. Claims of originality and contribution to knowledge may be demonstrated through creative outcomes, which may include artefacts such as images, music, designs, models, digital media or other outcomes such as performances and exhibitions.
- Practice-led Research is concerned with the nature of practice and leads to new knowledge that has operational significance for that practice. In a doctoral thesis, the results of practice led research may be fully described in text form without the inclusion of a creative work. The primary focus of the research is to advance knowledge about practice, or to advance knowledge within practice. Such research includes practice as an integral part of its method and often falls within the general area of action research.

Since 2008 we have had examples of both these modes but we have applied the Arts and Humanities Research Board (now Council) (AHRB, 2000) test for research processes rather than outputs. This centres around three key features of any doctoral research proposal:

- '1. It must define a series of research questions or problems that will be addressed in the course of the research. It must also define its objectives in terms of seeking to enhance knowledge and understanding relating to the questions or problems to be addressed.

2. It must specify a research context for the questions or problems to be addressed. It must specify why it is important that these particular questions or problems should be addressed, what other research is being or has been conducted in this area and what particular contribution this project will make to the advancement of creativity, insights, knowledge and understanding in this area.
3. It must specify the research methods for addressing and answering the research questions or problems. In the course of the research project, how to seek to answer the questions, or advance available knowledge and understanding of the problems must be shown. It should also explain the rationale for the chosen research methods and why they provide the most appropriate means by which to answer the research questions’.

Practice-led research is concerned with the nature of practice and leads to new knowledge that has operational significance for that practice. In a doctoral thesis, the results of practice-led research may be fully described in text form without the inclusion of a creative outcome. This can be found in much of the concerns of the Architectural History and Theory Group within the School and is also partially evident in the Architectural Science Group resulting in staff hovering around the recently formed Design Practice Research Group. This has been a healthy confusion, but it is clear that the primary focus of research here is to advance knowledge about practice or to advance knowledge within practice. Such research includes practice as an integral part of its method and often falls within the general area of action research. An example of this is a recent thesis (Fazlic) on the design of Sustainable High Rise Towers in Temperate Climates in which design work was conducted in order to test the processes rather than outcomes of practice.

The doctoral theses that emerge from this type of practice related research are not the same as those that include artefacts and works as part of the submission:

“A practice-based PhD is distinguishable from a conventional PhD because creative outcomes from the research process will be in the submission for examination and the claim for an original contribution to the field are held to be demonstrated through the original creative work.”¹⁹

In practice based research design work or practice undertaken which produces creative outputs is an integral part of the research process. This is also supported by documentation of the research process, as well as some form of textual analysis or explanation to support its position and to demonstrate critical reflection. A thesis arising from a practice-based research process, such as the one given above, is expected to both show evidence of original scholarship and to contain material that can be published or exhibited.²⁰

Our practice-based doctoral submissions have included a detailed ‘contextualisation of the creative work’ often in the form of drawings and models but also in the form of prototypes and componentry.

Nevertheless in some cases (Heidi Day in particular) the outcomes (knowledge) have embraced both the artifact and the operational dimensions (practice-led) of practice – or entity and process as one candidate defined it. It is clear however, that the critical appraisal or analysis is the basis of the claim for the originality and location of the original work. It also provides the basis of the submission as a contribution to knowledge in the field, showing doctoral level powers of analysis and mastery of existing contextual knowledge, in a form that is accessible to and able to be judged by knowledgeable peers.



Fig. 3
An example of a practice based PhD submission at WSA (Rob Thomas).

Making

Intuitively, we can be aware that the act of making something, whether physical or otherwise, calls on knowledge that is different to conventional knowledge. Furthermore, we can acknowledge that such knowledge evolves and is essential to culture, well-being and prospering. Gaining traction for such knowledge in universities is not easy, as Buchanan reminds us: ... theory was highly prized in the universities, practice was tolerated, and production or making -the creation of what Bacon calls “artificial things”- was generally ignored as a subject of learning, except to the extent that the design of instruments played a greater and greater role in the investigation of the natural sciences.

We are drawn to the term ‘making knowledge’ employed by Dunin-Woyseth to distinguish the kind of knowledge with which the making professions are concerned. Our school journal has been titled MADE since 2004 and it proclaims it is ‘about mate-

rials and connections in architecture: physical making, joining and crafting; also the intellectual materials and connections of architecture; its sciences, histories, theories, practice and material culture'. The term is related to the established distinction introduced by Gilbert Ryle, 'between knowing how and knowing that and belongs obviously to the broader category of the knowledge-how (Ryle 1945-46)'. The establishment of knowing-how, or making knowledge in our discipline would add to a small but fledgling field of enquiry within our University that currently includes Music. The crucial point is that in certain disciplines, and Architectural design is one of them, knowledge can be partly advanced by means of practice.

This has been the basis of advances in design-based research in the school and as John McKean reminds us: "Before we got caught between the physical sciences, social sciences and humanities, and the fences erected round what each considers the content and methodologies of 'real' research, we can agree that any good research demands rigour, revelation, relevance and return" ²² and these are in fact the tests applied to our research outputs regardless of the discipline or research group.

If architecture is to take its place in the University then the idea that a young architect who may be termed a 'research student' in the university would take, as the subject of research, the practice of their own discipline should be a natural one and not a cause for anxiety. Our PhD studies have all included critical reflection upon that practice and on the results that inform practice.

The viva has been based on this and conducted in front of the 'work'. Thus artefacts, designs, models and components and completed buildings that had been designed and constructed have been central to the candidate's submission for the degree. As Candy sets out it remains "that the thesis, as lodged in the Library, would include a permanent record of any artefacts submitted towards the examination. In this way, the practice-based PhD can be understood within the traditional context of the purely written PhD without any major revolution in education being required." ²³

Cross-cutting perspectives and methods of inquiry

The lenses we use to examine these topics are changing too. Some recent and ongoing PhDs investigate the everyday in low carbon design practices (Gabriela Zapata), insulation installer practices in retrofits (Timothy Forman) and the appropriation of urban green spaces for apple growing (Kate Knowles). These studies share a common interest in the everyday activities of different groups of people. The methods are broadly ethnographic, on some occasions using full participant observation in a range of contexts in the architectural practice, on site and in urban settings. This is related and yet different to the pioneering use of participant observation at the WSA in a 1978 PhD study by Cooper. ²⁴

This turn towards the everyday and embedded studies again reflects Dewey's view of art as part of quotidian experience rather than as an elitist activity confined to museums and galleries. ²⁵ It recognises the need to engage with people directly, to address the issue highlighted by Feyerabend in his assault on overly academic approaches to research: "[i]nstead of asking the people involved in a problematic situation, developers, educators, technologists and sociologists get their information about

‘what these people really want and need’ from theoretical studies carried out by their esteemed colleagues in what they think are the relevant fields. Not live human beings, but abstract models are consulted; not the target population decides, but the producers of the models.”²⁶ This formed part of Feyerabend’s irreverent critique of rationalist methods in science, claiming that the production of new knowledge required imagination and anarchy in thinking rather than slavish adherence to a mythical scientific method.

A promising development emerging from the focus on the everyday is a growing fascination with the disconnection between planned and directed policies, designs and methods and *ad hoc* practices, whether of design teams, building occupants or designer/constructors. This direction of PhD research owes much to Mary Douglas’ theory of ‘dirt’ as “matter out of place”²⁷ and de Certeau’s descriptions of tactics as subversive activities pitted against commerce, politics and culture.²⁸ These approaches to design practices, making and the cultural context of architecture will continue to distinguish PhD research in the Welsh School of Architecture.

In this section, we have emphasised how architecture draws on its social and cultural base. William Carlos Williams, the modernist poet, described the best architect being a person “with the most profound insight into the lives of the community” and if so, it would follow that research into this art would not ignore the messy and difficult contexts within which the art is practised and it is this that continues to provide the potentials for that research.

Notes

- 1 Martin, L., RIBA Conference on Architectural Education. Report by the Chairman 1958
- 2 Forster, W.P., Coombs, S. and Thomas, R. (2008). “The architect and the academy: research through design at the Welsh school of architecture.” In: Roaf, S. and Bairstow, A. (eds.). *The 2nd Oxford Conference 50 Years On – Resetting The Agenda For Architectural Education*. WIT Press. Southampton, pp.63-68
- 3 Powell, C. (2008). *The Welsh School of Architecture 1920-2008: a History*. Welsh School of Architecture, Cardiff University
- 4 Carolin P Ibid Peter Carolin.pdf
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Mackintosh School of Architecture

Forms and Reforms of Doctoral Education in Schools of Architecture in Europe

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What do we have now?

The context and dilemma

An exploration of doctoral education within schools of architecture at this point in time appears to be particularly apposite. Given the recognition and growing acceptance of the potential for research to drive development and innovation in both architectural practice and education, exactly how doctoral training and study might be aligned and structured to help develop research behaviours and thinking becomes a critical question for all higher education institutions. This also reflects the shift, particularly marked in the UK, for universities to become mixed economies of teaching research and consultancy, as opposed to the historical model of institutions' activity and income stemming from and biased largely towards teaching. While this has typically been led by necessity to diversify to achieve greater financial viability and sustainability, it has prompted many institutions to reconsider the place of research and consultancy within their portfolio of activities.

The potential for doctoral research and training to provide both momentum and focus to research activity within institutions, while also growing researcher capacity both there and within the architectural profession, is enormous. However this requires any institution to consider doctoral provision in particular in a far more strategic way, and to consider how to lead the development of this field rather than merely responding incrementally and in a reactive manner. This is a significant departure from the past, and parallels other significant shifts and changes in the higher education context.

One of the key questions therefore is how can schools contribute significantly to architectural research and innovation, and to what extent do they have to rethink their output particularly in relation to doctoral education to be able to achieve this?

Doctoral Education at the Mackintosh School of Architecture

A doctoral programme has been available in the Mackintosh School of Architecture through the University of Glasgow since 1975. Although the Mackintosh School is now part of the Glasgow School of Art, the doctoral degree programme has remained essentially unaltered over the intervening period and continues to be validated by the University of Glasgow. As such the programme is a generic one, and open to all areas of potential doctoral research and is not specific to the creative arts, architecture or any one discipline. The key stipulation is that programmes of research may be proposed in any field of study within the expertise of GSA, subject to the requirement that the proposed programme is capable of leading to scholarly research and its presentation for assessment by appropriate examiners.

Two research degrees are available, Doctor of Philosophy (PhD) and Master of Philosophy (MPhil). The PhD is normally undertaken through three years of fulltime or five years of part time study. The MPhil is normally undertaken though one year of full time study or two years of part time study, and can be awarded as an intermediate award for students not progressing to complete a PhD.

The defined aim of the PhD is to make an original contribution to knowledge. On completion of the research programme and in relation to their research PhD candidates should show evidence of being able to:

- Discover, interpret and communicate new knowledge and understanding thorough original research and or scholarship of publishable quality which satisfies peer review;
- Present and defend research outcomes which extend the forefront of a discipline or relevant area of professional practice;
- Demonstrate a systematic and extensive knowledge of the subject area and expertise in generic and subject or professional skills;
- Take a proactive and self-reflective role in working and to develop professional relationships with others where appropriate.
- Independently and proactively formulate ideas and hypotheses and to design, develop, implement and execute plans by which to evaluate these;

- Critically and creatively evaluate current issues, research and advanced scholarships in the discipline.

The aims of the MPhil are ostensibly the same. Unlike undergraduate or taught post graduate programmes, the years of study are seen to be at one single level with the learning and research outcomes being achieved through sustained engagement with the subject matter rather than a progression through a series of progressive learning outcomes.

Candidates applying to the doctoral programme must provide a detailed proposal of their programme of research structured around the following information;

- Research Questions and Problems - what do you intent to find out;
- Research Aims and Objectives - what do you hope to achieve;
- Research Rationale - why do you think the research is worth doing;
- Research Context - what is the relevant literature and practice within your particular field of enquiry;
- Research Methodology – What procedures and or analytical processes might you use to answer your questions
- Research Outcomes - what is the balance of visual/textual materials;
- Ethical implications of the proposed research

In addition candidates must hold an upper second classification of Honours degree from any British university or equivalent. The application should provide two academic references, English language attainment certificate for students whose first language is not English and a portfolio of supporting visual and or written work as appropriate.

Consideration of the proposal takes into account the candidates qualifications, whether the proposed programme of work is capable of being studied to the depth required to obtain a PhD, whether the proposed programme of work is capable of being completed within the designated time period, whether the appropriate resources and facilities will be available and whether the appropriate supervision can be provided.

Applications are reviewed in a three stage process, firstly by a panel of PhD coordinators and nominated staff to review the candidates qualifications, the overall quality and robustness of the application, and secondly by potential primary and secondary supervisors to review the detailed proposal to consider whether or not the application should progress to the final selection stage of interview. The interview panel will then make a recommendation to the Research Degrees Sub-committee as whether or not to offer a place to the candidate. Successful candidates are made an offer of a place identifying the primary supervisor, host school and start date.

Supervision

A supervision team normally comprises two supervisors, with one acting as Primary Supervisor or Director of Studies. A third supervisor may be appointed if it is required by the project. External supervisors are only appointed when the expertise required by the project is demonstrable and the expertise is not available within the institution.

Students must meet with supervisors on a regular basis and levels of contact across the academic year are defined and benchmarked against national level descriptors and funding council requirements. Primary supervisors are expected to provide 36 hours of input across the year, including 9 hours normally dedicated to administration, and 27 hours to both direct contact through supervision meetings and indirect contact through reading, review and feedback.

Supervisors must either hold a doctoral degree or have a doctoral training qualification. In addition primary supervisors must also have supervised one or more research student to completion. Supervisor will not normally be responsible for more than six research students at any one time. Staff undertaking research towards a Phd will not be appointed as supervisors.

Research Training

GSA provides an institution wide generic research skills programme which is mandatory to all first year MPhil and Phd students. The programme aims to:

- Provide training in generic research skills appropriate to the level of study in Architecture, Art, Design, Digital design, Historical and Critical Studies and related fields;
- Provide students with the necessary study, professional and transferable skills to engage in a project of advanced research in their field of enquiry;
- Enable students to develop the necessary critical judgement to engage in post-graduate research
- Provide support for students in their initial stages of their programmes of study, enabling increasing independence

At the start of their training programme students are also asked to complete a training needs analysis to provide a profile of the student's existing strengths and capabilities, allowing a more detailed and tailored regime of training to be identified and agreed with the supervisory team and the Phd co-ordinator.

Although candidates provide an outline of their programme of research with their application, this outline is considered to be a proposal and is not regarded as binding. During the first session, the student in consultation with their primary supervisor formulates a closer definition of the topic, and decided how they intend to present their submission. When agreed this forms the basis of the Registration of the research project.

Forms of submission

Students submitting for the degree of Phd may submit their portfolio of work in one of two forms;

- by research project through a portfolio combined with an extended written text of 25,000 – 40,000 words which together represent or embody new knowledge;
- by written thesis of between 70,000 – 100,000 words

Examination

The final submission is examined by a panel of examiners, usually one internal and one external, and convened by a convenor. The role of the examiners is to act both as experts and peers.

The external examiner provides specific subject expertise that align with the research topic, while the internal examiner provides knowledge of doctoral level expectations and quality thresholds. Neither examiner has had any input to the supervision of the student or the development of the research work.

The examination takes place in camera, and provides an opportunity for the examiners as a panel of experts and peers to interrogate the work, and the candidate to be able to demonstrate their expertise in the area and ownership of the thesis in particular. This form of examination allows an in-depth and focused discussion of the thesis, but does not necessarily entails a wider dissemination of the new knowledge.

The examiners may determine that the submission is accepted for the degree; that it can be accepted subject to minor changes or subject to more significant changes in which case a period of time during which the changes must be made will be specified.

The panel may also decide that the submission is not acceptable either on the grounds that it requires elements require significant revision or that the overall standard is not acceptable, and in these circumstances a period of up to one year can be given for the necessary work to be carried out by the candidate. The panel also has the right to reject the thesis in its entirety with no right to revision and resubmission.

Normally the thesis or research report becomes available for consultation by the wider community after it has been deposited in the GSA library. However authors are permitted to restrict access for one year or at most three years, unless the reader has received the author's express permission to see it. The supervisor will be able to advise the author whether this is advisable for commercial or patent reasons.

Unrestricted thesis / research projects are available for loans to other United Kingdom libraries through the Inter-Library loan Service. Photocopied or microfilmed copies may be supplied to libraries and individuals on payment of the reproduction costs. Copying and loaning do not affect the author's rights in any way.

Has it changed in time? Has the Bologna process had any influence?

In many ways the structure and dimensions have changed very little over time, and have been very little effected by external influences such as the Bologna process

which is seen as affecting undergraduate and postgraduate taught provision rather than research degrees.

The model remains three years of full time or five years of part time research led study focused around a research proposal and the development of an area of new knowledge.

There are limited amounts of funding for post graduate and research degrees, and this teamed with the length of professional academic study in architecture and the raising costs of tuition, very few numbers of students intending to qualify as architects within the UK undertake doctoral study. Doctoral study is not seen as critical to the path of entering the architectural profession. Likewise, while a PhD is increasingly cited as a condition for research and doctoral teaching posts, most teaching posts now require a teaching qualification rather than a research degree, in part reflecting the professionalisation of university teaching, and in part recognising the lack of penetration the PhD has had into the wider academic population

In this way students undertaking a PhD at the Mackintosh School of Architecture can be described as undertaking a PhD through the study of an architectural related or focus subject rather than an architectural doctorate. At present the concept of the architectural doctorate have no meaning for the institution, the doctorate seen as being specific to no particular field, but potentially being relevant to any. In this way the model of study deliberately remained open with little specificity. This is quite typical across the UK sector rather than being a specific characteristic of MSA.

Some subjects within the field of architecture have been better represented in doctoral study than others, namely history, theory and technology. Significantly under-represented have been research programmes exploring practice and design, particularly those that are practice based or practice led. Given the intrinsic link with practice, both in the architectural professional and architectural education this must represent or rather miss-represent the need for or the development of new knowledge within the architectural field.

Vision for the future

Given the shortcomings identified in the current situation, how is the Glasgow School of Art attempting to remedy the situation?

GSA has undertaken a series of steps to increase the supervisory capacity across the institution. Having identified the lack of supervisory capacity in certain areas, supervisory training was offered to all research active staff through SEDA (Staff and Educational Development Association). This allowed staff who did not have a Phd to become suitably qualified, while providing a platform for a shared discussions on the nature and challenges of doctoral research. Subsequently GSA has validated a Post Graduate Certificate in Supervision, which provided the current training vehicle for potential doctoral supervisors.

Providing such training had allowed the number of supervisors to double within the last six years, and also allowed the development of supervisory capacity across all departments and disciplines.

In tandem with this the institutions website has been revised to provide dedicated pages introducing current supervisors, their research and supervisory interests and experience and links to the GSA research repository, RADAR, allowing potential candidates to consider the expertise available, and whether the institution can provide appropriate supervisory support. Research students are now also represented on the website, making them an increasingly visible part of the research community.

The development of the RADAR research repository has also provided a comprehensive and accessible record of the range of research being carried out within this small specialist institution. The repository provides a means for staff to gather and archive research outputs, and to set in context the new knowledge they contain. This, in tandem with the supervisors research pages, provide a clear indication of the types of research activity the potential supervisor engages in, and read in conjunction with the research student pages, also gives an indication of the supervisors track record and current supervision load.

Much of our current work is directed to creating a critical mass within the doctoral community in MSA and GSA, and to connect staff and research students explicitly to current research centres and clusters. Within the Mackintosh School of Architecture these are;

- MEARU – Mackintosh Environmental Research Unit
- Glasgow Urban Lab
- History of Architecture and Urban
- PRAXIS
- Pedagogy and architectural education practice

In addition these overlap with other areas of interdisciplinary practice or strategy development within the wider institution such as with the Health and Well being resulting in collaborative supervisory teams. In this a cross institutional Research Degrees Sub-Committee which reporting to the Research and Knowledge Exchange Committee is crucial to be able to ensure that an overview of provision is maintained, and doctoral students needs are supported irrespective of subject matter, research methodology, supervision team or training needs.

Simply put our vision is to locate doctoral students at the heart of the GSA research community.

The Scottish context and beyond

The Scottish Graduate School for Arts and Humanities (SGSAH) has recently been created with the aim of developing a more cohort, strategic and sustainable partnerships with organisations from across the creative, cultural and heritage sectors, and to provide access to research expertise across both universities and other organizations such as museums, archives and special collections. The SGSAH is funded both through the Scottish Funding Council (SFC) and the Arts and Humanities Research Council, (AHRC).

This marks a shift both in the funding process for many doctoral awards, but perhaps more significantly in the nature of the relationships across institutions and between higher education and other places of scholarly activity, and a first major attempt to have a much more integrated and articulated strategy for the development of doctoral study and research capacity within the arts and humanities. Similar initiatives such as research pooling, also encouraged and supported through the SFC have resulted in the development of major research interdisciplinary and multi-partner projects, and provided a means to develop research capacity beyond the scope of any single institution.

The SGSAH supports the development of research students and early career researchers in Scotland through a range of activities. It is based upon the AHRC Doctoral Training Partnership Scotland, a prestigious consortium of eight Higher Education Institutions comprised of the Universities of Aberdeen, Dundee, Glasgow, Edinburgh, St Andrews, Stirling and Strathclyde, and Glasgow School of Art.

The AHRC DTP Scotland supports doctoral research and training in a wide range of Arts and Humanities disciplines, and provides access doctoral funding, currently through awarding fifty four fully funded doctoral student scholarships per annum. Applications for these are open to any student who holds the offer a conditional or unconditional offer at any of the consortium partners, and must be supported by a nomination from the host institution. Applications are considered by four specialist disciplinary panels, and then ranked identifying the those with the strongest combination of research proposal, supervision expertise and research profile.

In addition the resulting studentships may be extended from the usual three years of study to include a further six months of funded activity as an embedded practitioner within one of the consortium's industry partners, thus providing both funded post doctoral experience and direct articulation of new knowledge and expertise to closely related areas of the creative and cultural economy.

SGSAH will provide the framework for the. Working together, we are able to provide our students with access to research expertise across the nation and to our universities' world-class resources – including museums, special collections and archives. Supported by the Scottish Funding Council and the Arts and Humanities Research Council (AHRC), we aim to create a supportive community of doctoral graduates, capable of being research leaders in whichever sector they choose to enter upon graduation.

The purpose of the SGSAH is not only to develop the cohorts of students funded through the AHRC, but to impact all postgraduate researchers across the SGSAH consortium, through the development of innovative and collaborative training provision that anticipates the needs of future practice rather than merely repeating what currently exists. This is perhaps the most challenging aspect for the consortium partners, and is dependent on the discussions occurring within and the intelligence coming from the disciplinary panels. For architecture this means a dialogue with other visual and creative disciplines including creative writing, poetry, theatre and drama, film and television, fine art, design. This also presents the opportunity to better understand the nature and content of research proposals, research methodology and potential research collaborations being considered within other institutions and schools of architecture.

Glasgow School of Art is also a partner in the ADAPT-r ITN, (Architecture, Design and Art Practice Training-research Initial Training Network)—a partnership between seven schools of architecture across Europe, providing doctoral training and early career research fellowships aimed at developing practice based research across architecture, design and fine art. The network, funded through the Marie Curie FP7 initiative for four years, aims to build capacity in practice based research while also developing specialist research training suitable to and supportive of the nature of research in and of creative practice, developed and tested through forty early career research fellows and seven experienced researchers. At the heart of the network is a programme of six monthly Practice Research Symposium, allowing a regular shared research training programme to be established, while giving doctoral candidates the opportunity to share research work in progress. Alongside this the ADAPT-r ITN will also result in two major research conferences, a major exhibition, three key books, and a website providing public access to research and events.

Participation in both of these consortium provides insights into the parallel or alternative doctoral programmes at other institutions in the UK or across Europe, as well as helping to develop and disseminate the creative practice research.

Expected profile of a researcher

To understand the expected profile of the future researcher, it is perhaps useful to look at the expectations embedded within the doctoral research training which is required to be undertaken by all candidates irrespective of the detailed research proposal. In the most part this training is generic, and has been developed over time, based on the intrinsic requirements of research activity as recognised in universities, and latterly in response to the training requirements set out by the UK Research Councils.

Training requirements

The UK Research Councils collaborate to identify best practice and to set standards in doctoral and research training. In considering the range of research skills to be developed and promoted, there is recognition that while much research training may occur at the outset of a research programme or degree, the process will also be continuous and develop throughout the course of the research. While generic research training programmes can provide access to common methodology and practices, key thresholds and behaviours, these can be further expanded and enhanced by detailed and strategic consideration by the researcher and supervisory team, to more fully align with the research proposal and the researcher's individual needs.

The Research Councils also emphasise the belief that training in research skills and techniques is core to the development of the research students, and that the doctoral student is expected to make a substantial contribution to knowledge in their area, normally leading to published work. While the development of employment related skills may form a component part of this, they should not detract from this the core objective.

The purpose of this statement is to provide a common view of the skills and experience of a typical research student s thereby providing universities with a clear and consistent message aimed at helping to ensure that all research training is of the highest standard, irrespective of discipline. In addition it is expected that individual research councils may also further define areas of specialist training appropriate to that field.

Research skills and techniques - to be able to demonstrate;

- The ability to recognise and validate problems
- Original independent and critical thinking, and the ability to develop theoretical concepts
- A knowledge of recent advances within one's field and in related areas
- An understanding of relevant research methodologies and techniques and their appropriate application within one's field
- The ability to critically analyse and evaluate ones findings and those of others
- An ability to summarise, document, report and reflect on progress

Research environment – to be able to;

- Show a broad understanding of he context, at national and international level in which the research takes place.
- Demonstrate awareness of issues relating to the rights of other researchers, of research subjects, and of others who may be affected b the research eg confidentiality, ethical issues, attribution, copyright, malpractice, ownership of data and the requirements of the Data Protection Act.
- Demonstrate appreciation of the standards of good research practice in their institution and or discipline
- Understand the relevant health and safety issues and demonstrate responsible working practices.
- Understand the process for funding and evaluation of research
- Justify principles and experimental techniques used in ones own research
- Understand the process of academic or commercial exploitation of research results

Research management - to be able to;

- Apply effective project management through the setting of research goals, intermediate milestones and prioritisation of activities
- Design and execute systems for the acquisition and collation of information through the effective use of appropriate resources and equipment.
- Identify and access appropriate bibliographical resources, archives and other sources of relevant information.
- use information technology appropriately for database management, recording and presenting information.

Personal effectiveness – to be able to;

- Demonstrate a willingness and ability to learn and acquire knowledge
- Be creative, innovative and original in ones approach to research
- Demonstrate flexibility and open-mindedness
- Demonstrate self discipline, motivation and thoroughness
- Recognise boundaries and draw upon or use sources of support as appropriate
- Show initiative, work independently and be self-reliant

Networking and team working – to be able to;

- Develop and maintain co-operative networks and working relationships with supervisors, colleagues and peers, within the institution and the wider research community
- Understand one's behaviour and impact on others when working in and contributing to the success of formal and informal teams
- Listen, give and receive feedback and respond perceptively to others

Career management – to be able to;

- Appreciate the need for and show commitment to continued professional development
- Take ownership for and manage one's career progression, set realistic and achievable career goals, and identify and develop ways to improve employability.
- Demonstrate an insight into the transferable nature of research skills to other work environments and the range of career opportunities within and outside academia
- Present ones skills, personal attributes and experiences through effective curriculum vitae, applications and interviews

To be innovative and venturous, one needs to be clear sighted, well equipped mentally and technically, able to harness your initiative and curiosity, persuasive and self reflective. The demands of contemporary doctoral practice are no less exacting than those of architectural practice.

Related Sources and Documents

Arts and Humanities Research Council

<http://www.ahrc.ac.uk/Funding-Opportunities/Postgraduate-funding/Pages/Postgraduate%20funding.aspx>

ADAPT-r Initial Training Network

<http://adapt-r.eu/>

Engineering and Physical Sciences Research Council

<http://www.epsrc.ac.uk/Pages/default.aspx>

Research pools: Scottish Funding Council

<http://www.sfc.ac.uk/research/researchpools/researchpools.aspx>

The Glasgow School of Art

<http://www.gsa.ac.uk/study/graduate-degrees/doctoral-study/>

Joint Research Councils' Statement

The Vitae Researcher Development Statement

<http://www.vitae.ac.uk/researchers-professionals-development/about-the-vitae-researcher-development-framework/the-vitae-researcher-development-statement>

Postgraduate Certificate in Supervision

<http://www.gsa.ac.uk/study/graduate-degrees/pgcert-%28supervision%29/>

RADAR; research art design architecture repository

<http://radar.gsa.ac.uk/>

SEDA supervising postgraduate research

http://www.seda.ac.uk/?p=3_1_10_1_13

Scottish Graduate School for Arts and Humanities

<http://www.sgsah.org.uk>

Descriptor for higher education qualification at level 8: Doctoral Degree

QAA UK quality Code for Higher Education, Part A: Setting and Maintaining threshold academic standards Chapter A1: the National Level (p14)

<http://www.qaa.ac.uk/AssuringStandardsandQuality/quality-code/Pages/Quality-Code-Part-A.aspx>

Scottish Credit and Qualifications Framework Level 12 Descriptors

<http://www.scqf.org.uk/The%20Framework/Level%20Descriptors>



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Niels Albertsen is a Professor of Urban Research, MSc (political science). Employed since 1975 at the Aarhus School of Architecture. He was highly engaged in establishing research education in the 1990s, particularly through cooperation among Nordic schools of architecture. From 1997-2002 he was the director of the Welfare City Research Project, 2002-2011 Head of the Department of Landscape and Urbanism, 2004-2015 co-director of the Centre for Strategic Urban Research (www.byforskning.dk). Fields of research and teaching: urban and social theory, architectural and design theory, the sociology of (the architectural) professions, the sociology and philosophy of art, issues of cross-disciplinarity. Recent publications include: (2011): "Landsby, storby, grænseløs by [Village, Large City, Limitless City]" in Thomas Juel Clemmensen (red.): *Grænseløse byer. Nye perspektiver for by- og landskabsarkitekturen*. Aarhus: Arkitektskolens Forlag, 26-37; (2013): "Atmosfærernes by. Fænomenologi i bystudiet [The city of atmospheres. Phenomenology in urban studies]" in Bjørn Schiermer (red.): *Fænomenologi. Teorier og metoder*. Copenhagen: Hans Reitzels Forlag, 215-41.



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Tim Anstey is an architect and academic, and joined AHO as Chair of PhD Programme in 2013. He was formally Director of Research at KTH School of Architecture, Stockholm in which role he worked with developing research culture and research-driven Masters education. He has a strong interest in the history of discourse around architecture and design, with a focus on how ideas about the role of the architect have been inscribed into architectural discourse. His current research project "Things that Move", funded by the Swedish National Research Council 2014-2016, examines 16th century architectural texts through the thematic of process, temporality and mechanics. From 2011-2013 he was co-director of the Swedish National Strong Research Environment "Architecture in the Making". He is on the editorial board of SITE Magazine.



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Horácio Manuel Pereira Bonifácio has a Bachelor's degree in History from the Faculdade de Letras of Universidade de Lisboa and a PhD in Architecture (History of Architecture speciality), Faculdade de Arquitectura Universidade Técnica de Lisboa, with a dissertation on the Portuguese Architects of the first half of the 18th century (XVIII). He was Professor of the Faculdade de Arquitectura Universidade Técnica de Lisboa since 1978, until 2011. Since 1993 he is Professor of the Theory and History of Architecture at the Faculdade de Arquitectura e Artes of the Universidade Lusíada de Lisboa. He also taught at the Universidade Lusíada of Oporto. He is a researcher at the Research Center for Planning of Territory, Architecture and Design (CITAD), at Universidade Lusíada, coordinating a Research line in the area of theory and history. He has participated in several congresses and scientific meetings in Portugal and abroad. He has several published works in the field of History of Portuguese Architecture of the 16th, 17th and 18th centuries, dedicating mostly his research to the subject of Baroque and particularly the issue of training and professional activity of the architects of that time. He played management roles at the Faculdade de Arquitectura e Artes and is currently Director of the Faculdade de Arquitectura e Artes da Universidade Lusíada de Lisboa.



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Luc Bousquet is an architect, graduate of National Institute of Applied Sciences from Strasbourg in France (>INSA Strasbourg / ex-Superior national school of arts and industries > ENSAIS). From 1996 till 2003, Luc BOUSQUET was architect-advisor within the network of Architecture, Urbanism and Environment Councils (CAUE), associative structures which accompany local governments or inhabitants, in their projects of construction or urban development. He practised in various departments in France (Saône-et-Loire, Doubs, Ardèche), which is what gradually widened his competences in town planning and local development. In 2004, he became Architect and Urbanist of (French) State (AUE). From 2005 till 2008, he worked in the Ministry of Equipment in Paris, where he lead research and experiment programs, concerning mainly questions of density,

sustainable communities. In 2008, when this ministry became that of the ecology, he participated in the development of a national workshop: the Territorial Studios. These works, based on the voluntary service of the elected members of a territory, consist of building with them, together with the State's local services concerned by new ways to work in partnership, aiming at building more resilient and more united territories, by using firstly the tools of spatial conception. Since 2010, he is director of research and partnerships in the National Superior school of Architecture from Lyon. He helps teachers to develop projects, linked with territories and contemporary problems of built spaces. He piloted the scientific organisation of school, while reorganising research teams and increasing scientific activities.



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Joaquim José Ferrão de Oliveira Braizinha has a Diploma in Architecture from the School of Arts of Lisbon and a PhD on Architecture by the Universidade Técnica of Lisbon. From 1976 until 2001 Project he was a teacher in the Universidade Técnica of Lisbon. From 1990 until now Project he is a teacher in the Universidade Lusíada of Lisbon. He became Full Professor at Universidade Lusíada of Lisbon in 1997. From 1997 until 2009 he was the Director of the Faculty of Architecture and Arts of Universidade Lusíada of Lisbon. He has been a Researcher in the Research Center of Architecture and Urban Design (CITAD) of Universidade Lusíada of Lisbon and has participated in many congresses and scientific meetings in Portugal and other European Countries. He is the Coordinator of the ERASMUS program for student's mobility and the Coordinator of the 3rd Cycle, PhD in Architecture in Universidade Lusíada of Lisbon.



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Teresa Calix is an Architect and Assistant Professor at the Faculty of Architecture of the University of Porto (FAUP), being currently responsible for the course in urban design in the Integrated Master's Degree Programme in Architecture (MIARQ) and the Coordinator of the Profile "Urban Dynamics and Forms" of the PhD Programme in Architecture (PDA). She is also a member of FAUP's Executive Board. She presented her PhD dissertation in Architecture (2013) with the title "The Contemporary City Morphologies: Structures and Textures. An Interpretative Matrix on Urban Form: The Porto Urban System". She is a member of Centre for Architecture and Urban Studies (CEAU) in the working group "Territory Dynamics and Morphologies", financed by the Portuguese Foundation for Science and Technology (FCT). She has developed a regular research activity, among which one could highlight the work produced under and following the scientific framework originated to face the relevant issues raised by Portuguese Regional Development Plans as requested by the Portuguese Regional Administration entities.



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Ben Campkin is Director of the UCL Urban Laboratory and Senior Lecturer in Architectural History and Theory at the Bartlett School of Architecture. He is the author of *Remaking London: Decline and Regeneration in Urban Culture* (IB Tauris, 2013) and co-editor of *Dirt: New Geographies of Cleanliness and Contamination* (IB Tauris, 2007, paperback 2012) and *Cities Methodologies* (IB Tauris, forthcoming). Ben is also co-editor of *Urban Pamphleteer* (2013-) and his work has recently appeared in journals such as *Architectural Theory Review* (2013), *The Journal of Architecture* (2007), *Architectural Design* (2010) and the *Centre for Education of the Built Environment: Transactions* (2009), and anthologies including *Urban Constellations* (2011), *Camera Constructs: Photography, Architecture and the Modern City* (2012), and *The Art of Dissent: Adventures in London's Olympic State* (2012).



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Luis Soares Carneiro is an Architect and Associate Professor at the Faculty of Architecture of Porto. His PhD thesis: *Portuguese Theatres of Italian Tradition*, was presented in 2003 at the University of Porto. He researches on issues related to current and historical theatre buildings, as well as Housing. Currently he is exploring some of the lesser-known cases of the Portuguese twentieth century architecture. He teaches "Project 3" in 3rd Year Course as well as "Thesis Project" in the Doctoral Course. He also has intensive architectural design activity, particularly in the areas of renewal and heritage buildings.



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Adalberto Del Bo, graduated in Architecture at Politecnico di Milano, is full Professor of Architectural and Urban Composition at Politecnico di Milano – Scuola di Architettura Civile, where he is teacher of Architectural and urban design. His works make up an essentially unitary experience that deals mainly with issues of architectural theory and design, along with urban analysis and planning. Besides studying the methods of formation and transformation of cities (in Abruzzo and Lombardy), he combined in his research the attempt to codify the elements of formal/historical analysis (the range of the inquiry widened to include issues of rural architecture and landscape construction) with the purpose of identifying the genealogy and the relationships linking the two experiences. Besides these interests, supported by publications and theses, he conducted studies on the settlements form, on topics related to the idea of city (with particular attention to the Modern Movement and to the work of Ludwig Hilberseimer) and to the principles and rules of architecture. He is a member of Politecnico di Milano Doctorate Board of 'Architecture, Built Environment and Construction Engineering', he is Politecnico's delegate for relationships with South-Central Asia and Pakistan. He is scientific director of a research on 'The elementary part of the city. Typology, density, building and composition'. He is also director of historical and urban design activities for the regeneration of an ancient walled city in Pakistani Punjab. He is the director of the 2010 'Lafayette Park. Detroit' exhibition, shown in the Architecture Schools of Milano, Napoli, Delft, Cleveland, Detroit, Chicago, Como, Roma. In 2012 he chaired the Conference Committee of *Cities in Transformation. Research and Design*, held in Politecnico di Milano, by EAAE and ARCC architectural associations. His activity in architectural design has been published on national and international reviews and exhibited, among others, at Biennale di Venezia, Triennale di Milano and abroad. Awarded in national and international architectural competitions, among his public built works must be pointed out the Cemetery-Park in Novate Milanese and the University Buildings in Chieti - collected in the book 'Il campus universitario di Chieti' - where the Campus Sports Centre was awarded the "European architectural prize for sport facilities 1996".



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Catharina Dyrssen is a certified architect MSA and PhD, and holds a full professorship in Architecture and Design Methods at the Department of Architecture, Chalmers University of Technology, Göteborg, Sweden. With a long experience of lecturing, conducting workshops and leading design studios in architectural and urban design on master level, she has taken an explorative approach on public space, public building and urban landscapes. Together with three colleagues (among them, co-author Marie Strid), she introduced research by design courses on master and PhD levels at the department in 2005. More recently her educational activity has concentrated on doctoral supervision and PhD courses within architecture and design. With an additional academic education in Musicology she has also taught contemporary music history and theory at the Department of Musicology and the Academy of Music and Drama, Gothenburg University. The doctoral thesis, titled *Musical Space. Metaphors, rituals, institutions* (1995), investigated metaphoric, compositional and institutionalisation interrelationships between architecture and music. The cross-disciplinary background has also formed her current research profile. It stems from design driven research methods and often seeks inter-artistic approaches, sometimes combined with methods from social sciences and humanities. Four

main profiles can be recognised: Design driven and practice based architectural theory and methods - see e.g. 'Navigating in Heterogeneity: Architectural thinking as research' in *The Routledge Companion to Research in the Arts* (2010); Architecture, public space and sound; Intersensory and bodily experience of architecture; Architectural thinking in the development of contemporary urban landscapes. She has been the project leader of the nationally funded artistic research projects *Transmission* (2006-2007) and *Into Noise* (2008-2011), a collaboration with sound artists and acousticians/sound designers in the group Urban Sound Institute. In the project *Traffical Cityscapes* (2009-2011), she conducted practice based and theoretical studies on the contemporary urban landscape and in the project *Network City Skaraborg* (2013-) she is currently involved in developing design based methods for regional planning. She is also engaged in the explorative and critical art, architecture and philosophy project *Transvaluation* (2013-). As former Head of Master and Doctoral education at the department (2002-2006) and Head of Department (2009-2012), she was active in forming a national collaboration between the four main schools of architecture in Sweden (in Umea, Stockholm, Goteborg and Lund) which resulted in national funding 2011-2015 from Research Council Formas for two strong research environments (*Architecture in Effect* and *Architecture in the Making*) and a doctoral school (*ResArc*), as a joint venture between the four schools. Since the 1990s Catharina Dyrssen has been engaged in building artistic research in Sweden, and is 2010-2015 a member of the Committee for Artistic Research within the Swedish National Research Council, from 2013 as Head of the committee.



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Irena Fialová is a full time Associate Professor at the Department of Urban Design at the Faculty of Architecture of the Czech Technical University in Prague, Czech Republic since 2010. She was the Coordinator for the Doctoral Study programme and serves as the Vice Dean for Science, Research and Art now. She leads courses and lectures in Theory of Urbanism and Tendencies of Contemporary Urban Development for Czech and English speaking students. She focuses her research on mapping the transformation of Prague since 1990 and the impact of large shopping malls on the quality of public space. Her work experience ranges from lecturing and teaching through urban planning and architecture design to project management and publishing. She is the (co)author of several books and the (co)founder of *Zlatý řez*, a Czech architectural magazine and publishing company, and has lectured internationally at various occasions and schools. For 15 years she was the Czech expert of the European Union Prize for Contemporary architecture and its 2009 Jury member.



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Wayne Forster has been deputy head of the Welsh School of Architecture since 2002. Wayne's role in the School centres on activities in academic leadership in Design, teaching and learning and practice based research through the School's Design Research Unit (DRUw) which was set up to pursue collaborative research based design. In "Towards a Critical Regionalism: Six points for an architecture of resistance", Frampton recalls Ricoeur's "how to become modern and to return to sources; how to revive an old, dormant civilization and take part in universal civilization". Wayne's approach to architecture centres on the geographical context of the building - on topography, climate, light and tectonic form added to intelligent use of resources. This has dominated much of his work over the past 25 years both in the design studio and in more orthodox research work - the use of local materials, building techniques based on tradition and innovation and especially the design of the building envelope in response to an appreciation of the local climate are all constituent parts of critical enquiry and practice. This practice is based on ideas related to Pragmatism and based on the premise that 'Theory and practice are not separate spheres; rather, theories and distinctions are tools or maps for finding our way in the world'. As John Dewey put it, there is no question of theory versus practice but 'rather of intelligent practice versus uninformed practice.' Since it's foundation the

Unit has received a number of awards including the Cardiff University Innovation prize for 2009 and the RIBA Regional Award for the the Baglan Eco-factory and the Margam Discovery Centre in 2010. In 2013 DRUw was also awarded an RIBA commendation for outstanding research conducted in a School of Architecture.



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Giovanna Franco, architect, PhD and Associate Professor of Technology of Architecture teaches "Fundamentals of Construction" (bachelor course) and "Technology for Architectural Restoration" (master programme) at the University of Genoa (Italy), Polytechnic School, Department of Sciences for Architecture. She is member of the Board of the PhD Programme in Conservation of Architectural Heritage of the Polytechnic of Milan. She also teaches at the School of Specialization for Architectural Heritage and Landscape (master post-master programme) at the University of Genoa. Author of more than 130 publications, she's member of the scientific committee of the Journal "Il Progetto Sostenibile" for the topics concerning building renovation. Her research topics are: 1) Analysis of traditional building techniques, methodologies for renovation. On this topic she's published numerous Guides for maintenance and conservation of traditional rural architecture for Marsilio Editori, Venice (2000, 2006, 2008). 2) Maintenance, upgrading and enhancement of built heritage of XX Century. She's been involved in the Italian translation of Atlas Sanierung, Detail Edition, writing an essay on Italian Architecture of XX Century, *Atlante cronologico del Novecento in Italia*, 2009. She's also been, together with Stefano F. Musso, scientific responsible for the interventions of adaptation and enhancement of the permanent exhibition in the 'Museo del Tesoro' of architect Franco Albini in Genoa (2011). 3) Technological innovation, sustainability and energy saving in historical context and protected landscape. She's been scientific responsible for the research in charge of the Ministry of Cultural Properties, Activities and Tourism focused on new *Guidelines for eco-efficiency of traditional architecture in UNESCO site Cinque Terre, eastern Liguria* (2011), and of the research focused on the *Smart Management of historical heritage*, in charge of Ligurian Region (2012-2014). The management process of restoration and re-use is now addressed in the national research program PRIN 2010, recently granted funding, focusing on the implementation of BIM (Building Information Modelling) for historical architectural heritage (2012-2015). 4) Restoration and management of archaeological sites and parks. She's been principal contractor and work package leader in the 5FP Growth 2000. She's taken part, as member of the Scientific Committee, in the international workshop EAAE-ENHSA (2011) *Conservation/Regeneration. Modernist Neighbourhoods* in Bucharest and she published the essay *Sustainability and Heritage: a challenge for contemporary culture* (2012). She's been actively involved, as responsible for the Department DSA, in European Project CAT-MED (Change Mediterranean Metropolises Around Time) Green Apple, Comune di Genova, UrbanLab, coordinating working tables (2010). She's been involved in the working group of Department DSA in the Europea project Beachmed-e "Strategic management of litoral coast for a sustainable development of Mediterranean coastal areas" Medplan measure 3.1 (2005-2008). She's been mentioned and received a prize in competition EAAE prize 2009-2010 'Writings in Architectural Education - Climate Change: Sustainability/Responsibility' for her text *Acting upon the recent inheritance. Sustainability and responsibility towards the contemporary*, published by The Royal School of Architecture of Copenhagen (2010).



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Cristina Olga Gociman is a Professor at “Ion Mincu” University of Architecture and Urbanism in Bucharest and holds a PhD in Architecture since 1999 from Ion Mincu University of Architecture and Urban Planning, in the Department of the Doctoral School, a Ph.D. of Architecture, and a research supervisor. She is a member of the National Council for the Certification of University Degrees and Diplomas. She is a national research project manager in a PN2 partnership – in the fields of architecture and urbanism strategies that reduces risks and hazards (2012-2016). She was the scientific secretary of the Faculty of Architecture between 2006 and 2010. She has participated and delivered papers in more than 30 national and international congresses and symposia. She has had several books and book chapters published with publishing houses from Romania and abroad. She undertook ongoing civic activities as a member of the UAR Board of Directors during 1995 – 2002, as a member of the OAR National Council during 2001 – 2010, and as a Vice-President of OAR Bucharest Territorial Branch during 2001 - 2010. She was chair of National Architecture Biennale in 2012. She has worked as an architect with Romproiect and with SC Criba Design SRL. Awards: Central area in Alba Iulia (1979); SLAST award for publishing performance (1985); UAR award for drawing (1986); Warsaw Challenges (1986); Luceafarul Theatre of Chisinau (1991); CEC Corporate View (1999); Patriarchal Cathedral (2002)(2012); Chamber of Notaries Public (2003); Remodelling of Cartii Edgar Quinet Street (2007); Bucharest Order of Architects medal of the OAR for her whole corpus (2010); Outstanding world research leader 2014 from Iamure Multidisciplinary Research.



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Cristina Gaston Guirao studied at the School of Architecture of Barcelona (ETSAB) and has PhD in Architecture at the Polytechnic University of Catalonia since 2002 with the title: *Mies y la conciencia del entorno*, under the direction of Helio Piñon Pallares. The thesis obtained the “Extraordinary Doctorate Prize in Architecture and Urban area” of the Polytechnic University of Catalonia, in 2002-2003, and the first prize of the “Fourth Architecture Thesis Contest of Caja de Arquitectos Foundation” in 2003. She has published books such as *Mies: el proyecto como revelación del lugar*, (2005), *Park Avenue. Streetscape* (2011), *El Proyecto Moderno. Pautas de Investigación* (2007), as co-author. As a member of *La Forma Moderna* (Form) research group of the Architecture School of Barcelona she has participated in several founding research projects on the subject of Modern Latin American Architecture since 2003. The research group is the centre of an extensive and solid international network based on cooperation and educational exchanges with Latin American countries. She has intense research activity in collaboration with research groups in Argentina, Brazil, Colombia, Chile, Ecuador, México, Paraguay, Uruguay, Venezuela and Portugal. As a result of this cooperation she is visiting professor of Universities in Ecuador, Chile, Brazil and Bolivia. She also is the co-editor of the collection of books: *Documentos de Arquitectura Moderna en América Latina 1950-1965*, 3 volumes. Barcelona: *Casa América Catalunya*, 2004, 2005, 2006, which have been awarded as “Commented Titles” in the CICA Bruno Zevi Book Award 2008. Professor of the Architectural Design Theory and Practice Master at the Architecture School of Barcelona, since 2006, and of the Modern Form’s Doctorate Programme in Architectural design since 2003. She is head of the research Seminar on Modern Form of the Master. She also teaches the Architectural Design VII-VIII subject in the ETSAB, UPC since January 2010. Cristina Gastón is the founding principal of the architectural firm *grv arquitectes* with Xavier Vidal and Isidre Roca. Their work has been awarded in national and international competitions such as EUROSPAN 5. Selected for the exhibition JAE (*Jóvenes Arquitectos Españoles/ Young Spanish Architects*) of the Spanish Government’s Ministry of Housing (2008). Their work has been exhibited in Spain, Chile, Brazil and USA.



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Tore Haugen is a professor of architectural management at NTNU – The Norwegian University of Science and Technology, Department of Architectural Design and Management. Haugen has been full time employed dean of Faculty of Architecture and Fine Art from August 2005 to July 2013. Professor Haugen is at present the elected rector of the Nordic Academy of Architecture for the period 2013 - 2015. From August 2013 Haugen is a senior advisor and head of NTNU 2060 - Visions for Campus Development project. Haugen finished his doctor degree at NTNU in 1990, combined with studies at the University of California, Berkeley and at the Royal Institute of Technology, Stockholm. His main professional interest lies within project management and facilities management. He has been active as member and chairman of a number of international conferences, and had many positions of honors in ISO, CIB and EuroFM. During the period 1980 - 1993 Haugen worked as a researcher and manager at SINTEF Architecture and Building Technology responsible for a number of research projects in the area of Energy Conservation in the built environment and Building maintenance and modernization. In 2001 Haugen established the Norwegian Centre for Real Estate and Facilities Management at NTNU (<http://www.metamorfose.ntnu.no/>). This led to the development of two master programs offered at NTNU from 2005 and a number of R&D projects the area of Facilities Management, Real Estate and Project management. Haugen has been main or co-supervisor of more than 15 doctoral students and external examiner or opponent on a number of doctoral defences in the Nordic countries as well as in the UK and the Netherlands.



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Helka-Liisa Hentilä holds a PhD and is Dean (2014-) and professor (2003-) in Urban Design and Planning at the Oulu School of Architecture, University of Oulu. She has acted for 2010-2013 as a Dean of Education at the Faculty of Technology, and held a position as a head of Department of Architecture from 2006 to 2013. Her research and teaching focus on sustainable land use planning of the changing northern built environment, including strategies and solutions that integrate health promotion and participatory approach to land use planning. She has acted as a responsible leader of several cross-disciplinary externally funded research projects, including the cross-disciplinary project *Integrative Urban Development Concept: Case Sustainable Winter City* (2012-2014), and *Land Use Planning for Physical Activity* (2013-14). She has acted as a leader of cross-disciplinary project PUDAS – *Participatory Urban Design Support with Advanced Information Technology Environment* (Academy of Finland 2009-11), and *KaSuKaT – Management of Growth and Decline and the Quality of Living Environment: The Case of Mining Communities in Northern Finland* (Ympäristöklusteri 2006-2009). She has 27 years of research & pedagogical experience in different Schools of Architecture (University of Oulu 1986-90 and 2003->, Royal Institute of Technology in Stockholm 1990-93, University of Art and Design in Helsinki 1994-2002). She is also a registered practitioner and member of the Finnish Association of Architects SAFA. She is an author of 15 prize-winning or awarded national and international architecture competition entries mainly in the field of urban design and planning. The confidential posts include board chairmanship of European Suomi Finland (2006->), a foundation in charge of organizing the world's largest international architectural competition for young architects under 40 years old.



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Aulikki Herneoja holds a doctorate and is a SAFA Architect and Senior Lecturer (2009-to date) in Architectural Design studies at the Oulu School of Architecture, University of Oulu. At present she is also a part-time coordinator at the Doctoral Programme for Architecture (2014-2015). Her research interest is on the technology supported augmented interior and urban spaces, and their contribution on experiencing architecture. Methodologically her interest lies on Research by Design in its diverse forms. Herneoja has acted as a responsible leader in the Academy of Finland funded research project *AUL—Adaptive Urban Lighting. Algorithm aided lighting design* (2011–2013) and as a

co-leader responsible of the discipline of architecture in a multidisciplinary *UBI Metrics—Multidisciplinary Framework for Evaluating Ubicomp Systems in Real-World Urban Settings*—research project led by Professor Timo Ojala, University of Oulu (2011-2014). She has also been in charge of the University of Oulu, Department of Architecture share in the multidisciplinary *SparkSpace—Adaptive lighting control with multi-channel ambient sensing* (2011-2014) research project. Dr. Herneoja has several scientific positions of administration in the University of Oulu: Board member (elected) of Faculty of Architecture (Oulu School of Architecture), 2014-2018; Doctorate Training Committee, Technology and Natural Sciences, University of Oulu Graduate School (UniOGS), Member 2014-2017, Deputy member 2012-2013; Responsible of Major subject Architecture in Doctorate Training in Architecture, Faculty of Architecture 2014-2017, Department of Oulu, University of Oulu 2011-2013. She is also a part-time practicing architect holding a partnership in the Architects' office EST Ltd Herneoja – Niskasaari since 1991, where her specialities are permanent informative and experiential exhibitions, such as Liminganlahti Visitor Centre exhibition 2011-2012, and exclusive domestic interior design and fixed furniture. She is also a member of the Finnish Association of Architects SAFA and former board member (2010-12) and has also taken actively part in the activities of the local department of SAFA (1995-2000; 2008-2013). She has been a member of the Arts Council of Oulu Province 2004-2006, 2007-2009. She is also member of the Friends of Kinerma Association and a deputy board member since year 2001.



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Sari Hirvonen-Kantola is Postdoctoral researcher in the Oulu School of Architecture, at the University of Oulu, Finland. She has a PhD (2013) on Integrative Urban Redevelopment Work in the City of Vantaa. She has also a Licentiate (2007) on urban planning nearby history, a degree on the Expert Programme on Spatial Planning (2005–2006), and a Master's degree on Architecture (2004). In addition, she has participated in different courses and programmes offering the postdoctoral researcher good research skills, such as leading a research group, managing research projects, and communicating science to the media, general public and decision makers. Hirvonen-Kantola's main field of expertise is integrative urban/ spatial planning and development work in the context of urban regeneration. Her other interests are planning research, urban planning nearby history, and building renovation. All these aspects contribute to developing urban planning and development work, in the context of urban regeneration and renaissance. Hirvonen-Kantola's teaching work also has supported her work on the topic. She has taught building renovation during 2004–2008 and urban planning and design, especially planning theory, practice and strategic urban planning during 2008–2013. The demand for sustainability has challenged us to shift towards a culture of holistic spatial planning and efficient collaboration. In her dissertation, Hirvonen-Kantola analyzed the skill and other prerequisites for bringing together expertise in land use planning and urban development. The motivation for this study stemmed from the need to gain a clear understanding of the nature of integrative urban development work, from the point of view of public urban planning and development agencies. Since integration of viewpoints and efficient collaboration as such in spatial planning and urban development are Hirvonen-Kantola's main interests, she has been actively involved in enhancing the Finnish scene for architectural research in general, and planning research in particular.



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Dag Kittang is a professor of urban planning at the Norwegian University of Science and Technology, NTNU, Department of Urban Design and Planning since 2009. From 2010 – 2013 Kittang was Vice Dean of Research and Artistic Development of the Faculty of Architecture and Fine Arts. This also included responsibility for the PhD- education and PhD-courses in philosophy of science and methodology. Kittang graduated as architect in 1974 from the Norwegian Institute of Technology and has been working as a planner at the municipality of Selbu (1975 – 1977) and consulting architect at

Asplan and Norconsult (1978 – 1992). From 1992 – 2003 Kittang was employed as research manager at SINTEF Architecture and Building Technology and senior researcher from 2006-2009, mostly doing research on sustainable urban development. Kittang defended his PhD-thesis at NTNU in 2006; "The Wooden Town of Trondheim – a study of an urban planning discourse". Kittang is often used by peer reviews and as opponent at doctoral defences.



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Saverio Mecca, full professor of Building Production is also the Dean of Department of Architecture DIDA of University of Florence since January 2013 and before Dean of the Faculty of Architecture, he was professor also at University of Calabria and at University of Pisa. He is working actively in academic research on construction management and local and indigenous architectural heritage analysis and innovation. In more recent years, he has been working actively in European projects on vernacular architectural knowledge systems and in training in graduate courses and post-graduate courses in the Mediterranean regions. He has been partner of several EACEA project and he coordinated a European project on earthen dome villages of Northern Syria. He is partner of still running EACEA project VerSus, Vernacular Heritage and Sustainability.



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Konstantinos Moraitis works as a Professor at the School of Architecture of the National Technical University of Athens (NTUA). He obtained his Diploma of Architect – Engineer at the School of Architecture of NTUA (1978) and continued his studies on postgraduate level, studying Ethical and Political Philosophy (Philosophie Éthique et Politique) with specialization in Philosophy of Aesthetics – Seminar on Critical Theory of Art (DEA - Université I de Paris, Panthéon-Sorbonne, 1980-1981). He attained the post-graduate program of Arabic and Islamic Studies of the 'Hellenic Centre of Arabic and Islamic Studies –EKMAIS' (Pantios School of Political Sciences, Athens, 1981-1982). He also holds a PhD degree in Architecture and Landscape Architecture, with his doctoral thesis entitled '*Landscape – allocating place through Civilisation. Exposition and theoretical correlation of the most significant modern approaches concerning landscape*' (School of Architecture of NTUA). Since 1983 he teaches studio courses, concerning building design as well as urban and landscape design at the pre-graduate program of the School of Architecture of NTUA. He is also responsible, since 1994, for the postgraduate seminar of the School of Architecture of NTUA, concerning '*History and Theory of Landscape Design*'. He has presented numerous publications of architectural projects and scientific articles and has also participated in collective scientific editions. He is the author of a tutorial book under the title '*Cultural Landscape*', concerning the history of landscape design form the period of Italian Renaissance till Romanticism. He has also been awarded numerous distinctions in architectural competitions in Greece and Cyprus, as well as with two 1st prize distinctions in International Architectural Competitions, concerning the '*Urban and Landscape Design for the city of Lviv – Ukraine*' (2008) and the '*Design for the Centre of Holistic Medicine in the isle of Allonisos – Greece*' (1998). He is member of several scientific associations, institutes and societies, such as the Hellenic Technical Chamber, the Hellenic Architectural Association, the Hellenic Institute of Architects, the Hellenic Committee of the International Council on Monuments and Sites (ICOMOS), the Hellenic Philosophical Society and the Hellenic Society for Aesthetics.



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Anita Moun holds, at present, the position of a research professor at the Faculty of architecture and Fine Arts at NTNU. She is the leader of the multidisciplinary R&D program for building processes, which is a part of The National Centre of Project-related Activities - Project Norway. Moun is involved in several strategic initiatives and projects with the aim to improve building processes and the performance of the AEC-industry. She graduated as an architect at NTNU in 1995, and she has a PhD from the same university focusing on the use of BIM in collaborative teams. She has been working as an architect

and project manager in large-scale projects in Germany for ten years. Moum was a research manager at SINTEF Building and Infrastructure 2008-2010, responsible for the development of the building process- and architectural research. From 2010-2012 she was a senior adviser for research at the Faculty. Her main fields of interests are integrated and collaborative design and delivery processes and project management.



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Josep Muntañola Thornberg is a PhD Architect, Senior Full Professor in the Department of Architectural Design, Department of Architectural Design in School of Architecture of Barcelona, Polytechnic University of Catalonia, since 2010. He holds an honorary PhD Degree from the University of Da Lusiada, Lisbon, in June 2005. Muntañola Thornberg is a Member of the Catalan Royal Academy of Fine Arts, 2003 and a member of the Spanish National Commission of Evaluation of Research, 2006. Muntañola Thornberg is the author of more than 25 books and 200 articles such as: "Architecture on the Threshold of the Digital Age: Revolution or Regression?" in the *Proceedings of the EAAE/ARCC* Vol. 1, Copenhagen, June, 2008. *Las formas del tiempo*, Badajoz: Editorial Abecedario, 2007. *Architecture 2000: Mind, Land and Society*, *Arquitectonics*, issue 11, Barcelona: Edicions UPC, 2004. *La arquitectura como lugar*, Barcelona: Edicions UPC, 1997. *La Topogènese*, Paris: Anthropos, 1997. *The City Evaluated by Its Children*, City Hall of Barcelona, 1992. "Architectural Cognition and the Semiotics of Place", Symposium in Andros, in *Espaces et Societes*, No. 47, 1987. "Towards an Epistemological Analysis of Architectural Design as a Place-Making Activity", in *Behavior and Meaning in the Built Environment*, Broadvent, Llorens and Bunt (eds), London: Wiley and Sons, 1980.



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Eglė Navickienė is an associate professor and vice-dean responsible for research at the Faculty of Architecture, Vilnius Gedimino Technical University (VGTU), Lithuania. She currently teaches several courses on architectural design and composition. She is an author of a book *Nauja architektūra istorinėje aplinkoje: kūrimo patirtis (New Architecture in the Historical Environment: Experience of Creation)* (Technika, 2006), a co-author of a book *Gintautas Juozas Telksnys: architektas (Gintautas Juozas Telksnys: an architect)* (Artseria, 2005), author of 11 scientific papers and about 40 articles in professional journals. She is a founder and was a leader of Artistic Training Centre at Faculty of Architecture, VGTU; she taught courses at the Faculty of Construction and Architecture, Kaunas Technical University, and at the Department of Architecture, Kaunas Art Institute. She was a visiting professor at Kyungpook National University, South Korea for a summer course and at a number of universities in Europe. Her current research interests cover integration of contemporary architecture into the historic urban environment, preservation of urban heritage, spirit of place, as well as architectural composition and research in architecture. She earned an MA in architecture and a PhD in Humanities from the Faculty of Architecture, VGTU.



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Herman Neuckermans graduated in 1967 from K.U. Leuven (Belgium) as an engineer architect, where he also obtained his PhD on Design Methods and Computers in Architecture in 1976. He has been a practicing self-employed architect from 1967 till 1974. He is a full tenured professor at KU Leuven, department of Architecture, since 1981, where he teaches design methods and theory including CAAD, architectural design studio, and traditional construction. He is founder and chair of the CADLAB where a team of 4 to 9 researchers study the use of computers in the early design stages. Publication list from 1986: <https://lirias.kuleuven.be/simple-search?query=neuckermans&submit=Go>. He was head of department of architecture, urban design and planning for 13 years and shared the program committee for another 15 years. He was during 23 years a member of the engineering faculty enrolment committee and shared the academic engineering staff evaluation committee for six years. He has been sharing educational and research

assessment committees internationally. He is actively involved in EAAE (European Association for Architectural Education) since 1996 and acted as president of this association from 2000 till 2003. He was a council member of EAAE (1996-2009) and a member of the Joint Working Party between ACE (European Council of Architects) and EAAE and project leader for the EU funded MACE project on behalf of EAAE. He became an emeritus of KU Leuven in 2009 and was teaching till 2013. Homepage: <http://www2.asro.ku-leuven.be/asro/english/home/HN/home.htm>



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Cristina Victoria Ochinciuc is an architect and a professor at Ion Mincu University of Architecture and Urbanism, and holds a PhD in Architecture (1999, Ion Mincu University of Architecture and Urbanism). Teaching diversified with gaining new skills through specialization, continuous training process, namely: She specialises in sustainable architecture and energy efficiency of buildings, and is an energy auditor gr. I, and technical expert for quality requirements in construction. She was coordinator of the Masters Programme: "Sustainable Development. Integrated concept of built space and energy audit" (2002-2011), and is now Director of the Doctoral School SITT of IOSUD, UAUIM (2012). Ochinciuc is a Research specialist in sustainable building architecture and was involved in the grants / contracts obtained by competitions as project director or scientific responsible of the Ion Mincu University of Architecture and Urbanism team partner. She has authored 148 papers (journal & conference papers, books, chapters), 192 presentations (posters / oral communications, courses, lectures). Ochinciuc is a member of OAR Bucharest, and is a founding member of the AAEC Association of Energy Auditors in Construction (2004), as well as a member of the technical approval Committee of technical regulations of the Ministry of Regional Development.



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Luca Ortelli is the Director Laboratoire de Construction et Conservation (LCC) at the School of Architecture, Civil and Environmental Engineering (ENAC), École Polytechnique Fédérale Lausanne (EPFL). In 1983 Ortelli graduated from Facoltà di Architettura del Politecnico di Milano (Italy). Ortelli was the editor of the architectural magazine "Lotus international" from 1980 to 1990. He was co-director of the architectural guides collection "Stella polare" Clup Edizioni, Milano from 1988 to 1993 and Assistant, Federal Institute of Technology Zurich ETHZ from 1983-1986. He taught at, Scuola Tecnica Superiore di Lugano-Trevano from 1985 to 1989 and was a Visiting critic, University of Miami (USA) in 1987. He run an Architectural practice in Mendrisio (Switzerland) from 1990 to 2002 and was Substitute professor, École d'Architecture de l'Université de Genève from 1989 to 1991. From 1992 to 1996 he was Full Professor of Architectural design, at the École d'Architecture de l'Université de Genève and Visiting professor, South California Institute of Architecture (Vico Morcote, CH) from 1994 to 1996. Since 1997 he is Full Professor of Architectural Design, Federal Institute of Technology Lausanne EPFL. From 2001 to 2002 he was Visiting Professor, Facoltà di Architettura, Università di Bologna (fall semester) and Visiting Professor, Istituto Universitario di Architettura, Venezia (fall semester) from 2007 to 2008. He has been the Director Section d'Architecture, École Polytechnique Fédérale de Lausanne from 2002 to 2008. Since 2011 to date he is the Director of the Institute of architecture, ENAC Faculty, École Polytechnique Fédérale Lausanne. Since 2007 he is a Member of ENAC Faculty Direction and since 2006 Co director of the collection Essai d'architecture PPUR, Lausanne.



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Henrik Oxvig is head of research at The Royal Danish Academy, Schools of Architecture, Design and Conservation. He graduated in comparative literature from the University of Copenhagen in 1990, and he was first doctoral student and later assistant professor in the Department of Art History, University of Aarhus. In 1996 he published with professor Lise Bek the book, *Rumanalyser (Analysis of Spaces)*, which presented Alois Riegl, Max Dvorak, Werner Hager and others for a Danish audience and showed how this analytical tradition continued with among others Rosalind Krauss. Along with his work as a theorist Henrik Oxvig participated in various architectural projects: His ambition has continuously been to bridge the gap between theory and practice, which was why he – after a longer appointment as associate professor at the Department of Art History at the University of Copenhagen – in 2005 became associate professor and director of the ph.d. programme at The Royal Danish Academy of Fine Arts, School of Architecture, which in 2011 merged with the schools of Design and Conservation; as mentioned Henrik Oxvig is now head of research at this merger school.



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Gunnar Parelius, is the Vice-Dean at NTNU, Trondheim Norway. He graduated as a qualified architect from NTNU, Trondheim in 1978. After some years in architectural practice, Parelius returned to education and theory/research mostly focusing on the aesthetic and semiotic foundations of the architectural design process. Since 1987 he is the leader of the administration of The Faculty of Architecture and Fine Art (as it was later named), in 1989 becoming Faculty director and then Vice-Dean from 2013. Since the early 90s Parelius is a regular representative of the faculty in several national and international organizations – among them the Nordic Academy (NAA) and Heads' Meeting in EAAE ENHSA in Chania, Greece. Besides being active in organizational, strategic and administrative work he has kept up his theoretical/academic activities through several channels: The Semiotic Circle of Trondheim, The Nordic Summer University, The Nordic Association of Architectural Research, NorFACourses for PhD students. In all these instances both taking on administrative tasks arranging seminars, courses and international conferences and being academically active presenting papers, doing editorial work, moderating, evaluating, acting as peer-reviewer, board member etc. Parelius has also, from the start, been active in the ENHSA-EAAE Sub-network Workshop on Architectural Theory, taken some part in work the EAAE Research Group since the summer of 2011 and as a EAAE Council member 2013-2014.



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Claus Peder Pedersen is Head of Research since 2011, and Associate Professor since 2007 at the Aarhus School of Architecture. He was Associate Professor at the Royal Danish Academy of Fine Arts, School of Architecture between 2003 and 2007 and founding partner of the architectural office TRANSFORM (1997-2003). He holds a PhD in architecture entitled "Dynamic generation of form in architecture" from The Aarhus School of Architecture (1999). He is member of the executive board of ADAPT-r, a FP7 ITN focusing on practice-based research in creative enterprises. Fields of research and teaching: artistic and practice-based research, architectural theory, theory of representation and digital design and manufacturing. His most recent publications include: *When Architects and Designers Write/Draw/ Build/? : Essays on Architecture and Design*. (Editor) Aarhus: Arkitektskolens Forlag, 2013 and *Tilfældets Tektonik*. Aarhus: Antipyrine. (Arkipelaget; Nr. 3), 2014.



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Camilla Perrone is assistant professor on Urban and Regional Planning at the University of Florence. She had served an appointment as Professor of Urban and Regional Planning at the Geography Institute, University of Tübingen (W3 level) in 2011, through which she has consolidated international collaborations with Africa and Brazil. She is a licensed architect, with significant professional experience. Her concurrent appointments include Founding Director of the Research Laboratory of Critical Planning and Design – whose research focuses on interdisciplinary and comparative perspectives; and Coordinator of the PhD Program on Urban and Regional Planning. She has served numerous academic roles, as lecturer, research programs coordinator, master degree and PhD thesis supervisor, and PhD theses supervisor. Her teaching has been honoured by being awarded the “2013 AESOP Excellence in Teaching Award” for the Course *Living Landscapes (landscapes for living): Policies, Practices, Images* organized at the University of Florence, in competition with hundreds of programs in 30 countries across Europe. Her current fields of interest cover the followings areas of work: critical planning and design; new sustainable forms of city and regional planning beyond traditional city design and town planning; contemporary regional urbanization processes (from “suburbanism” to “postmetropolis” on which she is running a national research project partnered among the others, by City Institute at York University of Toronto and Geography Institute, at the University of Tübingen; UCLA, Department of Urban Planning); interdisciplinary urban and environmental studies, DiverCity and interactive design; social, spatial and environmental justice; research methodology. She has published articles and books on spatial planning, participatory design, and urban policies for managing diversity. Recent publications: *Giochi di potere. Partecipazione, piani e politiche territoriali* (Utet, 2013; co-edited with M. Morisi); *Everyday Life in the Segmented City* (Research in Urban Sociology, Vol. 11/2011; co-edited with G. Manella and L. Tripodi); *DiverCity. Conoscenza, pianificazione, città delle differenze* (FrancoAngeli, 2010).



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Marios C. Phocas received his Diplom degree in Architecture including specialization in Architectural Technology and Structural Design from the University of Stuttgart in 1995. He completed his doctorate on Earthquake Resistant Structural Building Design, at the Institute of Building Structures and Structural Design (ITKE) of the Faculty of Architecture and Urban Planning at the University of Stuttgart in 1999. Dr. Phocas is currently Associate Professor at the Department of Architecture of the University of Cyprus, since 2009, as well as co-principal of the Archimedes Research Center for Structural and Construction Technology, since 2005. From 2006 until 2013 he served as Interim Head of the Department of Architecture, from 2004 until 2009 as Assistant Professor at the Program of Architecture. Prior to his appointment at the University of Cyprus he was Main Research Associate, Academic Teaching Consultant, and extraordinary Dozent at ITKE of the University of Stuttgart, from 1996 until 2004. Dr. Phocas was responsible for the development and implementation of the programs of undergraduate- and graduate studies in Architecture at the University of Cyprus. Since 2007 he serves as representative specialist of the Scientific Technical Chamber of Cyprus in the European Committee on Education and Training in the Field of Architecture, for the evaluation of EU-programs of studies in Architecture. Currently he is also a member of the Advisory Committee of the European Network of Heads of Schools of Architecture. He is the author and/or co-author, co-editor of twelve books, fourteen book chapters, thirty journal papers and fifty three refereed conference proceedings papers, in the areas of integrated architectural design, structural and construction design, kinetic structures and earthquake resistant structural building design. He has received fourteen architectural awards for project designs, in Germany and Cyprus.



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Rui Jorge Garcia Ramos is an architect and Associate Professor with Habilitation at the Faculty of Architecture of the University of Porto (FAUP). He is currently engaged in the Integrated Master's Degree Programme (MIARQ) and in the PhD Programme in Architecture (PDA). He presented his PhD dissertation in Architecture (2005) with the title "The Middle-class Single-family House in Portuguese Architecture: change and continuity in the domestic space in the first half of the 20th century". He is a researcher at the Centre for Architecture and Urban Studies (CEAU) in the working group "Atlas da Casa", financed by the Portuguese Foundation for Science and Technology (FCT). His research interests include: the house; living spaces and lifestyles; culture and housing; architecture and identity in 20th-century Portugal. He is a regular participant in courses, conferences and workshops, with several publications both in Portugal and abroad. He is a member of the Governing Board of the Architect José Marques da Silva Foundation (FIMS), Director of the PhD Programme in Architecture (PDA), and Member of the Scientific Board at FAUP.



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Dominique Rouillard is Architect, tenure Professor at the Ecole Nationale Supérieure d'Architecture Paris-Malaquais, and Scientific Director of the Research Laboratory LIAT (Laboratoire, Infrastructure, Architecture, Territoire) in Paris, habilitated by the Office of Architectural, Urban and Landscape Research under the Direction of Architecture and Civil Heritage (BRAUP-DAPA). <http://www.paris-malaquais.archi.fr/laboratoire-liat-84-1.html>. She is Professor at the Doctoral program of the University Paris-EST (department Ville Transport Territoire) and at the University Paris 1 Panthéon-Sorbonne (department History of Art /Architecture). Dominique Rouillard has been scientific consultant for exhibitions at the Centre Georges Pompidou (*Les années 50, La Ville, Archigram ...*), and scientific expert for different symposiums. She has been the scholarly director of the symposium L'Infraville at L'Ecole Nationale Supérieure d'Architecture Paris-Malaquais (2010), and chair of the 7th Urbanism & Urbanization PhD International Seminar in Paris (2013). She has been invited in different international universities and she is by now Visiting Professor at École Polytechnique Fédérale de Lausanne and Adjunct professor at AMUR masters program (Architecture and Urban Planning Project Management), École Nationale des Ponts et Chaussées. She is founder member of Architecture Action, office for architecture and urban design in Paris. <http://www.architectureaction.com>

Dominique Rouillard has published extensively on architecture, cities and urban utopias. The previous researches focused on the relationship between architecture and site, monument and memory, leading to four main publications:

- *Le site balnéaire*, Mardaga, 1984.
- *Construire le pente*. Los Angeles 1920-1960, Paris, UPI/In Extensio, 1984; translated *Building the slope. Hillside Houses 1920-1960*, Arts & Architectural Press, 1987, reprinted Hennessy & Ingalls, 1999.
- *Les monuments de la langue*, VRD Editions, 1989
- *Architecture contemporaine et monuments historiques*, Le Moniteur, 2006.

Since the nineties her researches questioned the immediate history of contemporary architecture and infrastructures. Books related to this theme :

- *L'infraville. Futurs des infrastructures* (ed. D. Rouillard), Archibooks, 2011.
- *Superarchitecture. Le futur de l'architecture 1950-1970*, Les Éditions de la Villette, 2004. (Partly in English: «Radical architecture», in *Tschumi. Le Fresnoy Architecture in Between*, New-York, 1999 ed Moncelli Press. Introduction translated in *Journal of Architectural Education* (vol 66 Issue 2 «Architecture and Utopia»), introduction to the book by Anthony Vidler).
- *Imaginaires d'infrastructure* (ed. D. Rouillard), L'Harmattan 2009.
- *La métropole des infrastructures* (ed. D. Rouillard and C. Prelorenzo), Picard, 2009.

- *Le temps des infrastructures* (ed. D. Rouillard and C. Prelorenzo), L'Harmattan, 2007.
- *Echelles et dimensions. Ville, architecture, territoire* (ed. D. Rouillard and C. Prelorenzo), L'Harmattan, 2003.
- *Mobilité et esthétique. Deux dimensions des infrastructures territoriales* (ed. D. Rouillard and C. Prelorenzo), L'Harmattan 2001.



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Magda Saura Carulla holds a PhD in the History of Architecture, from the University of California Berkeley (1988) and PhD in the History of Art, from the Autonomous University of Barcelona, UAB, (1989). She is a Headline Professor at the Department of Architectural Design in School of Architecture of Barcelona, Polytechnic University of Catalonia, since 1984. Saura Carulla is the Director of Urban Form Archive of Catalonia, 2000-2011. She is also Coordinator of GIRAS International Research Group, funded by the Government of the Generalitat of Catalonia, in 1995. So far, Saura Carulla has participated in several I+D projects, all funded in national and international public calls during the past 5 years. Namely: I+D project: Architecture, Education and Environmental Assessment. 10000€ MEC, Ref: EDU 2010-16299, 2011 – 2013. Headline Researcher: Magda Saura. GIRAS Research Group of Architecture and Society. 50000€ AGAUR, Ref: SGR-2009-1194, 2009-2013. Headline Researcher: Magda Saura. I+D project: Architecture and Education. Spaces: the hidden dimension of the culture. 37510€, MEC, Ref: SEJ2007-62970, 2008-2010. Headline Researcher: Josep Muntañola. GIRAS Research Group of Architecture and Society. 37600€ AGAUR (L-99321), Ref: 2005SGR-00462, 2002-2008. Headline Researcher: Josep Muntañola. Assistance in preparing of European projects, 5774€, DURSI, Ref: 2007LiderEU0037, 2008. Support in International Congress, 6000 €, ARCS, Ref: 2008ARCS-2000QO, 2008-2009. Support in Congress, 6000€, MEC, Ref: Edu2008-01411E, June 2008-December, 2008. Support in Congress, 6000€, 2010ARCS156, 2011.



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Antonino Saggio is an architect, scholar and professor and holds the Architecture and Information Technology Chair at the School of Architecture at Sapienza, University of Rome. He is the coordinator of the PhD program in Architecture - Theory and Design, one of the oldest and more relevant in Italy. Saggio is the founder and editor of the international book series "The Information Technology Revolution in Architecture", very popular around the world being published in English (by Birkhäuser), in Chinese (by Prominence) and in Italian (Testo&Immagine, Edilstampa). The 38 books being published since 1998 represent a theoretical and cultural survey of the new digital realm of architecture. Saggio delivered Lectures and Key Notes speeches on Information Technology and Architecture and History of Italian Contemporary Architecture in many institutions around the world. He has a vast bibliography (thirty Prefaces, many Chapter of books and catalogues, essays in referred journals, articles in "Architectural Design", "Architese", "Jae", "Domus" ..). He is author of several books, among which: *Architecture and Modernity From Bauhaus to the IT Revolution* (Carocci 2010), *Giuseppe Terragni Life and Works* (Laterza, 1995 2004, 2005, 2011), *Introduction to Information Technology Revolution in Architecture* (Carocci 2007) *Peter Eisenman. Drillings into the Future* and *Frank O. Gehry* (Testo&Immagine 1996 e 1997) *Giuseppe Pagano* (Dedalo 1984) *Louis Sauer An American Architect* (Officina 1988 in English in 2012). His editorial activity comprehends the co-foundation of the magazine "Il Progetto" the direction of the book monographs "The Architects" (Marsilio) after the death of Bruno Zevi, the direction of the supplement "On&Off", the on line section "Coffee Break" in webzine "Arch.it" that holds eighty of his articles. He taught for many years at Carnegie-Mellon University and he was visiting at ETH Zurich, Polis University Tirana, NCTU Taipei, GHK U. Kassel. U. E. Mondlane Maputo.



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Lara Schrijver is Professor in Architecture at the University of Antwerp, Faculty of Design Sciences, and DAAD guest professor at the Dessau Institute of Architecture for the academic year 2013-2014. She holds degrees in architecture from Princeton University and Delft University of Technology, and received her PhD from Eindhoven University of Technology. Before coming to Antwerp, she was leader of the research program in Architecture at Delft University of Technology, and guest lecturer at the Rotterdam Academy of Architecture. She is currently on the editorial board of *Footprint* journal. She was an editor for OASE for ten years, and served four years on the advisory committee of the Netherlands Fund for Architecture. Her work has been published in the *Journal of Architecture*, *Footprint*, and *Volume*. Her book *Radical Games* (2009) was shortlisted for the 2011 CICA Bruno Zevi Book Award. Her research focus is on twentieth-century architecture and its theories.



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Carl Fredrik Lutken Shetelig, is the Dean at NTNU Dean at the Faculty of Architecture and Fine Arts at NTNU. Shetelig is educated as building engineer (1982-84) and master of architecture (1984-1990). In 1994 he co-founded Pir II arkitektkontor AS along with four partners. Selected major works: analysis and planning concept for urban development at the former harbour area Brattøra in Trondheim, plan and building design of NOBØ housing area in Trondheim, Ceciliebroen - bridge over Nidelven at st.Olavs hospital in Trondheim, Vest siden oppvekstsenter - 1-10 school in Porsgrunn and Scandic hotel in Trondheim. As vice dean for education at the faculty of architecture and fine art at NTNU (2005-20013), Shetelig has had a key role in developing architectural education with special emphasis on "learning by doing" establishing TransARK (Transformative learning in architectural education) and TreNOVA (Innovation & education in use of wood as building material). Shetelig's main focus as dean (2013-) has been the strategic development of the faculty establishing FORM, CLIMATE, IMPACT as major navigation nodes and TRANSPARANCE as guiding principle for developing organisational clarity at the faculty.



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Jüri Soolep is a Guest-Professor at Umeå School of Architecture, Sweden. He has been the Rector of the Nordic Academy of Architecture as well as dean and professor of the Faculty of Architecture in the Estonian Academy of Arts. He received his Doctorate from Portsmouth University in 2001 with the dissertation *On Realities and Horizons of Design in Architectural Education*. He was involved in implementing the Architectural Policy of the Estonian Government and was member of the Advisory Committee on Training and Education in the Field of Architecture for European Commission. He was leading the Nordic Academy of Architecture work group and was the general editor of the report for the Nordic Council of Ministers: *Nordic Dimension in Architectural Education: Working Towards Better Accreditation and Quality Assurance*. Jüri Soolep has lectured at the universities of Tartu, Oulu, Porto, Cork, Portsmouth, Liverpool, and Hosei Tokyo. He has been an external examiner at the University of Portsmouth, Bucharest and Lichtenstein. He has been keynote presenter in several international conferences – most notable of these are: AESOP conference in Helsinki. *Space, time, luxury* and EFAP conference in Luxembourg *POLITIQUES ARCHITECTURALES*. Jüri Soolep is also one of the partners in the architectural office *AB Medium*. His current fields of interest include studies in representations of architectural phenomena in the age of digital imago sphere and the archetypal structures and political meanings in the history of architecture.



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Constantin Spiridonidis is Associate Professor at the School of Architecture, Aristotle University of Thessaloniki, Greece. He graduated as an architect from Aristotle University of Thessaloniki, Greece in 1978 from where he also holds a PhD in Architectural and Urban Design Theory (1988). From 1979 to 1981, he studied urbanism at the Department of Urbanism at the University Paris 8 St. Denis, France, and at the same time he attended a course in General Semiotics offered by the UER Arts Plastiques Paris-Sorbonne. Since 1982, he has been teaching at Aristotle University of Thessaloniki, Urban and Architectural Design Theories and Design. He is the author of many publications on architecture, urban design and architectural design education, which are his main research interests. In parallel, he contributes to projects on architectural and urban design in Greece. Constantin Spiridonidis has taught at the School of Urban Planning in Volos, Greece, the School of Fine Arts of St-Etienne, France and the Aarhus School of Architecture, Denmark. He offered short workshops at the Antwerp School of Architecture, Belgium, at Lyon School of Architecture, France. He has lectured at numerous schools of architecture in Europe (Brussels, Portsmouth, Plymouth, Istanbul, Grenoble, Belgrade, Skopje, Ankara, Warsaw, Lille) and America (Mexico, Rio de Janeiro, Lima) and has been an external examiner of diploma design theses at many Schools and participated in external visiting bodies in schools of architecture in Europe and Latin America. Since 1992, his work on design theory has shifted into architectural education and design pedagogy. On these foci, Spiridonidis has organised a number of international conferences and workshops, summer schools, intensive courses for students through a big number of EU funded educational programs on architectural design education and pedagogy. From 1998 to 2001, he was President of the European Association for Architectural Education. Since 1998, he has been a member of the EU Advisory Committee on Education and Training in the Field of Architecture. Since 1998, he has held the responsibility of the organisation of the annual Meeting of Heads of European Schools of Architecture. Spiridonidis has published many articles on architectural education and he is the editor or co-editor of 15 volumes presenting the debates of the Heads of European Schools of Architecture regarding higher architectural education in Europe.



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Sally Stewart is the Deputy Head of the Mackintosh School of Architecture, The Glasgow School of Art. Sally has over twenty five years of experience in architectural education and leadership. She has lectured and examined in a wide range in institutions both in the United Kingdom and overseas. She is a member of the RIBA Validation Panel, undertaking a peer review process that monitors compliance with internationally recognized minimum standards in architectural education and encourages diversity in student achievement. Recent validations have included visits both within the UK, the Middle East and Latin America. Previously Postgraduate Programme leader, and Head of Undergraduate Studies, she currently teaches Postgraduate students in within the Masters by Conversion studio, and through the Mapping the City elective which she also developed and validated. She is the Phd co-ordinator for the Mackintosh School contributes to the doctoral training programme at GSA, and supervises doctoral students across a range of subjects both within and outside the institution. Her research publications include Design and Wellbeing; design for dementia, design for the elderly, inclusive design, Design Culture; Charles Rennie Mackintosh and Japan and Japan-ness. Current research work includes themes architectural education including education of the future practitioner, reflective and reflexive practice, pedagogy and the design studio. Sally is currently working on an examination of the communities of practice within Glasgow school of Art, both historical and contemporary and their influence on the practices and individuals involved. She is the Principle Investigator within the Glasgow School of Art for the ADAPT-r Initial Training Network., and supervisor for the early career research fellows based at GSA.



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Marie Strid is an architect MSA and PhD, head of the division Building Design and vice Head responsible for the Doctoral education at the Department of Architecture, Chalmers University of Technology, Göteborg, Sweden. Strid has been teaching since 2000 giving lectures and supervising mainly within the field of workspace architecture, but also in sustainability and entrepreneurship, on both bachelor and master levels. She has also been co-supervising doctoral students. Together with three colleagues, among them co-author in this publication Catharina Dyrssen, she introduced research by design courses on master level at the department in 2005. Together with two other colleagues she also introduced leadership as part of courses in master thesis preparation in 2009. During last years the educational activity has widened into leadership and career planning for master and PhD students, both within the department and for doctoral students from all departments at Chalmers. Her doctoral thesis, titled *Space for Entrepreneurship* (2006), developed within the field of workspace architecture, investigated the spatial aspects of the process of start-up activities – seen as a process of learning - in university-based business incubators. The PhD work was part of a larger research project *Construction Client with the customer in focus* (2001-2005). One of the main research interests is based on a user perspective of architecture and the knowledge production that an organisation produces where space is seen as an active agent. As a result the field of interest also covers the design process and the architects' role in the process. This was further investigated in the research project *Lean Architectural Design* (2009-2012). When first working as a vice Head of Doctoral education at the department (2009-2011), she was involved first in *Arkitekturakademin.se: Swedish Architectural Research Initiative* (2010-2011) and then in the national collaboration between the four main schools of architecture in Sweden (in Umea, Stockholm, Goteborg and Lund) which resulted in national funding 2011-2015 from Research Council Formas for two strong research environments (*Architecture in Effect* and *Architecture in the Making*) and a doctoral school (*ResArc*), as a joint venture between the four schools. Strid is part of the steering committee as well as the programme group for ResArc. Since 2009 Strid has also been active in the start-up and continued development of the Centre of Healthcare Architecture at Chalmers. Besides leading two master studios in Healthcare Architecture the centre has a strong collaboration with both national and regional public and private actors. As part of the work at the centre Marie is active in leading a Nordic network of researchers.



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Karolina Tulkowska-Slyk is an architect holding a PhD, She studied at the Faculty of Architecture Warsaw University of Technology (1987-1994) and is an architect and President in the architectural studio FP Akcent, since 1997. From 2006-2010 she was a Lecturer in Department of Interior Design, Faculty of Architecture Warsaw University of Technology. Her doctoral thesis is on the Method of recording and sharing historical knowledge on the example of the Faculty of Architecture WUT, defended at Faculty of Architecture WUT, 2010. Since 2011 she is an Assistant Professor in Department of Interior Design, Faculty of Architecture WUT. She has published widely. Some of her publications include: "Virtual representation of the historic space riches" (co-author) in: *Automation in Construction*, Elsevier 2003; "Identifying the Space: Urban Composition Elements Course as an Introduction to Advanced Urban Planning Exercises" (co-author), in: *Monitoring Urban Design Education in European Schools of Architecture*, ENHSA 2004; "Szkoła architektury - dwie koncepcje" („School of architecture - two concepts"), in: "Schola architecturae. Budynek szkół architektury" ("Schola architecturae. Architecture schools buildings"), Wrocław 2005; "Individualism and background architecture. Education dilemmas in the days of breakthrough", in: *Architectus*, 2(28)/2010, Wrocław 2010; "Warsaw in the 1930s and Contemporary Warsaw - International Influences versus Culture of the City" in: „Culture of the city", Wrocław 2012; "Environmental aspect in architectural education in XX and XXI century. Change of perspective", in: *Architectural Education and the Reality of the Ideal: Environmental design for innovation in the post-crisis*

world, Thessaloniki, Greece 2013. Selected Conferences & Seminars include: International Conference "Schola Architecturae", Wrocław 2006 (paper, presentation); International Conference ICAE (International Conference on Architectural Education), Beijing, China 2007 (paper, presentation); International Conference: Architecture in Culture. Culture of Architecture, Wrocław 2010 (paper, presentation); International Conference: Culture of the City. City in the Culture, Wrocław 2012 (paper, presentation); International Conference: Architectural Education and the Reality of the Ideal, Napoli, Italy 2013 (paper, presentation); Conference: Dom i Osiedle Jutra (Home and Housing tomorrow), Kościelisko (paper, presentation); Polish Architects beyond Poland, seminar, Liverpool, Great Britain (presentation). Selected Design Works, Prizes, Competitions include: Realized project of the multifamily complex, Sarmacka Street, Warsaw 2004 (co-author); Realized project of the multifamily complex, Sobieskiego Street, Warsaw 2006 (co-author); Ministry of Building Prize for outstanding creative achievements for realized project of the multifamily complex, Sarmacka Street in Warsaw, 2007; Realized project of the multifamily complex, Kazachska Street, Warsaw 2010 (co-author); 1st prize in Competition for architectural concept for public spaces in Wieliszew, 2013 (co-author); 2nd prize in Competition for concept for Xawery Dunikowski Square in Olsztyn, 2013 (co-author).



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Chris Tweed is professor and Head of the Welsh School of Architecture (WSA) and Director of the Centre for Sustainable Design of the Built Environment (SuDoBE) at Cardiff University. He has previously held teaching and research appointments at the University of Edinburgh, Carnegie Mellon University, and the Queen's University of Belfast, where he was also Head of Architecture. Tweed studied architecture at the WSA where he completed his doctorate on energy in buildings. He has subsequently conducted research on digital design tools, human interaction with the built environment and its technologies, architectural anthropology, and built cultural heritage at the urban scale. As a result, his research crosses the boundaries between architectural science, computer aided design, design research, architectural theory and social studies, all of which has been informed by a strong philosophical pragmatism derived from immersion in the works of James, Dewey and Hickman and an interest in early phenomenology. His current research interests lie at the interface between people and the built environment, particularly on issues relating to building performance (energy and environment) and sustainable design across different scales. Much of his work addresses people's responses to solutions developed by others, such as in the development of digital and other design tools, retrofitting of people's homes, implementation of low carbon policy through building legislation, and the comfort implications arising from new heating technologies. Understanding what happens in the fold between the official and unofficial, designed and realised, is crucial to ensuring high quality environments and user experience. Rather than assuming this to be a straightforward process, this research seeks to catalogue the variety of responses and the reasons why they occur. His work has been funded by industry (British Gas, British Telecom, and the Building Research Establishment), UK research councils and the European Commission under its second, third, fifth, sixth and seventh framework programmes.



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Johan Verbeke is professor of Research Design at KU Leuven, Faculty of Architecture Sint-Lucas and professor of Research by Design at the Aarhus School of Architecture. He is director of both PhD programmes. Between 2003 and 2009 he was the head of the School of Architecture Sint-Lucas. He is the creator and in charge of the Research Training Sessions (RTS) programme of the School of Architecture Sint-Lucas to develop and stimulate 'research by design' since 2004. He is actively stimulating and supervising research connected to art, architectural and design practice. Verbeke is currently coordinating the EC funded ITN ADAPT-r (Architecture, Design and Art Practice Training-research) project which develops creative practice research. He is president of eCAADe

(Education and Research on Computer Aided Architectural Design in Europe), he is active as scientific reviewer for many international conferences. Johan Verbeke is (associate-)editor of IJAC (International Journal of Architectural Computing) as well as JAR (Journal for Artistic Research).



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Antonella Violano is an Architect, Researcher in Architecture Technology at the Department of Architecture "L. Vanvitelli" of the Second University of Naples, Coordinator of ICAR12 Curriculum of the PhD in History and Technology of Architecture and Environment, SUN, from 2011. She mainly researches on the technological innovation field, for the built environment and environmental resources management, with a particular attention to: a) Technology Design for natural and built environment Quality, b) eco-compatible technologies for the environmental-energy efficiency of the building system. Teacher in PhD and Masters, Professional Training, E-learning Courses about Energetic Certification, she is the author of more than 100 publications about scientific and technical topics concerning with her research fields.



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Annemie Wyckmans is the Vice Dean of Research and Professor in Sustainable Architecture at NTNU Norwegian University of Science and Technology, Faculty of Architecture and Fine Arts. She has an MSc in Architectural Engineering from the Catholic University of Leuven, Belgium, a PhD in Building Technology and a postdoctoral degree on education for environment-friendly architecture from NTNU. Since 2006 she has been working mainly with project development and research on smart cities and neighbourhoods, aiming to promote the role of architectural design in smart, energy-efficient, climate-resilient cities (e.g. FP7-funded «ZenN Near zero energy neighbourhoods», RAMSES «Climate change adaptation, mitigation and sustainable development in cities» and IEA SHC Task 51 «Solar energy in urban planning»). Common for her contribution in these projects are emphasis on the role of architectural design, and action research methodologies. Her main responsibilities are developing and promoting strategic research in architecture, urban planning and art at Norwegian, EU and international Level (including China), in particular related to Smart Cities; and facilitating interaction between research, education and industry, to ensure capacity building of and awareness among future professionals (master and PhD). She is currently main supervisor for 3 PhD candidates and 3 postdoctoral researchers. In 2010 she initiated the international interdisciplinary MSc programme in Sustainable Architecture at NTNU, and has led an interdisciplinary Experts in Team course in Sustainable Architecture at NTNU 2006-2013.



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