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Ruptures

Design Research and the Academisation of Architecture

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Abstract

Until recently, university-based architecture was regarded as a discipline with professionally oriented design education at its core. Architectural research was conducted in fields such as the social- and engineering sciences. However, since the 1990s, more and more architects have begun conducting "design research", and a growing number of Master's and Ph.D. programs offer research-based design education. Against this background, in this dissertation I have analysed the culture and politics of design research at four architecture schools in the UK and USA.

On a conceptual level, I combine recent studies identifying design research as phenomenon leading to an academisation of architecture with approaches from Science and Technology Studies (STS) and sociological, anthropological and historical literature on the profession of architecture. The research methods I use to analyse design research are based on qualitative social science approaches. In particular, I am interested in architects' and architecture students' perspectives on design research.

Drawing on interviews, observations and analysis of research documents, I identify different cultures of design research and describe how this kind of research is practiced, organised and taught in each of these cultures. Furthermore, I show how the establishment of these cultures of design research is connected to and shaped by policies restructuring universities according to market principles. However, I do not want to reduce the practices, interactions and educational efforts constituting design research to mere products of science policymaking. Therefore, this thesis also examines architects' rationales for conducting design research, and the historical trajectories these rationales are related to.

One of the main findings of this analysis is that design research is a phenomenon that created, and continues to create, ruptures between architecture schools and the profession of architecture. In what follows, I will describe the problems these ruptures cause for the architects, as well as the novel opportunities for practice and education that they make possible at four different architecture schools.

Zusammenfassung

Bis vor Kurzem galt die Architektur an den Universitäten als Disziplin, in der die professionelle Entwurfslehre im Zentrum stand. Architektonische Forschung wurde meist in Bereichen wie den Sozial- oder Ingenieurswissenschaften betrieben. Seit den 1990er-Jahren werden jedoch immer mehr Architekt*Innen selbst als *Design Researcher* aktiv und es kommt zu einer Zunahme von Master- und Doktoratsprogrammen, in denen Studierende forschendes Entwerfen lernen sollen. Vor diesem Hintergrund habe ich in dieser Dissertation die Kultur und Politik des Design Research an vier Architekturschulen in Grossbritannien und den USA untersucht.

Auf einer konzeptionellen Ebene verbinde ich gegenwärtige Debatten über eine durch Design Research vorangetriebene Akademisierung der Architektur mit Ansätzen der Wissenschaftsforschung (STS) und soziologischen, anthropologischen und historischen Studien zur Profession der Architektur. Meine Forschung basiert auf den Methoden der qualitativen Sozialforschung, wobei ich mich vor allem für die Perspektiven der Architekt*Innen und Architekturstudierenden interessiere.

Basierende auf Interviews, Beobachtungen und der Analyse von Forschungsdokumenten identifiziere ich unterschiedliche Kulturen des Design Research und beschreibe wie diese Art der Forschung in der jeweiligen Kultur praktiziert, organisiert und gelehrt wird. Darüber hinaus zeige ich wie die Etablierung dieser Kulturen des Design Research mit einer Wissenschaftspolitik in Verbindung steht, die zu einer verstärkten Ökonomisierung der Universitäten beiträgt. Da ich die unterschiedlichen Praktiken, Interaktionen und Lehrangebote, die Design Research ausmachen, nicht ausschliesslich als wissenschaftspolitisches Produkt verstehe, gehe ich auch auf Logiken ein, die Architekt*Innen dazu motivieren Design Research zu betreiben, sowie auf historische Trajektorien, die diese Art der Forschung prägen.

Eine der zentralen Aussagen dieser Dissertation ist, dass die gegenwärtige Zunahmen von Design Research an den Architekturschulen zu Brüchen zwischen diesen Schulen und der Profession der Architektur führt. Welche Sorgen und Probleme diese Brüche den Architekt*Innen in den unterschiedlichen Kulturen bereiten beschreibe ich dabei ebenso wie die neuen Möglichkeiten, die durch diese Brüche für architektonische Praxis und Lehre an den verschiedenen Architekturschulen eröffnet werden.

For Magdalena

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Prologue

"In terms of establishing design research at the department of architecture, how would you advise me… what should I do?"

I had expected challenging questions, but not this one. Preparing myself for the job interview for a PhD position dedicated to the ethnographic study of 'design research' in architecture, I had thought very carefully about things my potential supervisors might ask. I had prepared myself to discuss methods I would use to examine design research in architecture and explain why I wanted to do a PhD. This question, however, did not seem to be one that anyone could answer, who had not conducted any kind of research on the respective subject yet.

To be fair, this request for advice did not come out of nowhere. Before it was asked, I introduced myself to my three interviewers, the people who would become my PhD supervisors. I talked about how I would analyse design research in architecture by means of observing how this kind of research is conducted, as well as by interviewing architects about their research activities. Then, the discussion shifted to the question for advice. The context within which this question got raised was a discussion about the political dimension of design research and how science policymaking is related to the growing interest in this kind of research. Specifically, we talked about how policymakers increasingly rely on indicators such as the number of completed research projects, publications in peer-reviewed journals or graduated PhD students to decide on the distribution of university funding. We agreed that this kind of science policy puts architects in a difficult position, since architecture is a discipline with strong ties to professional education. This orientation towards the profession structures architecture schools in various ways. Architecture professors are hired because they are outstanding designers, and many remain in their architecture practices after becoming professors. Students attend architecture school because they want to learn the craft of design. Within this environment, the production of papers in peer-reviewed journals, the education of PhDs and the acquisition of third-party research funding are not the top priority. Instead of papers, architecture schools produce designs, and instead of educating PhDs, they educate the next generation of architects. However, due to the growing importance of measurable research output, architecture

departments need to increase the numbers of academic publications and projects. If not, university administrators and science policy makers would understand that as a sign of low academic performance. In the worst case, this could lead to a reorganization of architecture departments. Confronted with this situation, members of architecture schools have started to discuss what kind of research could and should lead to more papers and funding.

Having backgrounds in the fields of history and Science and Technology Studies (STS), the people who sat in front of me were eager to get involved with this topic due to reasons ranging from an interest in the ways design research is conducted to questions about the historic roots of this form of research. The person who asked me for advice needed to engage with the political aspects of design research. Like the two others, he belonged to the academic faculty of the ETH Zurich. He was also the designated dean of the Department of Architecture, thus responsible for making strategic decisions for the department and deeply involved with the politics of research in architecture. Since the ETH understands itself as an internationally leading research university, measures such as publications, graduated PhD students or acquired funding were considered to be indicators of performance. For a dean, this meant having to think about what kind of research should be conducted, how research could be implemented, and, at least in this job interview, soliciting advice.

In my response, I tried to be convincing by including as much knowledge about design research as I could. I knew that design research had been already a heavily discussed issue within the world of architecture for a couple of years. Proponents of design research describe it as a form of research capable of producing new knowledge through the realisation of design projects. Within this discourse, architects are not depicted in a common-sense way as designers of houses and as people managing building projects. Instead, architects are portrayed as researchers who read, write, test or draw, in order to come up with new knowledge.

Although I was aware of this discourse, I had the feeling that just repeating what I knew about the literature on design research was not what the three people sitting in front of me wanted to hear. Actually, I was invited for a job interview because they were looking for a PhD student capable of doing ethnographic research on design research in architecture at four universities in two countries with longer histories of conducting this kind of research than Switzerland: the United Kingdom and the United States. Unlike Switzerland, where design research became a topic just very recently, design research has been a topic in both the UK and the USA since the

mid 1990s. At various architecture schools on both sides of the Atlantic, lecturers and professors of architecture do not just teach design, they also conduct design research. Furthermore, in both countries, design research has become part of architecture education, and students need to conduct research projects to graduate from architecture school. In some English-speaking architecture departments, there are even PhD programs in which architects dedicate almost their entire time to design research. As we discussed during the job interview, a comparative analysis of how design research is done in the UK and USA should allow one to find out more about design research at different architecture schools in different countries. Against this background, I had the feeling that my answer to the question for advice should at least include some clever remarks on the culture of design research. Trying to include cultural aspects, I formulated an answer, which went like this: what we currently have are theories about what design research in architecture is and how it should be conducted. However, we do not know much about the ways design research is conducted, organised and taught, and how this happens in different places. Once this is known, architects could use this information to think about what kind of design research fits into an institution like the ETH.

In that moment, I could not foresee two things which would fundamentally shape the way I conducted research from that day on. First of all, my answer was apparently satisfactory, because I was offered the PhD position and moved to Zurich four months later. Secondly, the request for advice became something that has accompanied me when conducting research ever since I responded to this question. Of course, I did not see the purpose of my analysis of design research in becoming an advising consultant aiming at identifying something like the 'three most innovative design research projects'. Neither did I see myself as a policy consultant judging the success of my thesis against based on the impact it has on actual policymaking. Above all, I wanted to get a better understanding of the cultures of design research at various universities and in different countries. The fact that design research is currently problematized and discussed by policy makers, deans and architects alike however, stayed in the forefront of my mind.

More than that, politics was something that became part of my own analytical perspective, and I decided to also examine the relation of science policy making and the increase of design research. Building relations between the culture and politics of design research in this way, my thesis became one about change. Considering architecture schools as places that have been leaning more towards professional education than research so far, I came to understand design

research as a phenomenon transforming architecture schools and their relation to the profession. In what follows, I will describe how this transformation took place in different cultures of design research and what it has to do with science policymaking. In particular, I will show how each of these cultures produced ruptures, ruptures that created both problematic disconnects between architecture schools and the profession, as well as new possibilities for knowledge production.

Introduction

This text is the outcome of my PhD research on design research at four architecture schools in the United Kingdom and United States. Since the 1990s, many architecture schools in the Western world have begun conducting and teaching design research.[1] Proponents of design research understand it as a form of investigation in which the realisation of design projects is a constituent part of a research process. In the introduction to the most comprehensive book series on design research currently available (simply called "Design Research in Architecture") the editor defines design research like this:

> "(…) architectural design research can be described as the processes and outcomes of inquiries and investigations in which architects use the creation of [design] projects, or broader contributions towards design thinking, as the central constituent in a process which also involves the more generalised research activities of thinking, writing, testing, verifying, debating, disseminating, performing, validating and so on."[2]

Descriptions like the one above caught my attention because I considered them as somewhat counterintuitive. Actually, design-based research has played no major role in architecture so far. Until recently, architects have been not researchers, but professionals, who have occupied the role of creator and manager of building projects. Architecture schools at universities have been, above all, places of professional education, where students learn what it means to be an architect. This education includes topics ranging from construction techniques and building statics to historic, legal and social aspects of architecture. Most importantly though, since the establishment of architecture schools in the 19th century, novice architects have been taught to invent and discuss designs of buildings.[3] This focus on design was important for the

[1] Dunin-Woyseth, H. and Nilsson, F. (2014): Design Education, Practice, and Research: on building a field of inquiry. In *Studies in Material Thinking*, 11, pp. 3-17.
[2] Fraser, M. (2013): Introduction. In Fraser, M [ed.]: *Design Research in Architecture. An Overview*. Farnham: Ashgate, pp. 1f.
[3] For a history of architecture education in UK and USA, see: Brain, D. (1989): Discipline & Style: The Ecole des Beaux-Arts and the Social Production of an American Architecture. In *Theory and Society*, 18, pp. 807-868;

establishment of architecture as profession, because design was the practice separating architecture from fields also involved in the production of the built environment, such as engineering. Unlike engineering, which was mostly considered to be concerned with technical issues, architecture got institutionalised as a design-based discipline, and design was understood to be an artistic and cultural practice, capable of synthesizing technical, material and social aspects of buildings. The people deemed to be best equipped to teach this practice at the early architecture schools were architects themselves. This legacy of the designing architect is still present at current architecture schools. Even today, design tutors are often experienced architects who work for or run their own architecture firms. Within the environment of the professional architecture school, academic research has a marginal position. At architecture departments, research is often conducted not by architects, but scholars in architectural side-disciplines, such as history and the social-, material-, or technical sciences. In other words: so far, architecture schools have been places in which it was more about professional design-focused education than research.[4]

That said, it would be wrong to assume that design related research did not exist until the rise of design research 30 years ago. Architecture schools had already experienced various waves of academisation prior to the 1990s.[5] The last major example of such a wave was the Design Methods Movement.[6] This movement took place at different universities mainly in the USA, UK and Germany in the 1960s and 1970s, and it consisted of an interdisciplinary group of product designers, mathematicians and architects. The architects belonging to the Design Methods Movement applied mathematical models to rationalise the distribution of space and asked questions about the inclusion of users' preferences about design. Yet, as with many other waves of academisation before, the Design Methods Movement did not last much longer than

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Crinson, M. & Lubbock, J. (1994): *art of profession? Three hundred years of architecture education in Britain*. Manchester: University Press, pp. 38-88; Cuff, D. (1991 [1993]): Architecture: The Story of Practice. Cambridge, MA: MIT Press, pp. 22-35; Stevens, G. (1998): The Favored Circle. The Social Foundations of Architectural Distinction. Cambridge, MA: MIT Press, pp. 168-187, 212-214.

[4] For more detailed impressions of research at architecture departments, see: Stevens, G. (1998): *The Favored Circle. The Social Foundations of Architectural Distinction.* Cambridge, MA: MIT Press, pp. 170-173 & 204-211.

[5] On the history of architecture – science relations, see: Picon, A. & Ponte, A. [eds.] (2003): *Architecture and the Sciences. Exchanging Metaphors.* New York: Princeton Architectural Press; Galison, P. and Thompson, E. [eds.] (1999): *The Architecture of Science*. Cambridge, MA: MIT Press; Weckherlin, G. (2013): Vom Betriebscharakter des Entwerfens. Konjunkturen der Verwissenschaftlichung der Architektur. In Ammon, S. & Froschauer [eds.]: *Wissenschaft Entwerfen: vom forschenden Entwerfen zur Entwurfsforschung der Architektur*. Munich: Wilhelm Fink, pp. 171-204.

[6] For a history of the Design Methods Movement see: Bayazit, N. (2004): Investigating Design: A Review of Forty Years of Design Research. *Design Issues*, 20/1, pp. 16-29; Cross, N. (1993) Science and Design Methodology: A Review. In *Research in Engineering Design,* 5, pp. 63-69; Fezer, J. (2015): A Non-Sentimental Argument. Die Krisen des Design Methods Movement 1962-1972. In Gethmann, D. & Hauser, S. (eds.): *Kulturtechnik Entwerfen.* Bielefeld: transcript Verlag, pp. 297-304.

two decades. Architecture school faculty members ultimately considered Design Methods to be too rigid and too far away from the lived realities of most architects for it to remain part of the curricula.

After this last heyday of research, it got rather quite around the topic of design related research. Architects would refer to the notion of research occasionally, for instance when gathering references and data about social, material or urban aspects of their building sites. Bearing this history in mind, it should not come as surprise that architects themselves attributed research in architecture a rather marginal role after the end of the Design Methods Movement. To give one example, here is a quote by Richard Plunz, professor of architecture at Columbia University, who characterised architectural research in the USA in the 1980s as follows:

> "´Research´ does not hold an important role in guiding the priorities of the ´culture of architecture´. (…) Architectural research survives as an ad hoc phenomenon which is employed when needed, remaining erratic for most subject areas and, in general, unmonitored and uninstitutionalized."[7]

Since the rise of design research, however it seems as if there is not much left of research's marginal position in architecture. Today, lecturers and professors of architecture pursue design-based research at various architecture schools in Central and Northern Europe, the USA and Australia. Many of these schools have integrated design research into their Master's Degree curricula and launched new PhD programs dedicated to design.[8] Beyond these research-based positions and programs, new journals, networks and conferences have been established in order to publish and promote architectural design research.[9] Accompanying this development is a

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[7] Plunz, R. (1987): Comments on Academic Research in Architecture in the United States. *Journal of Architectural Education*, 40/2, p. 62. Another example is: Buday, R. (2017): The Confused and impoverished State of Architectural Research. *Common Edge Blog.* Online available at: https://commonedge.org/the-confused-and-impoverished-state-of-architectural-research/ (09.09.2020).

[8] For PhD and MA education see: Belderbos, M. & Verbeke, J. [eds.] (2005): Proceedings of the colloquium *The Unthinkable Doctorate* at School of Architecture Sint-Lucas, Brussels; Buchanan, R. [ed.] (1998): Doctoral Education in Design: Proceedings of the Ohio Conference, October 8-11. Council for Graduate Education (1997): Practice-Based Doctorates in the Creative and Performing Arts And Design. *Report by the UK Council for Graduate Education;* Nilsson, F & Dunin-Woyseth, H. (2008): Some notes on practice-based architectural design research: Four "arrows" of knowledge. In *Reflections 7+,* pp. 138-147.

[9] For examples of journals, see: JAR – Journal for Artistic Research; AJAR - Arena Journal of Architectural Research; ADR – Architectural Design Research. Network and conference examples are: ARENA – Architectural Research Network; Smitheram, J.; Moloney, J. & Twose, S. (2014): *Proceedings of the Architectural Design Research Symposium 20 – 21 November*, Venice Biennale of Architecture, Victoria University of Wellington.

discourse questioning the difference between the sciences and architecture and describing design research as a genuine architectural approach to research.

One early and influential example of a text that has shaped the contemporary discourse of design research is called "Research in Art and Design".[10] It was published in 1993 by Christopher Frayling, at the time a professor of cultural history and rector of the Royal College of Art in London. In this text, Frayling questions the difference between art, design and the sciences, claiming that the three areas are closer to each other than common thought suggests. Describing how popular culture represents artists as chaotic and expressive personalities, designers either as engineering boffins or as hands-on and style-oriented individualists and scientists as hyperrational researchers, he identifies the separation between science, art and design as a historic mistake having more to do with stereotypes than with actual differences. Contesting narratives portraying science, art and design as separate entities, Frayling argues that all three areas are based as much on craftmanship and tinkering as they are on rational thought and careful observations, stating:

> "Research is practice, writing is practice, doing design is practice, doing science is practice, making art is practice. The brain controls the hand which informs the brain".[11]

Due to this similarity between the different areas, Frayling continues his argument, it would be a mistake to assume that only scientists conduct research. Quite the contrary, artists and designers can also be researchers and producers of new knowledge. According to Frayling, this research can take different forms, and range from more traditional art historic, sociological or psychological investigations of artworks and products of design, to research that is conducted through the realisation of works of art and design. In the latter case, artists and designers produce new knowledge through the creation of artworks and designs and express this knowledge with visual means (e.g., in paintings, sculptures, and sketches).

In the countries that will be analysed in this thesis – the UK and USA – architects and architectural theorists further developed arguments like the one by Frayling in order to establish

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[10] Frayling, C. (1993): Research in Art and Design. In *Royal College of Art Research Papers*, 1/1, pp. 1-5; On the effects of Frayling's text on the discourse on research in art and design, see: Belcher, S. D. (2013): Can grey ravens fly?: Beyond Frayling's categories. *Arts and Humanities in Higher Education*, 13/3, pp. 235-242.
[11] Frayling, C. (1993): Research in Art and Design. In *Royal College of Art Research Papers*, 1/1, p. 4.

architecture as a research-based discipline holding an independent position within academia.[12] Although the ways that architecture is characterised as a research-based discipline vary, most descriptions of design research are united by assuming that architecture is a field capable of integrating research approaches from different disciplines, while being centred around design.[13] According to scholars holding this view, architectural design has the capacity to synthesize different modes of research. When designing buildings, so the argument goes, architects often draw on research from fields ranging from history to material sciences. At the same time, design is understood to be a genuine architectural research practice and in the discourse of design research, acts of drawing or modelmaking are considered to produce knowledge that no other discipline can. Another feature of design research theories is that they regularly describe the design studio as "laboratory". In these laboratories, architects and architecture students do not just work on representations of buildings but experiment with different materials, technologies and ideas in order to create new knowledge addressing questions of space and built form in contemporary societies.[14] Part of this discourse on design research is also the question of when and how design research can be understood as an academic form of research. One example of the discussion on the academic status of design research is the publication "Architectural Practice and Academic Research" by the art and design theorists Michael Biggs and Daniela Büchler.[15] In this publication the authors identify three criteria which architectural design has to adhere to in order to count as academic research. First, it must be disseminated and influence other practitioners in the field. Second, the audience the researcher addresses must identify it as new knowledge. Third, the research must be placed in a context, as this allows others to understand the way in which knowledge develops or where it departs from.

Taking into account architecture schools' close relation to the profession, and considering the precarious position that research has had within it so far, the existence of design research is by no means self-evident to me. Writing this, I don't want to doubt that Frayling is right when identifying the difference between doing science and doing design not as big as common

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[12] E.g.: Till, J. (2008): Three Myths and One Model. In *Building Material,* 17, pp. 4-10.

[13] Examples for this position are: Fraser, M. (2017): Preserving openness in design research in architecture. In Nilsson, F., Dunin-Woyseth, H. & Janssens, N. [eds.]: *Perspectives on Research Assessment in Architecture, Music and the Arts. Discussing Doctorateness.* Abingdon: Roultledge, pp. 69-84; Groat, L. & Wang, D. (2013): *Architectural Research Methods.* Hoboken: Wiley; Lawson, B. (2002): The subject that won't go away but perhaps we are ahead of the game. Design as research. In *arq: Architectural Research Quarterly*, 6/2, pp. 109-114; Rendell, J. (2005): Architectural Research and Disciplinarity, In *Architectural Research Quarterly* 8/2, pp. 141-147.

[14] Furján, H. (2007): Design/Research. Notes on a Manifesto. *Journal of Architectural Education*, 61/1, p. 62-68.

[15] Biggs, M. & Büchler, D. (2008): Architectural Practice and Academic Research. In *Nordic Journal of Architectural Research,* 1, pp. 83-94.

thought might suggest. I also do think that architects can be considered as doing research when developing new building designs and when gathering data on social, material or urban aspects of their building sites. Furthermore, it needs to be highlighted that even the term 'design research' is not as novel as one might think. In his introduction to the aforementioned book series on design research, Murray Fraser identifies the artist, architect and father of the world-famous Elio Saarinen, Eliel Saarinen, as the first one mentioning the term design research already the 1940s.[16] Yet, until recently, design research has neither been permanently institutionalised at architecture schools, nor has it been discussed in a shared research discourse as academic form of knowledge production. Therefore, my research wonders about the question how considering and institutionalising architecture as a research discipline and design as academic research practice actually transforms architecture schools and their relation to the profession? As already mentioned, since the 19th century architecture schools have had the task of socialising novice architects into the profession and the people responsible for this education have been mostly professional architects working in offices. Taking this history into account, with this thesis, I seek to understand what an academic conception of architecture, as it is present in design research, does to architecture schools' professional duties.

Of course, I am not the only one curious about design research-related developments. Since the early 2000s especially architects and historians have identified design research as a phenomenon leading to an increased research orientation at architecture schools. In this regard, they write about the rise of the educational research studio[17] and the design-based PhD.[18] Furthermore, they associate design research with "a broad and sweeping transformation"[19] of architecture schools leading to more engagement with political, social and environmental issues. They also identify design research as constituting "(…) an experimental paradigm in which students and professors alike collaborate to push the boundaries of the discipline (…)".[20] However, so far it has not become clear at all what such a transformation might look like. The

[16] Fraser, M. (2013): Introduction. In Fraser, M [ed.]: *Design Research in Architecture. An Overview*. Farnham: Ashgate, p. 6.
[17] Griffiths, R. (2007): Knowledge production and the research–teaching nexus: the case of the built environment disciplines. In *Studies in Higher Education*, 29/6, pp. 709-726; Varnelis, K. (2007): Is there research in the studio? In *Journal of Architectural Education*, 29/6, pp. 11–14.
[18] Durling, D. (2002): Discourses on Research and the PhD in Design. *Quality Assurance in Education*, 10/2, pp. 79-85.
[19] Velikov, K.; Thün G. & Ripley C. (2012): Thik Air. *Journal of Architectural Education*, 65/2, p. 69.
[20] Furján, H. (2007): Design/Research. Notes on a Manifesto. *Journal of Architectural Education*, 61/1, p. 63.

literature mentioned above either theorises design research in broad and rather abstract terms, stops after asserting an increase in research activities, or describes singular research projects.

Design Research as Cultures and Ruptures

In order to address this gap, I combine approaches from STS with studies on the profession of architecture. Drawing on the work of STS scholars examining science as culture, such as Bruno Latour[21], and on the adaptions of these approaches to study art and architecture, by people like Albena Yaneva[22], I will analyse design research as cultural phenomenon. In particular, I examine to what extent shared ways of understanding, practicing and teaching design research exist. Part of this investigation are epistemological considerations and the question how knowledge is produced and passed on in design research. Furthermore, this cultural analysis will have a look at the social dimension of design research, asking how the members of a culture organise their research activities. In this regard, I want to know more about the ways design researchers interact and how they support each other as well as about their relations to universities and the architectural profession.

I will compare this research with already existing sociological, anthropological and historic analyses of architecture schools, the profession of architecture and their relation to each other, conducted by scholars, such as Dana Cuff, Spiro Kostof or Magali Sarfatti Larson.[23] Contrasting this literature with my own investigation of the culture of design research, I will search for similarities and differences in the ways design research, professional architectural work and architecture education are done and organised. Analysing what design research has to do with- and what makes it different to professional architectural work and -education allows me to gather impressions on the changes design research introduced at architecture schools. Taking both into account, the close connection between architecture schools and the profession and the academic orientation of design research, I am especially interested in examining how the rise of design research might disconnect architecture schools form the profession of architecture.

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[21] Latour, B. and Woolgar, S. (1979): *Laboratory Life: The Social Construction of Scientific Facts.* Beverly Hills: Sage

[22] Yaneva, A. (2009): *The Making of a Building: A Pragmatist Approach to Architecture*. Oxford: Peter Lang

[23] Cuff, D. (1993 [1991]): Architecture: The Story of Practice. Cambridge, MA: MIT Press; Kostof, S. (2000 [1977]) [ed.]: The Architect. Chapters in the History of the Profession. Berkley: University of California Press; Sarfatti Larson, M. (1995 [1993]): *Behind the Postmodern Façade. Architectural Change in the Late Twentieth-Century America.* Berkley: University of California Press.

To get a finer-grained impression of the similarities and differences of design research and professional architectural work and education, the following questions will guide this comparison: What do architectural design and design research have to do with each other? Are the outcomes of design research products of professional architecture, like buildings that are either built or published in professional journals and books, or something else? Do architects conducting design research know the same things than architects working on building designs? Is design research conducted by architects who still purse professional careers outside of the university or have architects conducting design researcher become full time academics? If they conduct research mainly at the university, how do they organise their research activities? How does the rise of design research affect architecture education? Do students in a design research based MA program still learn how to design buildings? Are the students still taught by professional architects or people working mainly at the university? What makes a PhD by design different to architectural work in an office?

The notion I want to introduce in order to analyse potential disconnections between architecture schools and the profession that design research might create is that of 'ruptures'. I will use this analytical metaphor to detect and describe these disconnections as well as to be precise about how they change architecture schools' relation to the profession. Apart from using it as a device for description, the notion of ruptures will also help me to arrive at some normative conclusions about design research. Understanding a rupture as an event that either fully or partly detaches elements that were closely related to each other before, I think of it as something that can create harmful effects as well as open up new possibilities. In this way, my thesis will also reflect on the problems for professional reproduction and unwanted effects, as well as new possibilities for action and knowledge production that design research might create.

Important to mention in this regard is that being interested in culture implies that I neither understand my research to be about THE transformation of architecture at the university, nor that am I interested in the analysis of research as it is conducted by individual researchers. Instead, I want to know whether ways of practicing, socially organising and educating design research exist that are shared by a group of architects and to what extent I can identify different cultures of design research. In this regard my research is inspired Karin Knorr Cetina's descriptions of different research cultures, in her analysis of what she calls 'epistemic

cultures'.[24] Utilizing Knorr Cetina's work for my analysis of design research, I want this study to be sensitive to cultural variations and different kinds of ruptures created, and to explore the differences in how these ruptures occurred at architecture schools in the UK and USA.

The Politics of Design Research

To examine the cultures and ruptures of design research is not my only aim with this thesis. I also want to gain a better understanding of the time in which design research became a topic of interest and how it happened. For someone like me, who is trained in sociology and STS, this context is important. I do not understand research as a self-contained activity, something that happens independently of the world it takes place in. Like any other area of research, design research also depends on funding, is influenced by technological developments and shaped by ideas circulating within society. Architects and historians interested in this kind of research have identified various reasons to explain why design research is currently a big issue at architecture departments. According to Antoine Picon, new possibilities for making digital visualisations provided ground for interaction between architecture and the sciences.[25] Writing about design research from the perspective of a professional architect who teaches design at the university, Patrick Schumacher understands design-driven investigations as a way to anticipate societal challenges to come and to develop novel design solutions for these problems.[26] The cultural theorists Sabine Ammon and Eva Maria Froschauer add one more reason the list. They highlight how new theories describing research and knowledge as social activity have attributed an epistemic dimension to artistic and design practices.[27]

Although my thesis will touch upon all of these topics and show how new technologies, societal challenges as well as novel intellectual developments shape the ways design research is done, above all I want to focus on the relation of design research and science politics. I consider this perspective an important one, because design research is currently an issue that is at least as much discussed by architects as it is by science policymakers. Rectors of architecture schools,

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[24] Knorr Cetina, K. (1999): *Epistemic Cultures. How the Sciences make Knowledge.* Cambridge, MA: Harvard University Press.
[25] Picon, A. (2008): Architecture, Science, Technology and the Virtual Realm. In Picon, A. & Ponte, A. [eds.]: *Architecture and the Sciences. Exchanging Metaphors*. New York: Princeton Architectural Press, pp. 292-313.
[26] Schumacher, P. (2011): Architecture Schools as Design Research Laboratories. In Hadid, Z. & Schumacher, P. [eds]: *Total Fluidity, Studio Zaha Hadid 2000-2010*, *University of Applied Arts Vienna.* Wien/New York: Springer, pp. 8-132
[27] Ammon, S. & Forschauer, E.M. (2013): Zur Einleitung. Wissenschaft Entwerfen. Perspektiven einer reflexiven Entwurfsforschung. In ibid. [eds.]: *Wissenschaft Entwerfen*. München: Wilhelm Fink, p. 18.

research evaluators and university administrators are all involved in the discourse on what design research is and when and how it can be considered as academic form of research. Some of the most recent examples of these discussions are collected in an edited volume titled "Perspectives on Research Assessment in Architecture, Music and the Arts".[28] In this volume, policymakers, deans of art and architecture schools, architects, musicians and artists discuss the question what constitutes an art and design PhD degree and how successful design and arts-based research can be measured.

The policy context within which design research is institutionalised at architecture schools is characterised by the growing economisation and marketisation of universities.[29] Unlike in the 1970s, when funding was still directly given to universities by the state, since the 1980s, universities have increasingly competed with each other for funding, students and researchers. After big parts of the heavy- and manufacturing industry moved from the Western world to countries with cheaper production costs, universities and small firms gained importance when it came to securing the economical superiority of Western countries. In this economy, not oil, steel or mass-produced goods were the backbone of growth, but creativity, ideas and new knowledge. This turn towards knowledge did not leave universities untouched. In the era of "Reganomics" and "Thatcherism", policymakers started understanding universities less and less as cultural entities that received money for research and teaching, but as public service institutions, competing with each other for research funding and students on markets.[30] In order to steer this competition, governments reduced barriers between industry and university and introduced science steering instruments, such as research evaluations. These evaluations measure the performance of universities and their departments through indicators like acquired research money, patents, publication numbers and number of students graduated, and governments distribute financial resources according to these results.

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[28] Nilsson, F., Dunin-Woyseth, H. & Janssens, N. [eds.] (2017): *Perspectives on Research Assessment in Architecture, Music and the Arts. Discussing Doctorateness.* Abingdon: Roultledge.

[29] My analytical perspective on science – policy relations is based on work, such as: Brown, R. & Carasso, H. (2013): *Everything for Sale? The Marketisation of UK Higher Education.* Abingdon: Routledge; Mirowski, P. (2011): *ScienceMart. Privatizing American Science.* Cambridge, MA: Harvard University Press; Olssen, M. & Petersen, M. A. (2005): Neoliberalism, higher education and the knowledge economy: from the free market to knowledge capitalism. In *Journal of Education Policy*, 20/3, pp. 313-345; Popp Berman, E. (2012): *Creating the Market University. How Academic Science became an Economic Engine.* Princeton: University Press; Slaughter, S. & Leslie L. (1999): *Academic Capitalism. Politics, Policies, and the Entrepreneurial University.* Baltimore: Johns Hopkins University Press.

[30] Braun, D. & Merrien, F. X. (1999): Governance of universities and modernisation of the state: Analytical aspects. In ibid. [eds.]: *Towards a New Model of Governance for Universities? A Comparative View.* London: Jessica Kingsley Publishers Ltd, pp. 9-33.

At architecture schools in the UK and USA, universities' new role as research service institutions competing for funding has contributed to an overall increase in research activities and the rise of phenomena like design research. This relation of politics and design research is documented in various publications by policymakers and architects, reflecting on recent developments at architecture schools. According to these publications, political reforms prompted the rise of design research.[31] In order to increase the research activities of creative fields like architecture, architecture schools at already established universities got increasingly treated as research entities. Within this policy context, university administrators asked questions about how architecture schools would fit into research-driven universities. John Templer, former president of one of the largest academic research associations in architecture in the US – the Architectural Research Centres Consortium – described the situation as follows:

> "If architecture schools are to be embedded in universities, then why, it was asked, should architecture faculty turn their back on the general university community expectations of scholarly research and publications?".[32]

Confronted with questions like the one above, the professionally oriented architecture schools had to adapt and increase their research activities. Otherwise, they would face serious consequences, in the worst case leading to the reorganisation or even closure of a school.[33] Related to these developments, research became an important topic at architecture schools and the label 'design research' was established to highlight architects' capacity to conduct research.

Against this background, my thesis asks how recent science policies transformed architecture schools and their relation to the profession. Interested in the cultures and ruptures of design research, I will analyse how policymaking contributes to the creation of ruptures between architecture schools and the profession and how this happens at different places. These are

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[31] For an overview of the transformations at art schools, see: Kälvemark, T. (2012): University Politics and Practice-Based Research. In Biggs, M. & Karlsson, H. [eds.]: *The Routledge Companion to Research in the Arts.* Abingdon: Roultedge, pp. 3-23. For literature on the design research – policy relation: Gorák, S. (1988): UK Architectural Education: Trends and Issues. In *Habitat Intl*., 12/1, pp. 75-86; Jenkins, P., Forsyth, L. and Smith, H. (2005): Research in UK architecture schools – an institutional perspective. In *arq: architecture research quarterly*, 9/1, pp. 33-43.

[32] Templer, J. (1990): Architectural Research. In *Journal of Architectural Education*, 44/1, p. 3

[33] E.g.: Mayo, J. M. (1991): Dilemmas of Architectural Education in the Academic Political Economy. In *Journal of Architectural Education*. 44/2, pp. 80-89; Steadman, P. & Hillier, B. (2002): Research Assessment Under the Microscope: Disturbing Findings and Distorting Effects. In *arq: Architectural Research Quarterly*, 6/3 (2002), pp. 203-207.

questions that neither the architects nor the policymakers reflecting on the political dimension of design research have asked so far.

Setting the analytical frame of my thesis in this way, I have to be cautious to not throw the baby out with the bathwater. This would happen if I were to assume that architects were only passive receivers of a policy-driven transformation of architecture schools and that design research is nothing more than just a reaction to university administrators' calls for an increase of research output. Actually, architects themselves took action to establish design research at their universities and influencing the way how science policies got implemented.[34] Furthermore, for architects to be entitled to receive funding for the creation of knowledge did not just mean to be pushed into something they never wanted to do. Many architects conduct design research in order to further develop their discipline by expanding critical, speculative and experimental activities.[35] Hence, it would be wrong to assume that the only political actions related to the rise of design research are market-driven ones. As the art historians Tom Holert[36] and Fiona Candlin[37] point out, recent developments in art- and design research cannot be understood without considering the effects of market-oriented reform, yet, neither should they be reduced to these reforms. In this latter regard, Candlin and Holert describe some of the historic trajectories of contemporary art and design research. They show how scholars conducting art and design research projects often critically reflect the conditions within they realise their research and how they subvert logics of economic science governance by drawing on approaches that got developed in feminism, critical theory, post-colonialism or in art forms such as conceptual art.

Taking these complexities into account, my examination of the political dimension of design research will have an eye on both the marketisation of universities as well as on architects' contributions to the establishment of design research, their reasons for doing so and the trajectories of these actions and reasons. Altogether, my thesis aims at better understanding connections between recent science policymaking, architects' efforts to institutionalize design

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[34] E.g.: Rendell, J. (2004): Architectural Research and Disciplinarity. In *arq: Architectural Research Quarterly*, pp. 141-147.
[35] One example is: Grillner, K (2013): Design Research and Critical Transformations: Situating Thought, Projecting Action. In Faser, M [ed.]: *Design Research in Architecture. An Overview*. Farnham: Ashgate, pp. 70-94.
[36] Holert, T. (2011): Artistic Research: Anatomy of an Ascent. In *Texte zur Kunst*, 82, pp. 38-64.
[37] Candlin, F. (2001): A Dual Inheritance: The Politics of Educational Reform and PhDs in Art and Design. In *Journal of Art & Design Education*, 20/3, pp. 302-310.

research, the ways how this research is conducted, taught and organised at different places and the ruptures it might create between architecture schools and the profession.

The Academization of Architecture

Analysing architecture in this way, my research is closely related to the work of a handful of scholars reflecting on the consequences of the increase of design research activities at architecture schools in terms of an academization of architecture.

The first one I would like to mention is the sociologist Robert Gutman. Although not directly working on current design research, his work on research in architecture should be mentioned here, since he has been, to my knowledge, the first sociologist to reflect on architecture's position at the university and its relation to research. In an article called "Educating Architects: Pedagogy and the Pendulum", Gutman identifies the question what kind of research architects conduct at the university as one of the big reoccurring topics at architecture schools.[38] According to Gutman this question was especially difficult to answer for architecture, due to its constitution as an artistic profession. However, as architecture has got institutionalized at universities seeing research as one of their core missions, architecture schools are, as Gutman writes, "(…) often pressed into evaluating themselves in terms of their contribution to research."[39] Since the end of the World War II this has had different consequences making the pendulum swing back and forth. Understanding the Design Methods Movement, which I have already mentioned above, as a development leading towards an academization of architecture by subjecting design to standards of the quantitative sciences, Gutman identifies the years after the disappearance of this movement as time in which research and design in architecture got separated again. This separation was achieved by delegation. Writing about his own experiences of being at an architecture school in the 1980s, Gutman asserts that research is mostly conducted not by architects themselves, but by scholars working in architectural side-disciplines, such as sociology of architecture or the material sciences. Reflecting on this situation, the sociologist writes: "There is less confusion now than there was two decades ago about the relationship of research to design. Each is thought of as a largely independent type of intellectual activity, operating in its own bailiwick and more likely to be creative when separate

[38] Guttmann, R. (2010 [1985]): Educating Architects. Pedagogy and the Pendulum. In Cuff, D. & Wriedt, J. [eds.]: *Architecture from the Outside In. Selected essays by Robert Gutaman.* New York: Princeton Architecture Press, p. 258-286.
[39] Ibid. p. 277

from each other."[40] Even though Gutman's statements about the absences of design-based research in the 1980s cannot be directly applied to my own research, with Gutman I will ask what it happens when design and research get closer to each other again at architecture schools.

The ones having reflected already about contemporary design research are the cultural theorists Sabine Ammon and Eva Maria Froschauer and the STS scholar Monika Kurath, who describe the current increase of design research as a trend leading to an academization of architecture. According to Ammon and Froschauer, this academization is expressed in a growing desire to reflect on the design process.[41] While design was understood as an inaccessible creative and artistic practice in the 1980s, since the rise of design research, the cultural theorists identify a new interest in reflecting on the epistemological potentials of design. Against the background of an increasing economization of science Monika Kurath, on the other hand, identifies a potential import of approaches from disciplines with an established research tradition into architecture.[42] Analysing policy documents and interviews with architects in Switzerland, Kurath shows how funding bodies and research committees often associate research in architecture with practices of established research disciplines. Hence, in order to receive funding for research and to get research based positions, architects need to familiarize themselves with approaches from more research focused disciplines such as the social- or material sciences. According to Kurath, this could lead to a transformation of architecture leading it away from its core practice design. Also Kurath, together with the sociologist Anna Hipp, mentions the discourse of design research I have outlined above. Highlighting its focus on design as research practice, they identify the existence of this discourse as indicating a development leading to the emergence of a research approach more closely related to genuine architectural ways of working.[43]

Building on this research, I understand my examination of the cultures and politics of design research as well as the potential ruptures design creates between architecture schools and the profession as an analysis speaking to current debates about the academisation of architecture at the university. Or to say it in Gutman's words, I am interested in finding out what happens to

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[40] Ibid. p. 279

[41] Ammon, S. & Froschauer, E. M. (2013): Zur Einleitung: Wissenschaft Entwerfen. Perspektiven einer Reflexiven Entwurfsforschung. In ibid. [eds.]: *Wissenschaft Entwerfen: vom forschenden Entwerfen zur Entwurfsforschung der Architektur*. Munich: Wilhelm Fink, pp. 15-48.

[42] Kurath, M. (2015): Architecture as Science. Boundary Work and the Demarcation of Design Knowledge from Research. In *Science & Technology Studies*, 28/3, pp. 81-100.

[43] Kurath, M. & Flach (now Hipp), A. (2016): Architektur als Forschungsdisziplin. Ausbildung zwischen Akademisierung und Praxisorientierung. In *architheses*, 2, pp. 72-79.

architecture schools when the 'pendulum swings back'. At least this investigation is guided by the hypothesis that the current rise of design research changes architecture schools at universities in the UK and USA. Due to the lack of empirical studies on the conduct of design research in both countries however, it is impossible to know how design research is done, taught or organised, if one or more cultures of design research exist as well as how this research is related to or different from professional architectural work and education.

UK and USA

There are two reasons why I choose to analyse design research in the UK and USA. Firstly, I selected the UK and USA because I wanted to compare cultures with a long-standing history in the economisation and standardisation of higher education. As I want to find out more about the relation of design research in architecture and policy-driven marketisation of universities, the UK and USA are ideal cases for analysis. Both countries were among the first to introduce science policies leading to the marketisation of universities. For example, already in the 1980s, the UK introduced research evaluations of universities in order to distribute resources according to the results of these assessments.[44] The USA, on the other hand, is not just considered home to some of the strongest research universities in the world. Boasting a long tradition in competition based science governance and deregulations of the fields of patent laws, intellectual property rights and university – industry partnerships, it is a particularly interesting site for studying the politics of design research.[45] Secondly, there are various differences in regard to the way design research is institutionalised in the UK and USA, making comparison of the practice, social organisation and education of design research more valuable. Since the 1990s several new PhD programs, research networks, journals and positions got launched in the UK. In the USA, on the contrary, design research is a comparably less institutionalised phenomenon. However, architects at various schools all over the USA still purse design research agendas and teach design research to students. Taking these differences as analytical point of departure, I can ask why design research in the UK and USA is institutionalised differently and what that has to do with policymaking as well as diverging actions taken by architects to establish design

[44] Bence, V. & Oppenheim, C. (2005): The Evolution of the UK's Research Assessment Exercise: Publications, Performance and Perceptions. In *Journal of Educational Administration and History*, 37/2, pp. 137-155. For a more comprehensive overview of recent science policymaking in the UK, see: Brown, R. & Carasso, H. (2013): *Everything for Sale? The Marketisation of UK Higher Education.* Abingdon: Routledge; McGettigan, A. (2013): The Great University Gamble. Money, Markets and the Future of Higher Education. London: Pluto Press.

[45] Mirowski, P. (2011): *ScienceMart. Privatizing American Science.* Cambridge, MA: Harvard University Press; Popp Berman, E. (2012): *Creating the Market University. How Academic Science became an Economic Engine.* Princeton: University Press.

research in the UK and USA. Related to this perspective, I can analyse how these differences might affect the culture of design research at the four architecture schools I selected as case studies.

Structure of the Thesis

The argument that my thesis wants to convey is that the introduction of design research at architecture schools created ruptures between these schools and the profession. As will be shown, this is because architects involved in design research increasingly drew on ideas, practices, outputs, organisational principles and funding streams of the sciences, which did not have much to do with professional architectural work. However, while it is possible to identify this general tendency of academisation, it would be wrong to assume that this inclusion of the sciences led to one big transformation of architecture schools and that it did change the professional set up of these schools entirely. One of the most important findings of this thesis is that design research is a heterogenous phenomenon consisting of different research cultures. In each of these cultures, approaches from the sciences and architectural ways of working got mixed and related to each other in different ways. Consequently, each of these cultures created different ruptures between architecture schools and the profession. In order to highlight this cultural heterogeneity, one of the main aims of this text is to describe some of the different ways of practicing, socially organizing and teaching design research. To do so, I decided to structure this thesis in three chapters. Each chapter takes place at a different school, and at each of these schools, I describe a different culture of design research, as I experienced it during my research stay.

Demonstrating cultural heterogeneity was not the only reason why I decided to describe three different research cultures at three different universities. Locating each research culture within another architecture school, I can show how the practice, social organisation and education constituting each culture is related to its academic environment. This in turn allows me to go beyond abstract descriptions of cultural patterns and to describe how cultural differences are connected to decisions of university administrators as well as to national university politics. Furthermore, the focus on different schools makes it possible to include the perspectives of the architectural faculty and architecture students working and studying within these institutions and to engage with the historic relations between design research and the particular architecture schools. Altogether, to describe different cultures at different universities opens up a comparative perspective for analysing similarities and differences in the ways design research

is conducted and related to science policymaking as well as in regard to the actions architects take to establish and participate design research and the historic trajectories of these actions.

The reason why I have decided to just describe three cultures within three universities, although I have analysed altogether four architecture schools, is an empirical one. At the fourth architecture school I visited, the faculty members were most critical about the idea of design research. I decided to utilize the questions and suspicions about design research articulated by architects at this school as point of departure for my conclusion.

A danger inherent to structuring a thesis in this way is that it could generate the impression that just one research culture existed at each architecture school, and that the one I describe is 'the culture' of the school. This was not the case. Actually, the results of my research can neither account for all the design research activities that took place at the different schools I analysed, nor for all policy relations present during the time of my school visits. During my research stays, I experienced architecture schools as places where different scholars meet and where architects maintain various approaches to research. The design research cultures I describe in this thesis are the ones I found to be strongly related to, and influential at, the analysed schools. In order to make this dimension of design research visible, I will include some reflections on the existence of other research approaches and on my reasons for analysing the culture that I did in each chapter.

Before I begin with describing these results of my examination of design research in the UK and USA, I would like to make some more conceptual and methodological remarks. In the remains of this chapter, I will elaborate more on the concept of ruptures and how it builds a critical analytical focus for the study of design research. Furthermore, I provide an overview of the case studies I have analysed and elaborate on the methods I have chosen to do so.

Ruptures: Normativity, Critique and the Analysis of Design Research

As I have already mentioned above, I will use the term 'ruptures' as an analytical notion to open up both a descriptive and a normative perspective. On the one hand, the concept of ruptures allows me to describe how design research might disconnect architecture schools and the profession and what these disconnects can look like. On the other hand, it serves as a frame

within which I can reflect on the effects the introduction of design research has on architecture schools. Since I have not written much more about this term so far, I would like to give a more detailed impression about why I introduced the notion of ruptures as well as how it is related to and different from the already existing concepts I rely on to analyse design research. Above all, however, in what follows, I will reflect on the normativity that is embedded within ruptures and how this term helped me finding a position to study design research.

First and foremost, to find a normative position was important for me because I understand my examination of design research to be related to debates about the academisation of architecture. Doing so, I entered a terrain that was by no means innocent. This is because the word 'academisation' is a rather negatively connotated term within the world of architecture. I acquired this impression from conversations with architects about my research topic. When mentioning the term 'academic' or speaking about the 'academisation of architecture', I heard several times that I am not speaking about a desirable development. Academic architects are considered to be incapable of designing good buildings. This is why they engage more with theory than with design. Unfortunately, as the criticism of academic architecture goes, theoretical debates often have no relevance for 'actual' architectural problems.

That is the kind of critique I don't want to convey in this thesis. It is stereotypical and one sided, since it assumes that academic work does not have any value for practice. Equating academic work with lack of design talent, it knows already how to judge a phenomenon before engaging with it more closely. Hence, if I were to let this kind of critical attitude guide my analysis, then I would not need to engage with design research any longer, as I would already know what to make of it. However, understanding the rise of design research as a phenomenon contributing to the academisation of architecture, I want to keep the possibility of critique open. Due to architecture schools' close ties to the profession of architecture, I think that an analysis of design research and its political conditions needs to be capable of identifying problematic developments.

The question of what this critique might look like, as well as the question of what normative point of departure it should take, were not easy for me to answer. Often the concepts one chooses to analyse a phenomenon with can serve as a framework for critique. Yet, this is not entirely applicable to my case. The STS approaches that guide my analysis of design research as culture have had a rather uncritical relation to architecture so far. The literature on science

policy, on the other hand, offers a wide variety of critical perspectives on problematic effects of recent policymaking on the sciences, however, not one that I can directly apply to study science policy induced transformations of a profession. Therefore, I have decided to depart from some of the theoretical premises and modes of critique that are part of the literature forming the analytical background of my thesis and to introduce the analytical term 'ruptures'. To give a more detailed impression what that means, on the following pages I will show how I use the notion of ruptures to reframe the perspectives of both STS and critical policy studies.

Form Science as Culture to Change at Architecture School

In the 1970s, Science and Technology Studies, or STS, was established as an interdisciplinary field studying the manifold relations between science, technology and society. Although STS scholars have analysed the sciences from various different perspectives, most of them shared the analytical aim of challenging the mainstream understanding of science. In popular accounts, science was characterised as a purely rational endeavour. The results of scientific inquiry were imagined to be true knowledge about nature, society or history. Drawing on approaches from the humanities and social sciences, STS scholars challenged this understanding of science by stressing 'cultural' aspects. Analysing the practices and interactions constituting science, they highlighted the constructed-ness of scientific facts and showed how interests of groups, technical conditions as well as political and historical circumstances shape research activities.[46]

Since the 1990s, various scholars have utilized STS based analysis of science to study the culture of art, design and architecture.[47] In their investigations of architecture, these scholars draw attention to the different ways architects design and interact, and to the knowledge they produce while doing so. Among all the approaches STS invented to study the culture of the sciences, the one that inspired the analysis of architecture most are the so-called laboratory studies. These 'lab studies' were developed to enable social-anthropological analysis of knowledge production in the natural sciences. Scholars such as Bruno Latour and Steve

[46] For this history of STS see: Sismondo, S. (2010): *An Introduction to Science and Technology Studies*. Chichester: Wiley-Blackwell, pp. 1-11. On the notion of culture in STS, see: Epstein, S. (2008): Culture and Science/Technology: Rethinking Knowledge, Power, Materiality, and Nature. In *The ANNALS of the American Academy of Political and Social Science*, 619, pp. 165-182.

[47] One of the first examples is: Born, G. (1995): *Rationalizing Culture. IRCAM, Boulez and the Institutionalization of the Musical Avant-Garde.* Berkley: University of California Press. For a recent example, see: Farias, I. & Wilkie, A. [eds.] (2016): *Studio Studies. Operations, topologies and displacements*. Abingdon: Routledge. An overview STS' engagement with art and design is provided by: Salter, C.; Burri, R. V. & Dumit, J. (2017): Art, Design and Performance. In: Felt, U., Fouché, R., Miller, C. A. & Smith-Doerr, L. [eds.]: *The Handbook of Science and Technology Studies.* Cambridge, MA: MIT Press, pp. 139-168.

Woolgar[48], Karin Knorr Cetina[49] or Sharon Traweek[50] conducted ethnographic research on laboratories. They demonstrated that these laboratories are cultural and social spaces where facts are made rather than just discovered, and where novices learn what it means to be a scientist. Challenging popular accounts and established theories of science, the lab studies describe laboratory scientists as tinkerers making experiments work by improvisation rather than by exactly following methodological descriptions. Furthermore, the lab studies highlight the agency technology has in the scientific discovery process and they analyse the social and technical networks shaping scientists' activities and -outcomes of laboratory-based research.

With regard to architecture, the lab-study approach became an analytical tool to describe the work going on in design studios and architectural offices. By means of ethnographic research, STS scholars such as Albena Yaneva, Sophie Houdart and Ignacio Farias explored the practices and tools of architectural design and portrayed architects as people 'constructing' and 'fabricating' designs of buildings.[51] Beyond that, they described the knowledge architects produce while designing as visual knowledge about buildings and they analysed how architects interact with each other as well as with clients in order to realise buildings. To what extent the mode of critique in architecture-based STS differs from the one of studies on the sciences becomes visible when focusing on the different reactions to these studies. Unlike scientists, who took laboratory-studies-based descriptions of the fabrication and construction of facts as provocation and as cause for objection, architects have taken on the STS based descriptions of their work in a rather uncritical way. The reason for this unproblematic relation is identified by Michael Guggenheim.[52] Reflecting on the relation between STS and architecture, he writes:

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[48] Latour, B. and Woolgar, S. (1979): *Laboratory Life: The Social Construction of Scientific Facts*. Beverly Hills: Sage

[49] Knorr Cetina, K. (1981): *The Manufacture of Knowledge. An Essay on the Constructivist and Contextual Nature of Science.* Oxford: Pergamon Press.

[50] Traweek, S. (1988): *Beamtimes and Lifetimes. The World of High Energy Physicists.* Cambridge, MA: Harvard University Press.

[51]For example: Farías, I. (2013): Epistemische Dissonanz. Zur Vervielfältigung von Entwurfsalternativen in der Architektur. In: Ammon, S. & Froschauer, E. M. [eds.]: *Wissenschaft Entwerfen: vom forschenden Entwerfen zur Entwurfsforschung der Architektur*. Munich: Wilhelm Fink, pp. 46-77; Houdart, S. (2008): Copying, Cutting and Pasting Social Spheres: Computer Designers Participation in Architectural Projects. In *Science & Technology Studies,* 21/1, pp. 47–63; Houdart, S. (2016): Architecture in the wild: The studio overflowed. In Farias, I. & Wilkie, A. [eds.]: *Studio Studies. Operations, topologies and displacements*. Abingdon: Routledge, pp. 120-136; Yaneva, A. (2009): *The Making of a Building: A Pragmatist Approach to Architecture*. Oxford: Peter Lang; Yaneva, A. (2012): *Mapping Controversies in Architecture*. Burlington: Ashgate.

[52] Guggenheim, M. (2020) How to use ANT in inventive ways so that its critique will not run out of steam? In Blok, A., Farias, I. & Roberts C. [eds.]: *The Routledge Companion to Actor-Network Theory*. Abingdon: Routledge, pp. 64-72.

> "(…) the attribution of agency to designers and the notion of 'fabrication' and 'construction' to describe their work perfectly fits their self-description. This is unlike scientists, who abhor the idea that objects in the world are connected to their own agency."[53]

Furthermore, Guggenheim shows that the current STS studies on architecture have another analytical outlook than the ones on the sciences. Instead of aiming at questioning popular images of architecture, these STS studies highlight the unique character of architecture as opposed to a technocratic understanding of the building process, often present in the building industry. Others don't contrast the results of their ethnographic research with established theories or popular understandings of architecture, as STS scholars did with science. Rather they show how approaches of the sociology or cultural anthropology fail to account for the details of architectural practice and knowledge.

Compared to these STS accounts of science and architecture, the aim of my research is different. Unlike the STS scholars analysing science as culture, I am not investigating design research in order to contrast my findings with a common and established understanding of design research, as Latour, Knorr, Cetina and others did with science. Since I understand design research as a young phenomenon which began taking shape in the 1990s, I don't think that there is much to learn by questioning a discourse that is currently forming through analysing an emerging practice about which not much is known. Furthermore, my research also differs from other STS studies of architecture, as this thesis will not question the social sciences' capacities to account for design research.

More interested in the question how the rise of design research transforms architecture schools, my point of departure for critique is based on the question of to what extent design research creates ruptures between architecture schools and the profession. In this regard, I will keep an eye on the question how architects' relation to professional work changes when involved in design research and how this happens at different places. In terms of critique, I want to analyse potential disconnections and reflect on the problems they might produce when thinking about the future development and reproduction of the profession of architecture. As will be shown in this thesis with reference to the work of sociologists, cultural anthropologists and historians, I

[53] Ibid., p. 68.

understand architecture as profession holding special knowledge and skills about the invention, representation, discussion and reconfiguration of building designs, which no other profession, discipline or industry has. Since architecture schools are the most important places for professional socialisation, a potential disconnection between architecture schools and professional practice, knowledge and personnel could be harmful for the reproduction of this profession.

Taking this critical perspective does not mean that I treat every new development related to design research and every variation from professional architectural work and education as reason for critique. Rather, I want to keep a symmetrical position, which does not understand each rupture created by design research immediately as problematic development. Actually, I think that when things get disconnected, alternative connections can emerge and something new can be built. This is what happened at the Bauhaus, where architects created ruptures between traditional design approaches, such as the Beaux-Arts style, by inventing modern design principles still admired today.[54] Another example that comes to mind are the students and young faculty who became politically active in the 1960s.[55] Driven by the ideals of their time, they wanted to radically change the way how architecture was taught in order to open the profession up for interaction with other disciplines, allow for more egalitarian interaction between teachers and students and foster exchange between architects and inhabitants. Although not all of the demands for change articulated in the 1960s survived, they have made a lasting impact in making architecture schools more open places, and some of the ideas are still visible in curricula. Taking this more productive dimension of ruptures into account, I understand it as an analytical term that calls for a balanced perspective. One that first analyses and describes disconnections and then reflects on problems as well as on new realms of action that the institutionalisation of design research might open up.

When I examine design research in this way, I reverse the analytical perspective of the laboratory studies. Instead of engaging with culture to question the established discourse on science, I will analyse how a discourse describing architecture as an academic and research-based activity, and the establishment of institutional settings within which this discourse were manifested (e.g., design PhDs, design research funding programs), might create ruptures

[54] For a history of the Bauhaus, see: Droste, M. (2002 [1990]): *Bauhaus. 1919- 1933.* Berlin: Taschen.
[55] For examples of what happened at architecture schools in the 1960s, see: Richards, W. (2017): *Revolt and Reform in Architecture's Academy: Urban Renewal, Race, and the Rise of Design in the Public Interest.* London: Routledge.

between architecture schools and the profession of architecture. Within this analytical frame, the already existing STS literature on architecture becomes part of my examination. Throughout this thesis it will serve as one further point of departure for reflecting on the academization of architecture. In combination with the sociological, anthropological and historic studies describing architecture as professional culture, I will use the work of Yaneva et al. for better understanding architectural knowledge. By analysing the relationship architectural building design knowledge has to knowledge produced in design research, I hope to learn how the rise of design research might contribute to epistemological changes at architecture schools. In this way, the notion of ruptures also adds also a new perspective to an emerging interest in the study of detachments in cultural anthropology and STS.[56]

Criticising Politics: Conditions and Concerns – Logics and Trajectories

Beyond redirecting the perspective of STS, I also use the notion of ruptures to adapt critical science policy studies to for the purpose of studying design research. In terms of political concepts, my analytical perspective is informed by scholars such as Sheila Slaugther and Larry Leslie who write about the rise of "academic capitalism",[57] blurring the boundaries between academia and the market, or Philip Mirowski, who criticises "neoliberal" science policymaking for embracing the idea of entrepreneurial freedom at the university.[58] The term that I will settle for when analysing the relationship between policymaking and design research is "marketization". Unlike related concepts such as neoliberalism, the term 'marketisation' opens up a wider perspective. While neoliberalism describes a set of beliefs and policies, such as the idea that "(…) human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills (…)"[59], utilizing the concept of marketisation, I can also analyse market oriented science policy decisions that might not be directly related to neoliberal ideas. My theoretical frame for examining these relations between science-focused market politics and design research is very much based on the work of the sociologist of science Elizabeth Popp Berman.[60] In her research on the marketization of universities in the USA, she shows that

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[56] Candea, M.; Cook, J.; Trundle, C. & Yarrow, T. [eds.] (2015): *Detachment: essays on the limits of relational thinking.* Manchester: University Press.
[57] Slaughter, S. & Leslie L. (1999): *Academic Capitalism. Politics, Policies, and the Entrepreneurial University.* Baltimore: Johns Hopkins University Press.
[58] Mirowski, P. (2011): *ScienceMart. Privatizing American Science.* Cambridge, MA: Harvard University Press. See also: Olssen, M. & Petersen, M. A. (2005): Neoliberalism, higher education and the knowledge economy: from the free market to knowledge capitalism. In *Journal of Education Policy*, 20/3, pp. 313-345.
[59] Harvey, D. (2005): *A Brief History of Neoliberalism.* Oxford: University Press, p. 2.
[60] Popp Berman, E. (2012): *Creating the Market University. How Academic Science became an Economic Engine.* Princeton: University Press. For marketization of universities in the UK, see: Brown, R. & Carasso, H. (2013): *Everything for Sale? The Marketisation of UK Higher Education.* Abingdon: Routledge.

political decisions made in the 1970s and 1980s created the conditions within which universities began to successfully build relations to the industry and to introduce research aiming at the generation of economic profit. According to Popp Berman, the abolishment of laws separating academic and market activities as well as the introduction of incentives for economic behaviour, such as permissions to patent research results, created the conditions within which academic actors began to engage in market-like behaviour. Adapting Popp Berman's thinking to my own research, I understand the acts of policymaking leading the marketization of the university as conditions that contribute to the rise of design research in the UK and USA.

Although I will draw heavily on this analytical perspective to analyse relations between the marketization of universities and design research, in terms of critique, my approach differs from the one of Popp Berman and other scholars critically engaging with science policymaking. This is because the same standards that are used to critically assess policy effects on the sciences cannot be applied to reflect on the consequences of science policymaking on a profession such as architecture. To give an example: Popp Berman herself problematises science policymaking because she holds policy reforms accountable for gradually replacing science's institutional logic of the search for truth with the economic profit motive. Much criticism by other science policy scholars goes in a similar direction, for example, when they negatively associate policymaking with the introduction of market structures responsible for compromising science's integrity. If I were now to apply this kind of critique to architecture, then I would create an almost silly situation. Since many architects at the university are also professionals for whom attracting and satisfying clients, running offices, collaborating with companies and in general existing in the market belongs to the daily business, it would be pointless to criticize architects for participating on a market. This is what being part of a profession involves.

Yet, these conceptual incompatibilities do not mean that it is impossible to use the work of Popp Berman and others to critically engage with the relation of design research and policies contributing to the marketization of universities. Here again, the notion of ruptures is very helpful to redirect the critical perspective part of policy studies. Interested in the ruptures design research creates between architecture schools and the profession, I will analyse to what extent market-oriented science policymaking contributes to the creation of these ruptures, and to the problems these ruptures might cause for the development and reproduction of the profession of architecture. Within the frame of my comparative analysis, this kind of examination happens with respect to cultural difference. I will focus on how policymaking set the conditions for the

rise of different cultures of design research and the ruptures these cultures create between architecture schools and the profession.

As I have already indicated shortly above, while introducing my interest in the policy dimension of design research, there is a potential danger inherent in a critical policy perspective like this one: to equate science policy contexts with research practices, interactions and ways of educating students. Various STS scholars have warned of using political contexts to explain practices because big and broad categories, such as marketization or economization, often cannot account for local complexities or wrongly associate these complexities with the analytical category.[61] In order to avoid this analytical mistake, I will fine tune my focus on problematic policy – culture relations by analysing the concerns that ruptures create. As STS studies on novel research fields have shown, analysing researchers' concerns is a way to investigate problematic relations between research practice and their political conditions.[62] One good example of this is the only publication on concerns that art and design PhD students experience during their course of studies, by the sociologist John Hockney. Interviewing students in newly established art and design PhD programs, Hockey shows how these students struggle with university rules and regulations as well as the tasks they have to fulfil in order to obtain a PhD.[63] According to Hockey, art and design PhDs understand themselves to be spontaneous, intuitive and open. Presenting evidence in a systematic fashion or engaging in analytical writing do not fit with their perceptions of creative freedom. In order to explain why this mismatch between self-conception and academic requirements could emerge, Hockey points out that, unlike their colleagues in science disciplines, art and design students were not prepared for this kind of research during the MA and BA studies. The disconnection between the different educational levels is present because art and design PhD programs have not evolved out of already existing study programs alone. Rather, British science policymaking was one strong reason for the introduction of these kinds of art and design PhDs. This in turn led to the introduction of PhD programs that have more to do with logics of academic research than

[61] For an overview of the debate see: Asdal, K. & Moser, I. (2012): Experiments in Context and Contexting. In *Science, Technology, & Human Values,* 37/4, pp. 291-306. One example: Murray, F. (2010): The Oncomouse That Roared: Hybrid Exchange Strategies as a Source of Distinction at the Boundary of Overlapping Institutions. In *American Journal of Sociology*, 116/2, pp. 341-388.

[62] For examples see: Felt, U.; Igelsböck, J; Schickowitz, A. & Völker, T. (2013): Growing into what? The (Un-)disciplined Socialization of Early Stage Researchers in Transdisciplinary Research. In *High Education,* 65. pp. 511-524; Zacharias, K (2018): *The Transdisciplinary Dilemma: Making SEAD in the Contemporary Research University,* PhD Thesis, Virginia Polytechnical Institute and State University.

[63] Hockey, J. (2007): United Kingdom Art and Design Practice-Based PhDs: Evidence from Students and Their Supervisors. In *Studies in Art Education*, 48/2, pp. 155-171.

with artistic practice. In that sense, it is not the students and their 'wrong' ideas about PhD research that can be made responsible for their confusions and concerns, but politics. Drawing on this kind of research, I will analyse concerns that architects and architecture students associate with the ruptures design research creates between architecture schools and the profession and examine what these concerns have to do with science policymaking.

Another way to circumvent drawing wrong connections between science policymaking and the ruptures design research might produce is by avoiding to only focus on the problematic aspects these ruptures create. For me this is important because I don't want to make the a priori assumption that, because market-oriented science reforms contributed to problematic ruptures, all design research activities are just expressions of the economisation of universities and all ruptures between architecture schools and the profession are a problem. Understanding ruptures as something that also can be desirable and productive – as an opportunity to build something new and to establish novel connections between parts that could not be connected before – my examination of politics wants to better understand architects' motives of becoming involved in establishing and conducting design research. In this way my analysis of disconnections between architecture schools and the profession wants to stay aware of the work of Candlin and Holert, who both highlight that the history of research in art and design has as much to do with science policymaking as it has with critical theory, feminism and conceptual art. Hence, design research cannot be understood without considering the effects of market-oriented reform. However, at the same time, recent design-research-driven developments at architecture schools cannot be reduced to these reforms.

Acknowledging architects' agency and the historic dimension of research in architecture, I will adapt what the STS scholars Andrew Barry and Georgina Born call "trajectories" and "logics of interdisciplinarity" in order to study the 'trajectories and logics of design research'.[64] Analysing how policymakers as well as researchers involved in contemporary interdisciplinary projects rationalize the importance and function of their research, Barry et al. identify different logics of interdisciplinarity motivating this kind of research. Juxtaposing these different logics with each other, the authors highlight that these logics cannot simply be viewed as the outcome of science policymaking initiatives. Although they acknowledge that it would be tempting to

[64] Barry, A.; Born, G. and Weszkalnys, G. (2008): Logics of Interdisciplinarity, In *Economy and Society*, 2, pp. 20-49; Born, G. & Barry, A. (2010): ART-SCIECNE. From Public Understanding to Public Experiment. In *Journal of Cultural Economy*, 3/1, pp. 103-119.

understand the rise of current interdisciplinarity as the sole outcome of the policy-driven marketisation of the university (e.g., calls for more collaboration with industry), they show that this would fall short. Drawing attention to the various reasons why scientists, engineers and artists collaborate with each other, they argue that it would be a mistake to view interdisciplinarity "(…) as entirely an emanation from governmental preoccupations with accountability, the knowledge economy or innovation, or as driven by commercial imperatives."[65] Giving examples of logics of interdisciplinarity deviating from current policy goals, they shown how researchers collaborate with each other, in order to critically intervene in environmental issues or to have a richer grasp of the social life of technical objects. The same is true for the trajectories of interdisciplinary projects. According to Born and Barry, they are not simply reducible to imaginations of innovation as articulated in programs funding transdisciplinary research. Interviewing artists involved in art-science collaborations about their work, they show that " (…) amongst the practitioners that we interviewed, art-science and its cognates are portrayed as stemming from a much larger, heterogeneous – if contested – space of historical coordinates."[66] According to the authors, these coordinates range from conceptual art, to technology movements to the new field of bio art. Utilizing this research of Born and Barry to analyse the politics of architectural design research, I will go beyond relating design research induced ruptures to market driven initiatives only. Therefore, additionally to analysing policymaking, I will examine the logics that motivate architects and architecture students to conduct design research and the historic trajectories that matter in this regard. In that sense, with regard to politics, my research tries to maintain a balanced perspective by taking into account decisions of UK- and USA-based policymakers as well as architects' actions and ideas about what design research is.

Research Methods and Case Studies

The methodological position of my analysis is one of the qualitative social sciences. Maintaining a bottom-up approach, my aim is to study what it means to conduct design research through the lens of practitioners, and to understand the ruptures between architecture school and the profession through the perspective of the ones experiencing it. Therefore, this thesis is

[65] Barry, A.; Born, G. and Weszkalnys, G. (2008): Logics of Interdisciplinarity, *Economy and Society*, 2, p. 23.
[66] Born, G. & Barry, A. (2010): ART-SCIECNE. From Public Understanding to Public Experiment. *Journal of Cultural Economy*, 3/1, p. 110.

less about statistical indicators or sources gathered in archives, but more based on descriptions of research practices and accounts of change. Being interested in identifying cultures, ruptures and the political dimension of all of this, the aspiration of my research is not so much to give detailed descriptions of all the characteristics of design research as I encountered it in the UK and USA. In this regard especially, my analytical focus on cultures is inspired by the concept of the ideal type, which Max Weber famously described as "(…) formed by the one-sided accentuation of one or more points of view and by the synthesis of a great many diffuse, discrete, more or less present and occasionally absent concrete individual phenomena, which are arranged according to those one-sidedly emphasized viewpoints into a unified analytical construct."[67] Focusing my analysis in this way, I want to draw attention to shared practices and ways of organising and educating design research. Doing so should allow me to identify to what extent different cultures are part of the phenomenon of design research and to ask what these cultures have to do with policymaking and to what extent they create ruptures between architecture schools and the profession. Something that would not be possible if I describe every design research project and all the political relations each project has in all its details.

Research Methods

Altogether, I combined three different methods for examining the culture and politics of design research:

1. Interviews conducted with professors, lecturers, heads of research programs and deans and administrators of architecture schools, as well as PhD and MA students. In these interviews I asked questions about design research activities and the social organisation and education of design research. Furthermore, I reflected with my interviewees on why and how research got institutionalised at their school and uncertainties related to the conduct of design research. In order to talk with the interviewees about these topics, I conducted "active interviews".[68] In these exchanges, both interviewer and interviewee are understood as active agents. Active interviews are considered to "(...) represent concerted efforts to collect actively assembled interpretations of experience that address particular research agendas."[69] As suggested by Holstein and Gubrium, I prepared a semi-standardised questionnaire prior to each interview. In order to make the interviews

[67] Weber, M. (1949): *On the Methodology of the Social Sciences.* Glencoe: The Free Press, p. 90.
[68] Holstein, J. A. & Gubrium; J. F. (1995): *The Active Interview.* Thousand Oaks: Sage.
[69] Ibid. p. 50.

comparable, the basic structure of each of the questionnaires remained the same throughout the entire time of my research. After introductory questions about the professional background of each interviewee, I asked about design research activities, outcomes of design research and about the interaction with others. I closed each interview with reflections on the institutional setting and political context design research is conducted in. When conducting interviews with architects involved in school administration activities, such as heads of architecture schools or of research programs, the questions about research activities were exchanged with questions addressing political decisions and developments related to design research.

2. Focused participant observations conducted in design studios and classes as well as gatherings, such as conferences and discussion rounds at architecture schools. These observations analysed practices of design research, student activities, interactions between students and instructors as well as produced outputs of design research and different ways to discuss and speak about design research.[70] All the observed activities were documented with written records as well as photos.[71]

3. Collecting documents related to design research. In particular I collected publications, PhD theses and educational curricula related to design research as well as documents concerning political issues, such as funding schemes of design research or university development goals.[72] This document-based data collection served as an addition to the actual fieldwork, which allows for a better knowledge of design research instructions, -concepts, -outputs and -techniques as well as the political discourse on design research.

I chose the "Grounded Theory" approach to analyse these data.[73] This approach works for a variety of data types, allowing to summarise as well as to explicate the different research materials collected. This makes it possible to analyse interview transcripts, observation notes as well as the other documents collected with one method. Another big advantage of Grounded Theory is that it is designed to generate theories out of the data, enabling me to theorise the

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[70] Knoblauch, H. (2001): Fokussierte Ethnographie: Soziologie, Ethnologie und die neue Welle der Ethnographie. In *Sozialer Sinn*, 2/1, pp. 123-141.
[71] Emerson, R. M.; Fretz, R. I. & Shaw, L. L. (2011): *Writing Ethnographic Fieldnotes.* Chicago: University Press.
[72] Wolf, S. (2004): Dokumenten- und Aktenanalyse. In Flick, U.; von Kardoff, E. & Steinke, I. [eds.]: *Qualitative Forschung. Ein Handbuch.* Hamburg: Reinbeck Verlag, pp. 502-513.
[73] Charmaz, K. (2006): *Constructing Grounded Theory. A Practical Guide Through Qualitative Analysis.* Los Angeles: Sage Publications; Strauss, A. & Corbin, J. (1998): *Basics for Qualitative Research Techniques and Procedures for Developing Grounded Theory.* London: Sage Publications.

relation between the culture of design research, policymaking and the transformation of architecture schools. Due to Grounded Theory's roots in symbolic interactionism and pragmatism, researchers using this method pay much attention to actions as well as to the question how social processes and practices unfold. Following the logic of Grounded Theory, the researcher first gathers materials such as interviews and observations. Once texts documenting the research efforts are available, the interpretation of data begins. According to the logic of Grounded Theory, the researcher has to start with an open way of coding his or her materials. In this first step, the codes are generated inductively out of the data material through assigning codes to single words, sentences or whole text passages in which social practices and processes are described. In a next step, these codes are summarised under different categories and the researcher has to relate the different categories to each other and to reflect about the character of their relation. As the categories are defined out of the initial codes, the work of coding, summarising them under a category and relating the categories to each other leads to the development of small theories 'grounded' in the data material of the researcher. The analysis process is open and allows for a mixture of data collection and data analysis efforts. In this regard, the definition and redefinition of codes and categories is an important part of the analysis process and leads to a permanent reflection of the generated analysis. I have focused the coding activities on the interview transcripts, observation notes and documents I collected and coded them according to the "open coding" logic, as described by Charmaz.[74]

I combined these open coding activities with a method called "Situational Analysis".[75] While Grounded Theory puts emphasis on practice and process, Situational Analysis draws attention to the arenas in which these practices and processes take place. Developed by the sociologist Adele Clarke as extension of the analytical tools of Grounded Theory, a Situational Analysis-based exploration identifies different actors, discourses and institutions involved in the creation of a situation and aims at identifying and describing their relations. In regard to my interest in design research and its relation to policymaking, this method allowed me to more precisely analyse the different policies, political players and institutional logics at architecture schools, and to relate these insights to the ways design research is practiced and how architects experience the rise of design research.

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[74] Charmaz, K. (2006): Constructing Grounded Theory. A Practical Guide Through Qualitative Analysis. Los Angeles: Sage Publications, pp. 42ff.
[75] Clark, A. E. (2005): Situational Analysis. Grounded Theory after the Postmodern Turn. Thousand Oaks: SAGE Publications.

Case Studies

I have applied these methods to analyse design research at altogether four different architecture schools; two in the UK and two in the USA (for an overview of the different case studies, the dates of my research stays and the research activities conducted there, see table below). I decided to maintain a case study-based approach, because I wanted to find out more about similarities and differences in regard to the culture and political dimension of design research at the different schools as well as within the different countries.

The selection of the cases was based on a variety of criteria. All of the chosen architecture schools offered either design research-driven MA or PhD courses or both. Each school was located within a well-known and highly ranked research university, therefore, I assumed that their individual research discourse structures were especially strong. Furthermore, the selected cases had strong design backgrounds and offered courses taught by professional architects. To make the comparison richer, the architecture schools were selected based on differences to the ways architectural research was implemented within them, as well as based on their historical development and general approach to architecture and architectural education.

During the years 2016 and 2017 I spent between 2 and 3 months at each architecture school. Architecture schools are complex institutions which offer various degree programs and employ faculty with different backgrounds. Hence, 3 months is a very short time period in which to gather data on design research activities at the different schools. Due to my interest in the academisation of the professional parts of the discipline of architecture at universities, I decided to limit the scope of my analysis by focusing attention on three parameters. One the one hand, I just analysed design research in the so-called 'accredited' educational programs. These programs are not just considered to be the heart and soul of most architecture schools, they are also closest to the profession of architecture. They are accredited by the professional bodies of each country (the Royal Institute for British Architecture [RIBA] in the UK and the American Institute for Architects [AIA] in the USA), therefore students are allowed to call themselves architect and practice as architect after graduation. On the other hand, I engaged with design research activities of architects teaching in these accredited programs. As their task is to teach students design, they are the ones closest to the profession of architecture. Furthermore, to find out more about the design research activities of architects teaching in professional programs allows me to find out more about the relation of the conduct of design research and research education at each school. Additionally, for the analysis of design research education in

professional programs and the research activities of architects teaching these programs, I focused on PhD programs dedicated to design research. Since these programs are a rather novel phenomenon closely related to recent policy reforms, I wanted to know more about the ways PhD students conduct design research in order to better understand how this kind of research is related to professional architecture practice.

UK	**USA**
Architecture School: UK 1 Design Research conducted by: MA- and PhD Students Faculty Dates of research stay: 11.01.2016 – 25.03.2016 Data collected: Interviews: 21 Photos: 723 Documents: 410 Notebooks filled with fieldnotes: 2	**Architecture School: US 1** Design Research conducted by: MA Students Faculty Date of research stay: 10.01.2017 – 30.05.2017 Data collected: Interviews: 19 Photos: 744 Documents: 69 Notebooks filled with fieldnotes: 2
Architecture School: UK 2 Design Research conducted by: MA Students Date of research stay: 18.04.2016 – 10.06.2016 Data collected: Interviews: 26 Photos: 328 Documents: 69 Notebooks filled with fieldnotes: 2	**Architecture School: US 2** Design Research conducted by: MA Students Faculty Date of research stay: 15.03.2017 – 30.05.2017 Data collected: Interviews: 16 Photos: 268 Documents: 15 Notebooks filled with fieldnotes: 1

The variations in the amount of data collected and time spent at the schools as displayed in the table above have different reasons. Firstly, I could not collect the same amount of interviews at each school. Some schools were smaller than others, reducing the number of possible interview partners and at places architects were more open to my research and more willing to give me interviews than others. The same goes for documents, observations and photos. Some of the schools produced more documents related to design research, other schools were more open to the idea of having an ethnographer observing their design research activities and taking pictures. Altogether this resulted in different numbers of data collected. During my time at each school I tried to balance variations. In case it was difficult to conduct interviews, I tried spend more time observing and collecting documents and vice versa. The reason why the research stay at the architecture school US 1 was much longer than at all the other schools was due to organizational issues. In order to make my research stay in the USA work, I needed a VISA and place of residence. Thanks to the support of my supervisor at this school, I could establish all of this at this particular school. Furthermore, I was able to commute to US 2 from this place of residence. Despite the longer time of my research stay, I was cautious making sure that I spend approximately the same amount of time at each of the analysed architecture schools.

For two reasons I have decided to anonymise all my case studies. Firstly, speaking with architects not just about the ways they practice design research but also about how they experience the implementation of design research at their architecture schools and the uncertainties going along with these transformation, I got involved in critical discussions about the actions of policymakers, university administrators and fellow faculty members. To me all of this was very valuable information allowing me to better understand the transformation of architecture schools and the relations these transformations have to policymaking. However, as valuable as this information might be, no architect or student who shared with me this kind of experiences should have a disadvantage out of being part of this thesis and because of his or her critical comments. Secondly, I wanted to draw attention away from individual research projects, architecture schools and designs. As my research is interested in cultures and politics, I did want to create a distance between architects, their work, the schools they do their work in and my analysis. Especially in field such as architecture, in which individual authorship is of such high value and in which many school built individual reputations, I did not want to see my research being caught up in the descriptions of singular projects and places and losing sight of cultural relations and political dynamics. This does not mean that my research is not interested in individual research projects. When it is though, then not to highlight the work of individual

architects but to give more details about activities within a culture. To anonymise my data helped me directing attention to cultures and politics.

Scope of Analysis and Research Strategy

As already mentioned various times, I consider this research to be about cultures of design research, their relation to politics and the ruptures between architecture schools and the profession they produce. Decisions on whom to interview and which studios and seminars to observe were done before and during each field trip. I prepared myself for each research stay by collecting documents about the schools and analysing their webpages beforehand. Based on this desk based examinations, I made lists with potential interview partners conducting design research and studios in which design research takes place. The purpose of these lists was to get an overview of the approaches to design research present and of the different people conducting research and the backgrounds and positions they have each of the analysed schools. During my time in the field, I used this information to monitor my research activities, in order to collect different impressions of the practice, knowledge social organization and education of design research and of the ways how architects experience the transformation of architecture schools and the effects policymaking. Yet, I did not just select possible interview partners and observation occasions based on the information I gathered beforehand. Utilizing a snowball sampling approach, I followed leads from people I met during my field trips and tried to establish contacts to other architects and students by recommendation.[76] The advantage of this method is that it allows the researcher to adapt to the actual situation, once I had arrived at a school. As already mentioned above, architects and students at the analysed schools had different attitudes towards my research and I treated architects' offers for help with establishing new contacts as welcome support. More importantly however, I decided to use this method because I wanted to find out more about cultures of design research. As already mentioned above, instead of traveling from architecture school to architecture school in order to collect data covering all and each research activity, I was more interested identifying shared ways of conducting, organizing and teaching this kind of research. In this regard, recommendations about fellow architects and students were immensely helpful for identifying architects and students maintaining similar approaches to design research. Having collected data in this way, I consider my research as giving impressions of different cultures design research and their relations to acts policymaking in the UK and USA.

[76] Biernacki, P. & Waldorf, D. (1981): Snowball Sampling: Problems and Techniques of Chain Referral Sampling. In *Sociological Methods & Research*, 10/2, pp. 141-163.

The Culture of Analytical Speculation

The first time I felt curious about the culture of "Analytical Speculation" was at an event I attended at the UK 1. This event was organised by graduate students, who invited faculty members to present and discuss their research activities. Since this was my first fieldtrip, and I had just arrived in the UK a couple of days ago, this kind of public happening was the perfect occasion to gather first impressions about an architecture school that was internationally renowned for its support of design research. It offered a PhD by Design program, had various professor- and lecturer positions dedicated to design research and the faculty were involved in making design research publicly visible through different formats, such as publications, exhibitions or events as the one I was about to attend.

In order to join this event, I had to go to the main lecture hall of the UK 1. This hall wall located at the ground floor of the school building: a 5-story-high and 200-meter-long warehouse, with a brownish brick-stone façade out of the 1960s, that provided enough space for all the 250 staff members and 1300 students of the UK 1. Entering this lecture hall, I was surrounded by approximately 150 chairs out of either yellow or grey plastic, a speaker's desk, a projection screen and around 70 visitors, which I identified to be mainly architecture students and some professors and lecturers. The walls of the lecture hall were white brick, and I could hear the noise of cars driving up and down an adjacent multi-lane road. Although all these new impressions made it difficult to concentrate on the architects' presentations, I noted one thing that became an important piece of information for identifying and describing design research at the UK 1: the architects who presented their research activities did not use design practices to develop buildings, but as tools to analyse spatial aspects of topics they were interested in.

The presentation that I found to be the most remarkable in this regard was by an architect who occupied the position of a senior lecturer at this school. In her presentation she talked about her design research approach and how she used architectural design practices as tools of analysis. Instead of using models and sketches to design a building, as architects in an office would do, she utilized these techniques to come up with new spatial readings and interpretation of artworks. No matter whether movies or paintings, she analysed these artworks by drawing and

modelling them and generated knowledge about the spatial properties and the relation of an artworks' content to its spatial construction. Throughout the presentation she also gave examples of her work, showing how she rebuilt a film as an architectural model and how she reinterpreted an art installation by spatially drawing and modelling parts of this installation. One of the biggest models she presented was based on her analysis of an avant-garde movie from the 1960s. In order to, as she said, "break the continuity of the film and present it as a spatial construct", she selected a few scenes and projected them onto a table she had built. The table was an abstract paper model of the hotel in which most parts of the film take place. By projecting scenes of the movie onto this table, she showed how the movie's topics are linked to the architecture of the hotel. Analysing relations between the narration of the movie and the depiction of architecture, she explained for example how the topic of desire is not just expressed through the interaction of the protagonists but also through the way the ornamented ceiling of the hotel got staged in the movie. Additionally, to presenting the design-based analysis, the senior lecturer talked about how publishing belonged to her research activities and that she wrote about her design-based research activities. In combination, the design and the text-based work led to various publications, in which she presented her work, built relations to discourses of other scholars dealing with similar topics, and summarized the findings of her research. These publications ranged from contributions to journals and booklets published by the UK 1, to a book.

While listening to the senior lecturer, I got the impression that her way of conducting design research actually did not have much to do with the work that architects did at architecture school. In one of the most compelling accounts of the culture of architecture in the late 20th century, the anthropologist and architect Dana Cuff portrays architecture schools as institutions closely related to the professional education, where students need to engage with a wide range of topics important for becoming architects, reaching from construction techniques and building statics to historic, legal and social aspects of architecture.[77] Most importantly, though, at the architecture schools described by Cuff, novice architects learn to invent, represent and discuss designs of buildings. Architecture degrees were held to teach students to synthesize architecture's aesthetic, technical, material and social aspects, by introducing students to different building design approaches. The people Cuff identifies as design teachers are mostly professional architects who are employed by or run an architectural office next to their

[77] Cuff, D. (1993 [1991]): *Architecture: The Story of Practice.* Cambridge, MA: MIT Press, pp. 63-66; 118-129.

engagement at the university. The historian Spiro Kostof describes what being a professional architect has entailed since the 19th century as follows:

> "This is what architects are, conceivers of buildings. What they do is to design, that is, supply concrete images for a new structure so that it can be put up. The primary task of the architect, then as now, is to communicate what proposed buildings should be and look like. The architect does not initiate buildings, nor necessarily take part in the physical act of construction. The architect's role is that of a mediator between the client, or patron, that is, the person who decides to build, and the work force with its overseers (…)."[78]

Compared to these accounts of professional architectural work and education, the research activities the senior lecturer presented at her talk at the UK 1 seemed rather unusual. If the senior lecturer had been invited to talk about her work at an architecture school described by Cuff, then she would have most likely talked about her approach to building design and presented the buildings she had worked on as a professional architecture. Maybe she would have also introduced her approach to design education. However, she did none of that. Instead, in the description of the design research she conducted at the UK 1, she did talk about design-based analysis leading to spatial interpretations of artworks and how this led to publications and not buildings.

As I wanted to find out more about the ways design research transforms architecture schools and how it might create ruptures between these schools and the profession, for me it was fascinating to witness a presentation in which design research contrasted so strongly with architectural practice. In particular, I wanted to find out to what extent additional members of the UK 1 conducted research in the way the senior lecturer did, and if so, how these research activities were organised and taught.

Focus on one Culture

Curious about cultures of design research, I spent most of my time at UK 1 conducting interviews with architects. I asked questions about their research activities, their modes of organising and teaching design research, and their participation in events like conferences,

[78] Kostof, S. (2000 [1977]): Preface. In ibid. [ed.]: *The Architect. Chapters in the History of the Profession.* Berkley: University of California Press, pp. xvii.

seminars and studio teaching sessions. The outcomes of these interviews and observations were very diverse. I met architects who made no distinction between design research and the building design projects they realised in their office and others who relied heavily on practices of other disciplines to conduct research. However, I also identified a group of architects that conducted research in a similar way as the people presenting their work at the event described above. As the senior lecturer, these architects used design practices to analyse spatial aspects of topics and issues they were interested. I decided to refer to these architects as belonging to the culture of 'Analytical Speculation', because analysis was not the only thing they did when conducting design research. Engaging more closely with their activities, I realised that many of the architects belonging to this group were engaged in, as they called it, "speculative design". This means that they created designs, in order to make proposals opening up new perspective on what architecture could become and how it can be done differently. Furthermore, I realised that these architects had established their own research community and they participated heavily in the PhD by Design program of the UK 1.

For two reasons I decided to focus my research on the activities of this particular group. Firstly, the architects belonging to this group were strongly represented at the UK 1 and occupied various different positions ranging from lecturer and professor to director of the PhD by Design program and Vice-Dean of the department of architecture the UK 1 belonged to. Secondly, they were heavily involved in establishing the discourse of design research. Wanting to know more about how design research transforms architecture schools and their relation to the profession, the various, and at times influential, positions that the members of this culture occupied at the UK 1 as well as their participation in the debates about design research made this culture interesting to me.

In order to provide a more detailed description of the ruptures that the culture of Analytical Speculation created between the UK 1 and the profession of architecture, in the following pages, I will describe the practice, social organisation, education and knowledge that constituted this culture. Closely related to these descriptions, I will reflect on how this culture differed from professional architectural work and show some of the few remaining ties it still had to professional education.

Analysis and Speculation

As I have already shown in the example of the senior lecturer above, in the culture of Analytical Speculation, architects used the practices of sketching, model making and digital drawing as tools for analysis. For them this meant to do work that has not much to do with professional architectural activities. Instead of being occupied with designing buildings, they drew sketches and made models to produce knowledge about the spatial aspects of the topic or object they were interested in. One of my interviewees made this clear by saying:

> "I think that for me, quite simply, research in architecture is not so much about designing new buildings, or even having a building as a subject matter, but using the methodology that we are taught as architects to think through, to apply to other fields (...)"[79]

Beyond doing this kind of analytic design, the architects put effort in building relations between their design activities and scholarly debates about the topics they dealt with. To do so meant having to contextualise design. In an interview, one architect, described design research to me in the following way:

> "(…) [design research] is that through making a design, a very particular set of knowledge can be established in its own rights, but also, in a way, can be put in a context."[80]

The members of the culture of Analytical Speculation achieved this contextualisation by reviewing literature and building connections between academic discourses on the topics in which they were interested and their design activities. Although literature reviews were not limited to one discipline, and architects understood their work as generally open to different kinds of inputs, they mostly engaged with works from the humanities and social sciences. Hence, to search for and read literature most of the time meant to get a better understanding of historic, social, political or philosophical dimensions of the topic they were dealing with.

For some of the architects, design research stopped after they built relations between their analytical design activities and the literature they used to contextualise their activities. The

[79] Interview, 03.02.2016, min. 12.
[80] Interview, 30.01.2016, min. 9.

senior lecturer I mentioned above who applied design to analyse the spatial construction of artworks, for example, ended her research at this point. For others, however, one more element belonged to their research activities. One further practice that was part of the culture of Analytical Speculation was the practice of speculation, and many of the architects I met engaged with, as one of my interviewees put it, the "realm of what if".[81] To speculate, architects created new design artefacts or introduced novel ways of designing. Often these activities were closely related to the knowledge they gained beforehand by means of design-based analysis and contextualisation. To what extent their designs would or could lead to the realisation of buildings did not matter to the architects. They understood the design artefacts or approaches they introduced to be proposals opening up new perspectives on what architecture is, what it could become and how it can be done. Hence, for the architects belonging to the culture of Analytical speculation, it was more important to contribute to the further development of architecture's design capacities than to produce building designs when speculating. In this regard the introduction of new aesthetics, styles, building types, -forms and -typologies was as much a valued outcome as the development of novel ways to process building materials or the application of architectural design practices to areas that did not belong to the realm of architecture before, such as computer games.

During my three months at the UK 1, I was able to observe several different ways of conducting speculative design research. For some architects, conducting design research meant to analyse architectural developments of the past in order to speculate about the future. In one of the research projects, two architects collected archival material on the development of energy and traffic infrastructures in a city on the West Coast of the USA. Interested in urban development in the future, the architects used this knowledge as point of departure for their speculations. Looking decades and centuries ahead, they made images and models in which they speculated about novel types of urban infrastructures that might one day be developed. These encompassed a new kind of power station that captured the forces released by plate tectonics underneath this city and converted them into energy as well as a freeway system that got used as astronomical device training its users eyes for star watching. Other members of this culture had a more contemporary perspective. In this regard, I learned from a young architect how he analysed computer games through drawing them as cartographical maps as well as by taking photos documenting the games' aesthetics. Furthermore, he collected literature, which included

[81] Interview, 21.03.2016, min. 4.

research on social and psychological factors responsible for giving players of computer games the feeling of being involved in a game as well as architects reflections on the design potentials of computers. The architect used this knowledge to speculate about new possibilities of digital architecture. To do so he created himself computer games, in which players became architects. By exaggerating trends of urban change, one game critically reacted to London's changing skyline. Being responsible for building luxury high-rise developments, the player had to design and advertise skyscrapers for the super-rich. In a second game developed by the young architect, players were encouraged to co-design cities and therefore enabled to create possible urban development scenarios. Again, other members of the culture of Analytical Speculation had chosen a hands-on making approach. They combined digital technology, robotics and knowledge about the history of local construction materials and procedures, in order to invent novel architectural building elements (e.g., digitally produced ornaments) and production techniques, which could change both the way building materials are produced as well as their aesthetics and forms.

Doing research in this way, the architects belonging to the culture of Analytical Speculation produced multiple different outputs. These ranged from singular artefacts, to exhibitions in which the architects presented their designs, to publications such as books and journal contributions. In these publications, the architects documented their analytical and speculative design activities as with images of their sketches and models. They also drew connections between the literature they read and their design work in these publications.

A University-Based Community

In terms of social organisation, being part of the culture of Analytical Speculation meant to work mainly at the university. This work included research, as well as tasks related to administration and teaching. In case an architect belonging to this culture did not have a full-time position at the UK 1, she or he had often a further part time job at another university.

Through talking with interviewees about their ways of exchanging with others, and by attending events at the UK 1 myself, I learned that the architects belonging to the culture of Analytical Speculation were open for interaction with all different kind of disciplines. Depending on their research topic, they would write articles for all different kinds of journals and participate at

conferences of various scientific communities. The culture of Analytical Speculation's defining organisational feature, however, was not its relation to other disciplines. What I understood to be the organisational backbone of this culture was actually a close-knit research community, which the culture's members had built by implementing elements and organising principles from scientific disciplines.[82]

This organisational adoption of scientific procedures and modes of exchange happened on various levels. For example, did the architects belonging to the culture of Analytical Speculation establish peer structures for mutual support. As various architects told me, at the UK 1 a "mentoring system" existed. More experienced design researchers regularly met with architects new to this kind of research. In their meetings they discussed difficulties architects experienced when conducting research as well as career related issues, such as possibilities of gaining visibility as researcher, future projects and where and how funding could be acquired. Apart from these rather local and school centred modes of social organisation, forums existed, which allowed members of the culture of Analytical Speculation to communicate with others conducting similar kind of research on a national and international level. Asking the design researchers of the UK 1 how they exchange with others about their research, next to their local school-based activities, they mentioned networks, conferences, journals and books. Examples are the "Architectural Humanities Research Association", the journal "ARENA Journal for Architectural Research" as well as the book series "Design Research in Architecture" published by Ashgate since 2013. In addition to the book series, members of the culture of Analytical Speculation also published their research in design research booklets edited by the UK 1. In these booklets, faculty summarized their work and research outcomes in approximately 50 pages.

Comparing these means of exchange with the modes of interaction present at professional architecture schools, we can say that the social organisation of the culture of Analytical Speculation disconnected this culture as much from the profession as did its practice and outputs. Instead of teaching design while working for an architectural office, as it would happen in professional contexts, being part of the culture of Analytical Speculation meant to belong to a university-based research community. In order to get a more detailed impression how the

[82] For impressions on the social organisation of scientific discipline, see: Becher, T. & Trowler, P. R. (2001): Academic Tribes and Territories. Buckingham: The Society for Research into Higher Education & Open University Press, ch. 5, 6.

modes of exchange established by the members of the culture of Analytical Speculation differed from professional ones, we just need to have a look at the research of the architecture sociologist Garry Stevens. In his study on the social structure of architecture, he identifies various ways how architects communicate with each other, describing architectural discourse as taking place in newspapers as well as in "(…) in galleries, museums, in the private sector, historical conservation, and in various cultural organizations that contribute to the work in the area."[83] He also identifies journals that have served architects for communicating about their activities already several decades before anyone spoke of design research, such as AIA Journal or Architectural Review.[84] These communication channels are used by various people belonging to the profession of architecture or communicating with the profession such as architecture critics, professional architects, architecture historians, clients as well journalists.[85] The mentoring systems, books and journals that I identified as belonging to the culture of Analytical Speculation, on the other hand, were mainly dedicated to exchange between architects doing research and working at the university.

The extent to which this difference also changed how communication of research outcomes was organised becomes visible when looking at the different architectural journals. The 'classical' architectural journals Steven writes about are published by professional associations, practitioners, private publishers or art institutions. The content of these publications are current buildings and building designs as well as discussions of these buildings, and, as Stevens writes, the journals' "editors compete to obtain the rights to the most fashionable projects and architects".[86] The books and journals in which the members of the culture of Analytical Speculation distributed their work, however, were either published by universities themselves, by academic publishing houses or academic societies. This also affected the way how content got selected. Instead of editors looking for "fashionable projects and architects" [87], selection procedures of the sciences got implemented. This should assure that research quality and not professional fame and fashion is the deciding factor for whether a contribution gets published

[83] Stevens, G. (1998): *The Favored Circle. The Social Foundations of Architectural Distinction.* Cambridge, MA: MIT Press, p. 208.
[84] Ibid., p. 209.
[85] For a more detailed description of the way the discourse connects different parts of the profession of architecture, see also: Sarfatti Larson, M. (1995 [1993]): *Behind the Postmodern Façade. Architectural Change in the Late Twentieth-Century America.* Berkley: University of California Press, p. 9ff.
[86] Stevens, G. (1998): *The Favored Circle. The Social Foundations of Architectural Distinction.* Cambridge, MA: MIT Press, p. 209.
[87] Ibid., p. 209.

or not. For example, the journal ARENA assesses the quality of all submissions through a partly anonymous peer-review process, which they communicate in their editorial policies like this:

> "All submissions are initially assessed by the Editor-in-Chief, who decides whether or not the article fits the scope of the journal and is suitable for peer review. The submission will then be passed on to a pair of specialist Editors for each of the sections in the journal (…). Submissions considered suitable by the specialist Editors are then assigned to two or more experts to peer review the paper. (…) The journal operates a 'double-blind' peer review process, meaning that authors and reviewers remain anonymous for the review process. (…) Based on the reviewer reports the editor will make a recommendation for rejection, minor or major revisions, or acceptance."[88]

While I present quotes like this one to identify how the culture of Analytical Speculation created ruptures between its architecture school and the profession, it is important to not overlook that the members of the culture of Analytical Speculation still participated in events and gatherings belonging to the world of professional architecture, such as exhibitions. Yet, when they did then they often established their own kind of research community structures at these events. An example is one of the first international conferences open for design research as conducted in the culture of Analytical Speculation, which took place in 2014 at one of the most prestigious events happening within the world of architecture: the Venice Architectural Biennale.[89] Titled the "Architectural Design Research Symposium", this conference was hosted by the architecture pavilion of New Zealand. Instead of presenting architectural design, as is custom at this Biennale, the conference was attended by more than 30 architects from all around the world discussing their design research activities at this symposium.

One further overlap between the social organisation of the world of professional architecture schools and the culture of Analytical Speculation that I could identify had something to do with the place where work was done. Both the architects working in offices as well as the members of the culture of Analytical Speculation conducted their design-based work in studios or ateliers. There they made connections between the literature they read, the topics they were

[88] See: https://ajar.arena-architecture.eu/about/editorialpolicies/ (04.02.2021)
[89] Smitheram, J.; Moloney, J. & Twose, S. [eds.] (2014): Proceedings of the *Architectural Design Research Symposium 20 – 21 November,* Venice Biennale of Architecture, Victoria University Wellington.

interested in and their design activities. In accordance with the STS scholars Alex Wilkie and Mike Michael, these studios can be understood as centres of synthesis, which they theorise as:

> "(…) we suggest that design studios can be productively understood as centres characterized by the compounding of entities, expertise and practices that are ordered and integrated through a multiplicity of processes. More specifically, we suggest that design studios entail processes wherein a heterogenous variety of elements are brought together and combine [sic] to generate knowledge (and its accoutrements) of some sort or another."[90]

However, as with the conference and publications, while noting these similarities, it is important to be aware that a design studio of a member of the culture of Analytical Speculation was used differently to an architectural office. As already mentioned above, the design of buildings was no central constituent of this culture of design research. Furthermore, the studios of the design researchers I describe here did not host design teams. Unlike professional architects, who, as Dana Cuff shows, often work together with several others in an office, the people belonging to the culture of Analytical Speculation conducted research either on their own, or they collaborated with one or two other researchers.[91] As I learned during my time at the UK 1, these collaborations were often project based and lasted for a couple of months. Only seldomly did I meet two or more design researchers with a shared research agenda. In this case, collaboration lasted for years rather than months.

The PhD by Design and Professional Education

In matters of education, the members of the culture of Analytical Speculation were heavily involved in supervising students of the PhD by Design program at the UK 1. Similar to the members of this culture, the students who attended this program used architectural design for analytical and speculative purposes. The outcome of such a PhD should be a design project, which opens up new perspectives on the architectural dimension of the topics the PhD students engaged with as well as a text of 60,000 words, describing and reflecting on their design

[90] Wilkie, A. & Michael, M. (2018): The design studio as a centre of synthesis. In Farias, I. & Wilkie, A. [eds.]: *Studio Studies. Operations, topologies and displacements.* Abingdon: Routledge, p. 29.
[91] Cuff, D. (1993 [1991]): *Architecture: The Story of Practice.* Cambridge, MA: MIT Press, ch. 5.

activities. For the field of architecture, the existence of such a PhD program was not self-evident. Before the introduction of this kind of design-based PhD programs at British architecture schools in the early 2000s, architects who wanted to obtain a PhD either could do one in architectural history or one related to the natural- and technical sciences, such as engineering.[92] In order to be accepted to PhD by design program at the UK 1, applicants had to submit a written project proposal, in which they needed to outline the research question(s) they are interested in, the methods they intend to use, a schedule for their PhD and possible outcomes. Furthermore, applicants had to submit a portfolio, in which they should prove their ability to work visually by including outcomes of their artistic or design-based work.

As most of the lecturers and professors belonging to the culture of Analytical Speculation, the PhD students did not practice as professional architects. During their PhDs, candidates did neither gain experience at architectural offices, nor were their degrees considered to be professional preparation. Instead, this PhD should prepare young architects for careers in academia. The director of this PhD by Design program once explained the difference between the PhD and the MA in architecture to me like this:

> "I have always sort of thought that research should be about pushing the discipline, and challenging the discipline, and the PhD is an original contribution to knowledge. (…) And I think Doctor means originally, the term, means teacher. And it definitely, the program, does attract people who, to some degrees, want to have an academic career."[93]

To support the academic development of the PhD students, the UK 1 also established structures for supervision and feedback. All of the students I talked to had regular supervisor meetings in which they received feedback on designs or text drafts, or could ask questions regarding their research activities. There were also more open formats of exchange, such as a "PhD by Design Conference" organised by the UK 1, in which students held public presentations. Although a research stay of three months was simply too short to analyse how many of the PhD students I met continued their academic careers, I noted a reproductive relation between the PhD by design and the culture of Analytical Speculation. Several of the lectures and professors I met at the UK 1 were once students in the school's PhD by Design program, which meant that the

[92] For a short history of the PhD in Art, Design and Architecture, see: : Rust, C.; Mottram, J. & Till, J. (2007): *Review of practice-led research in art, design & architecture.* UK, Arts and Humanities Research Council, pp. 19ff.
[93] Interview, 16.02.2016, min. 18.

PhD by Design program contributed to the reproduction of the culture of Analytical Speculation at the UK 1.

Professional Education

Writing about the PhD, I also would like to mention the relation between the culture of Analytical Speculation and the professional Bachelor (BA) and Master (MA) of Architecture offered at the UK 1. This is interesting because there existed a kind of half relation between the culture of Analytical Speculation and these educational programs: in terms of practice, they were different, but in terms of social organisation, they overlapped.

I identified the BA and MA education to be overlapping with the social organisation of the culture of Analytical Speculation, because architects belonging to the culture of Analytical Speculation taught design studios in the MA as well as in the BA. Doing so, they introduced students to the topics and design approaches they dealt with in their research. Hence, students engaged with the research topics of the design researchers, such as urban futures or novel building elements. However, the ways that took place in the MA and BA studios differed considerably from the way research was conducted in the culture of Analytical Speculation.

Spending time with students and attending various "crits", in which tutors and invited guests provide feedback to students on their design work, I got the impression that the design practice taught in BA and MA was more closely related to the profession than the research practice in the culture of Analytical Speculation. Since the BA and MA programs I analysed were professional architectural programs, allowing students to become practicing architects after graduation, they needed to be oriented along the lines of professional practice. Above all, this meant to be introduced to the basics of building design. If this did not happen, the UK 1 would lose its authority to award professional degrees. In case the Royal Institute of British Architects (RIBA) deemed the professional education of the UK 1 as not compatible anymore with professional standards, they could take back the school's status as professional education institution.[94] As this would go hand in hand with a loss of practically all students studying

[94] For RIBA's validation criteria, see document: RIBA (2011): *Procedures for validation and validation criteria for UK and international courses and examinations in architecture.* Online available at: https://www.architecture.com/-/media/C51FE552841E45628A0F327593597FC5.pdf?la=en (05.02.2021)

architecture because they want to enter the profession, most architecture schools were keen on avoiding this.[95]

Hence, instead of being engaged in analytical speculation about topics such as art works or computer games, the students were educated in studios which had to reproduce professional practice. Highlighting the relation between the profession and architecture education in this way, I want to mention that it would be wrong to assume that architecture schools and the profession have ever overlapped entirely. This is due the simple fact that schools do not have clients, and that a university-based design studio is not an office which has to make a profit. Therefore, students have always had more freedom to realise their own design ideas in architecture school. However, in educational studios belonging to professional degree programs, teachers have to make sure that an orientation towards working for clients exists by defining topics and briefs that students have to deal with in their designs. In that sense, professional architecture education can be understood as simulating, as the sociologist of architecture Magali Sarfatti Larson put it, "(…) practical problems for which apprentice architects must find realistic solutions".[96]

The members of the culture of Analytical Speculation expressed this professional orientation of education by highlighting how students in both, the BA and the MA, needed to engage with the complexities of building design. Asking one design tutor about what the BA students need to do in his studio, he replied:

> "(…) the students have to produce two [design] projects, one that is smaller, one that is bigger, and also they have a lot of compliances they have to do. They have to design a building, the building has to have a certain kind of resolution and complexity, so that they can get… at the end, the 3rd years get awarded a Bachelor degree." [97]

In order to achieve the required complexity, students needed to consider various aspects in their designs ranging from lighting and access to different floors of a building to legal and technical

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[95] On the history and importance of professional licensure in architecture see: Crinson, M. & Lubbock, J. (1994): *Architecture: art or profession? Three Hundred Years of Architectural Education in Britain.* Manchester: University Press; ch. 2; Cuff, D. (1993 [1991]): *Architecture: The Story of Practice.* Cambridge, MA: MIT Press, p. 41ff.
[96] Sarfatti Larson, M. (1995 [1993]): *Behind the Postmodern Façade. Architectural Change in the Late Twentieth-Century America.* Berkley: University of California Press, p. 10.
[97] Interview, 30.01.2016, min. 77.

issues related to the materialisation of buildings. For example, the design tutors asked the students to include elements in their designs, such as fire exits, or to describe how their design proposal reacts to local wind conditions, in terms of technical construction and safety. These were things that the architects belonging to the culture of Analytical Speculation did not need to think about in their work, but which architects working in professional practice had to in theirs. On the other hand, students in the MA and BA did not have to engage in as much design reflection as the members of the culture of Analytical Speculation were expected to. Talking with the head of the PhD by design program about differences between the MA and the PhD, he told me:

> "And one of the ways in which it [the PhD by Design] is different, say for instance, from a Masters course (…) is that on the Masters course a student can do a wonderful piece of work, but they don't need to know why it is a wonderful piece of work. But with a PhD (…) you always have to be able to do something that is original, but you have to contextualize it."[98]

Considering the overlaps as well as the differences with professional work and education, I understand the culture of Analytical Speculation as one that created ruptures between the UK 1 and the profession with regard to practice and social organisation. In terms of education, however, some this culture just cut half of the ties relating it to professional education. On the one hand the culture's members taught design in the professional BA and MA programs of the UK 1. On the other hand, while the students needed to figure out how to design buildings considering parameters important for actual construction, the members of the culture of Analytical Speculation did not have to care about those things in their research.

Knowledge about Form and Style

One further rupture between the UK 1 and the profession was added by the culture of Analytical Speculation with regards to knowledge. Before I provide an example of this knowledge, I want to have a look at how the STS scholar Albena Yaneva describes professional building design knowledge. This should help to better understand the epistemological differences between the

[98] Interview, 16.02.2016, min. 18.

knowledge that was part of the culture of Analytical Speculation and the knowledge that architects produce in offices or in BA or MA studios.

Drawing on ethnographic research about the work that members of one architectural office put into designing the extension to the Whitney Museum in New York City, Yaneva highlights that doing architectural design means gaining knowledge about a building before it is actually built.[99] To do so, the architects working on a the new Whitney Museum had to deal with various different kinds of knowledge, including: knowledge about the history of the museum (construction and its live as publicly debated object); knowledge about legal regulations and client requirements; knowledge about the new buildings style, aesthetics and materiality; and knowledge about the extension's relation to its urban environment (the traffic, style on volumes of surrounding buildings). As Yaneva shows, architects relate all these different kinds of knowledge to each when other working on building designs. In greater detail, she describes how architects get to know buildings by making models out of foam, drawing sketches on paper or using the computer to visualise and relate the various different parts of a building to each other. In case of the museum extension, this included design considerations about the floors and areas of a museum, the function and content of the different rooms and their relation to each other (are they connected through stairs, a hallway or are they positioned adjacent to each other), how visitors can enter and move through the building, the look of the façade, the volume of the building and its components as well as the buildings position within its surrounding area.

A different kind of knowledge from the one described above is created in the culture of Analytical Speculation. Instead of combining heterogenous knowledge about architectural styles, visitor movement and building regulations, in order to arrive at a design that a client could build, architects belonging to the culture of Analytical Speculation focused their attention on the analysis and development of circumscribed areas of interest. One defining characteristic of this knowledge is that it was often knowledge about form and style aspects of the research topics the members of the culture of Analytical Speculation were interested in. This means that architects belonging to this culture often focused on matters of spatial construction, materiality, architectural form or aesthetics when doing design-based analysis and speculation. By identifying this difference, I neither want to imply that professional architects do not have

[99] Yaneva, A. (2005): Scaling Up and Down: Extraction Trials in Architectural Design. In *Social Studies of Science*, 35/6, 867–894; Yaneva, A (2009): *The Making of a Building: A Pragmatist Approach to Architecture*. Oxford: Peter Lang.

specific interests, nor that they don't care about aesthetics. I am well aware that different architects know different things about different aspects of the built environment and that issues of form and style are important to many. What my analysis shows is this: while professional architects have to combine their special interests and aesthetic aspirations with knowledge about client wishes, legal regulations and so on, the members of the culture of Analytical Speculation did not have to do that. Instead, they focused on specific areas of research and on the formal and stylistic dimensions of these areas. As presented in the examples above, these areas ranged from computer games and future types of infrastructure to novel building materials. Hence, from an epistemological perspective, I understand the culture of Analytical Speculation to produce knowledge about form and style aspects of the built environment rather than about buildings.

One of the members of this culture from whom I have learned a great deal about this knowledge was a lecturer who generously invited me to his studio and who was willing to give me interviews on several different occasions. As this lecturer was among the first students to graduate with a PhD by Design and a faculty member conducting design research at the UK 1, I will give impressions of his PhD research and show how this is related to the research activities he conducted during the time of my visit.

For the first time, I met this lecturer in his studio, which was located in an old farmhouse a ninety-minute train ride away from the UK 1. After my arrival, he welcomed me and gave me a tour of the whole farm. While showing me around, he told me that, after he bought this area, he completely rebuilt the two main buildings that were once a farmhouse. The first building we walked through contained a kitchen, one room with tables, chairs and sofas as well as sleeping- and bathrooms. In the second building he had installed an architectural studio, containing various machineries and tools he used to design, such as a CNC machine,[100] a laser cutter, a robot arm and workbenches with hammers, saws, glue and paint. These tools and benches were surrounded by shelves and boxes filled with artefacts which looked like bricks or complexly twisted tubes, and he explained to me that that these artefacts are the outcomes of his research.

In regard to his research activities, he told me that this studio set up allows him to explore relations between building materials, production processes and the actual place where novel

[100] This is a computer numerical control (CNC) machine. CNC machines receive input instructions by a computer and are therefore capable of processing a piece of material (wood, metal, plastic) without a human operator.

architectural things are made. This research contained the design and development of all different kinds of architectural objects, ranging from tiles to artfully crafted ornaments. The invention of novel aesthetics belonged as much to his research as did the development of new production techniques, the exploration of the properties of the materials he designed with and an understanding of the environment he designed in. Although digital- and robotic equipment was an important component of the architect's research activities, for him design research was neither about technological development as such nor about keeping up with latest technical inventions. Instead, he understood his research to be more about the establishment of relations between local materials, the history of form giving as well about reflections on the possibilities and limits of hand-crafted and digital work. This research orientation was also reflected in the state the technical equipment available in his studio was in. He got the robot arm after it was taken out of service in the car industry. The other machines he possessed were, as he told me, not as precise and up to date as in architecture studios more oriented towards high-tech design. More important for his research than the latest technology was the clay available in the area surrounding his farm, which allowed him to bridge his natural environment and his research by using the clay as a raw material for his design activities.

As I realised over time through various conversations about the lecturer's research, all the work he did at the farm belonged to a bigger research agenda, the one he had developed as a PhD by Design student at the UK 1. He started the PhD approximately at the same time when he bought and rebuilt the farm, and in the beginning, his PhD research became about finding out what kind of architecture he could produce there and the sort of studio he would like to set up. Engaging with the farm and the area surrounding it, he decided that he wanted to work on architectural projects dealing with locally available materials. This led him to the clay that existed in the area. Since the material and aesthetic properties of clay are always specific to the region it occurs in, he identified it as an ideal material for a design research agenda that aims at being closely related to its environment. Furthermore, clay can be formed and manipulated in various different ways, which makes it an interesting material for architecture.

Once he decided to work with local clay, his PhD became more specific, and he ended up with a thesis dealing relations between clay and architecture. Exploring these relations, his PhD consisted of three projects leading to different clay objects, such as the tiles and twisted tubes I saw at the farm. The conceptual background of his thesis was related to the work and writing of early British photographers. Although they had apparatuses and chemicals to make photos,

in the beginning they were not able to fix the pictures taken. After a while the image on the photo faded away and was not visible anymore. Reading about the early days of photography, the lecturer identified similarities between his interest in clay and the problems of early British photographers. Like them, in his research he also a struggled to fix forms with clay and he decided to make form finding and the fixature of form his research topic.

The one clay research project he undertook during his PhD that convinced him that he was on the right track was a room that he produced out of clay. In this project, he analysed the properties of clay by digging a hole in the ground at the farm. Subsequently he covered the surface of the hole with clay, which he shaped with a palette-knife making the whole look like it has patterned walls. Through observing the hole, the lecturer realised that this hole was not a stable entity, and that the reason for that were the properties of the clay. As he told me:

> "What I noticed about the clay hole is that it is not set, it cannot be set. When it is wet it is malleable, and when it dries (...) it becomes really solid and hard, but when you put water again, it becomes soft. So, you can constantly change it, and it becomes this really malleable material that you can mould at the same time. But it will crack if you don't take care of it. So, it requires very high maintenance. So, the idea is that the whole needs maintenance every few days, depending on the weather, so it took forever. (...) So from there, I really wanted to understand the idea of using clay as a new material for casting."[101]

Since he had graduated from his PhD, and became a lecturer at the UK 1, he continued and further developed this kind of research. In one of these following research projects, he mounted different kinds of dispensers on a robot arm formerly used to assemble car parts, which he connected to digital interfaces allowing him to control the arm's movements. He used this set up to find out more about different forms that can be given to clay as well as to examine how clay could be used to give forms to other materials. In order to do so he produced objects by putting layers and layers of clay on top of each other and he used clay as a mould stabilising other materials, such as concrete, until they were dry enough to keep the form given by the mould. The outcomes were all different kinds of objects looking like helically twisted tubes, stars, tiles or bricks. For him all of this was architectural research, since to work in this way

[101] Interview, 30.01.2016, min. 9.

meant to be engaged in speculative design through producing artefacts giving examples of a novel kind of, as he called it, “architectural ceramics”.

The technical set up the lecturer created to produce architectural ceramics was in line with a typical 3D printing production process. He had a pump that extruded clay out of a barrel, and the form giving process was controlled by the movements of the old robot arm. In order to make the robot arm move, a model of the desired object had to be drawn digitally. These data were then fed to the robot arm via a computer-interface, and, so to say, instructed the machine how and where to move. The dispensers he mounted on the robot arm were responsible for controlling the amount of clay that was released while the robot arm moved above floor.

In epistemological regards, the lecturer had to deal with questions about material properties and the technical set up, such as: In order to go through the dispenser, how wet does the clay have to be? How fast should the robot move? How much clay should be dispensed at once? In order to produce a stable artefact these questions were essential. If one piles too much clay on top of each other too fast, the parts on top are so heavy that they squeeze out the water in the clay at the bottom. Hence, when the clay at the bottom had not enough time to dry before another layer is added on top, the whole object collapsed. In order to deal with these issues, he had think about possible solutions, which he articulated in the interview by posing more questions:

> “So, if you say: okay, well, it’s gonna collapse, what do I do? Do I make it in parts and join it together? So that would be one solution. Or, I let it try a little bit and then I continue printing? That is another solution.” [102]

Identifying, understanding and solving these problems, the lecturer conducted research as he “tests hypothesis”. He made certain assumptions about the robot, the clay and the artefact he wanted to produce, and he tested these assumptions through trying and observing what worked as intended and what did not. In the case of the project I just described above, the lecturer decided to produce different clay parts that he later joined, in order to create one bigger object. For him this was the preferred option when using a digitally controlled robot arm, because:

[102] Ibid., min. 64.

> "The problem is that the clay, when it dries a little bit then it shrinks in size, and the digital model and the computer is not responsive (…). We know that: okay, I mean there is the robot, it doesn't know how much it shrinks, how the shape has changed." [103]

Hence, with a digital setup like the one in the lecturer's studio, the production of bigger monolithic clay objects was not an option. If the robot arm would constantly dispense clay, then the clay object collapses because of the water extrusion. Yet, if one goes slower and let the already extruded clay dry before adding another layer on top then the whole object would lose its form. Since the robot arm did not notice that the clay changed its form when drying, it would have continued to extrude clay according to the digital model that controlled its movements. In the end this would not have produced the intended object either. Doing research in this way, the lecturer gathered knowledge about the properties of local clay, new production techniques, matters of form giving and keeping and relations between digital and manual labour.

Combining now these epistemological insights with my research on the practical, social and educational aspects of the culture of Analytical Speculation, I understand this culture as one that introduced new ways of doing and organising architecture to the professional architecture school. These new ways created various ruptures between the profession and the UK 1. While architecture schools were initially established as places where professional architects taught the practice of building design to students, the architects belonging to the culture of Analytical Speculation built their own university-based research community. Furthermore, they were not concerned with designing buildings that would ever be realized, but with utilizing architectural design practices to analyse objects and to speculate about architectural developments to come. This was also reflected in the knowledge produced in this culture. Instead of knowledge about buildings to be, the architects belonging to the culture of Analytical Speculation yielded knowledge about aspects of form and style in circumscribed areas of research. As shown in the example above, this can be knowledge about the history of from keeping, the properties of local clay and the techniques needed to produce a novel kind of architectural ceramics out of this clay. Part of this culture was a PhD by design program, that should prepare students for an academic career and, at least partly, reproduced the culture it was part of. The only professional element that the members of the culture remained related to was professional teaching, since

[103] Ibid., min. 64.

the architects belonging to the culture of Analytical Speculation still taught architecture in the professional BA and MA programs.

The Marketisation of the British University System and Design Research in Architecture

After I have described the practical, social, educational and epistemological differences between the culture of Analytical Speculation and the professional architectural work and education, I want to draw attention to the political conditions within which a culture could be established that had almost nothing in common anymore with the profession of architecture. Considering the professional history of architecture schools going back to the 19th century, for me it was remarkable to realise how few connections to the profession were left in the culture of Analytical Speculation, which made the question of politics an even more important one. As mentioned in the introduction, I am especially interested in finding out more about relations between cultures of design research, the ruptures these cultures create between architecture schools and the profession and science policies restructuring academia according to market principles and design research. In order to more closely examine now how the policy decisions leading to the creation of the market university (as Popp Berman[104] calls it) were related to the rise of the culture of Analytical Speculation, we first of all need to get an idea of the reforms of the British university sector during the second half of the 20th century.

Roughly speaking, recent university policy in the UK can be divided into two eras: the time between 1960 and 1980, and the time after the 1980s.[105] Between 1960 and 1980, research was understood to be a public service to society, and the UK government fully funded the research activities of its universities. The money for research was passed by the Department of Education and Science to the University Grants Committee, which acted as a buffer between national politics and the academia. This committee existed from 1919 until 1983, and it consisted mainly of senior academics who decided how public money would be distributed among the British

[104] Popp Berman, E. (2012): Creating the Market University. How Academic Science became an Economic Engine. Princeton: University Press.
[105] For an overview see: Deem, R. (2004): The Knowledge Worker, the Manager-academic and the Contemporary UK University: New and Old Forms of Public Management? In *Financial Accountability & Management*, 20/2, pp. 107-128; Fulton, O. (1991): Slouching towards a mass system: society, government and institutions in the United Kingdom. In *Higher Education*, 21, pp. 589-605.

universities.[106] Since the 1980s, the UK research system saw dramatic changes. British scholars analysing and commenting on these transformations describe research policies as leading towards an economization of the British universities.[107] As the government decided to increasingly distribute research funding according to market principles, universities had start to compete with each other for the resources to finance their research activities. [108] The political landscape within which this transformation happened was highly affected by the conservative party's dominance between the 1980s and the first half of the 1990s. Having had won the election of 1979 with the promise of cutting public expenditure, the conservatives started to restructure the distribution of university funding. In this regard, their reforms were driven by the idea that research is most effectively done when conducted within a competitive environment. When researchers have to compete with each other for resource, so the reasoning went, then the ones doing the best research will receive the most funding. Hence, instead of handing over money more or less directly from the government to the universities via the Grants Committee, research steering instruments and research councils were established in order to foster competition amongst academics. To receive funding, scholars had to write project applications to subject specific research councils, who would decide whether applications are worth funding, and evaluation mechanisms got introduced measuring the performance of universities. But this was not the only market logic related to the rise of design research. While fostering competition within the UK, the conservative government understood the constant production and acquirement of new knowledge as prerequisite to be able to economically compete with countries such as the United States, China or India.[109] In order to keep up with economic competitors, the conservatives created new universities and academized institutions dedicated to vocational training.

Overall, these reforms can be related to the rise of the topic of research at architecture schools in two ways. On the one hand, in order to not lose track in an increasingly globalised high-tech world, the conservatives decided to guarantee university status to 48 polytechnics in 1992. Originally places for vocational training, once granted university status, the polytechnics could

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[106] Shattock, M. & Berdahl, R. (1984): The British University Grants Committee 1919–83: Changing relationships with government and the universities. In *Higher Education*, 13/5, pp. 471-499.
[107] Collini, S. (2012): What are Universities for? London: Penguin Books, part 2; MacGettigan, A. (2013): *The Great University Gamble. Money Markets and the Future of Higher Education.* London: Pluto Press.
[108] Brown, R. & Carasso, H. (2013): Everything for Sale? The Marketisation of UK Higher Education. Abingdon: Routledge.
[109] For international competition and the role of universities, see: Anderson, R. (2006): *British Universities. Past and Present.* London: Hambledon Continuum, pp. 154 f.; Slaughter, S. & Leslie, L. (1999): Academic Capitalism: Politics, Policies, and the Entrepreneurial University. Baltimore: Johns Hopkins University Press, pp. 64ff.

award their own university degrees and develop their own research agendas. Since a lot of architecture schools belonged to this newly created universities the question got raised which kind of research is conducted at these schools. Initially established as places of design-based education, preparing students for entering a job market, rather than research, architecture schools had to react. As part of newly created research driven universities, architects needed to implement research structures.[110] One the other hand, the introduction of a new tool for competitive research funding created a situation in which architecture schools belonging to the 'old' as well as the newly established universities started to increase their research activities.

In order to understand how, we need to have a closer look at the way science funding has been organised since the 1980s. After the University Grants Committee got abolished in the 1980s, it was the UK research councils that took over the job of distributing money amongst the British universities.[111] These research councils consist out of different field specific councils, such as the Arts and Humanities Research Council, the Economic and Social Research Council or the Engineering and Physical Sciences Research Council. In 2010, these councils distributed around 4.5 billion pounds, and to receive some of this money researchers had to apply with a project proposal.[112] The decision whether funding is granted, is done by a committee consisting of representatives of the respective discipline. So far, the introduction of these councils would have created no need for architecture schools to increase their research activities. Since the different councils were simply responsible for distributing project-based research funding, it was up to the university institutes, schools and individual researchers weather they would like to submit a project proposal or not. Yet, the research councils do more than distributing project-based money. In order to assure that the government distributes the non-project bound money (which were 3.2 billion pounds in 2010[113]), which every university receives whether they apply for research projects or not as 'effective' as possible, the research councils evaluate universities. In these evaluations, subject specific panels rank the research performance of each university and their departments, schools and institutes approximately every six years. The better a university is ranked in this evaluation, the more money it gets from the government. After its

[110] For more detailed information on this transformation see: Rust, C.; Mottram, J. & Till, J. (2007): *Review of practice-led research in art, design & architecture.* UK, Arts and Humanities Research Council, pp. 14ff. Also the text by Frayling can be understood as reacting to the transformation of art and design colleges: Frayling, C. (1993): Research in Art and Design. In *Royal College of Art Research Papers*, 1/1, pp. 1-5.
[111] Fulton, O. (1991): Slouching towards a mass system: society, government and institutions in the United Kingdom. In *Higher Education*, 21, pp. 599ff.
[112] MacGettigan, A. (2013): *The Great University Gamble. Money, Markets and the Future of Higher Education.* London: Pluto Press, p. 116.
[113] Ibid., p. 116.

introduction in 1986, this evaluation was conducted in the years 1989, 1992, 1996, 2001, 2008 and 2014 and it has been subject to constant change. Since 1986 the evaluation changed its name three times. First termed "Research Selectivity Exercise", it was called "Research Assessment Exercise" in 1992, and it got renamed into "Research Excellence Framework" (REF) in 2014.[114] Furthermore, the scope of what counts as input for the evaluations has changed constantly. What started as an exercise in judging the quality of books, papers and patents, became in the year 2014 an evaluation of research outputs of universities and university departments as well as of the potential impact of this research and the environment within which the research got conducted.[115] As constant as the change was the critique of these evaluations. Academics from various fields kept insisting that the bureaucratic effort for making submissions is too high, that an evaluation mechanism based on quantification can never account for the complexities of research, and that it favours basic research in the sciences as well as universities with higher reputation.[116]

Within the world of architecture, further critique was added. As has been documented in various publications, architects at universities had the impression that they did not see their work represented in the evaluations. According to them, evaluators of the panel judging the work of architects often belonged to disciplines in the natural and engineering sciences who researched architectural topics, but were not architects themselves. Due to these interdisciplinary backgrounds, in their decisions about the quality of the work produced at architecture schools, the evaluators put too much emphasis on outputs typically produced in the sciences, such as publications in journals, while barely acknowledging work related to design. As most of the work at architecture schools was dedicated to design and design teaching however, they were constantly evaluated below average. Analysing the results of the research evaluation of the years 2001, the London based architecture professors Bill Hillier and Philip Steadman came to the conclusion that:

> "(…) it looks very much as though the Built Environment Panel, given the very heavy representation of construction and building science expertise, and given its lack of active

[114] For a short history of the REF, see: Brown, R. & Carasso, H. (2013): Everything for Sale? The Marketisation of UK Higher Education. Abingdon: Routledge, pp. 46ff.
[115] For an impression of the scope of the evaluation of the year 2014, see the document REF 02 (2011): Assessment framework and guidance submission. Online available at: https://www.ref.ac.uk/2014/media/ref/content/pub/assessmentframeworkandguidanceonsubmissions/GOS%20including%20addendum.pdf (19.11.2020)
[116] Bence, V. & Oppenheim, C. (2005): The Evolution of the UK's Research Assessment Exercise: Publications, Performance and Perceptions. In *Journal of Educational Administration and History*, 37/2, pp. 137-155.

practitioners, applied essentially 'scientific' criteria to buildings and projects submitted; and that, however widely-acclaimed the designs might have been, whether prize-winning or not, they were systematically under-valued as a consequence."[117]

For many architecture schools in the UK, these 'bad' evaluations were a problem. Especially at universities with high reputations for their research, university administrators expected their departments and schools to get high ratings. Being confronted with these expectations and the, from many architects' perspective, evaluators' unfair judgment, faculty of various British architecture schools argued for the inclusion of design into the evaluations. In order to convince the UK research council to include design, they described architecture as a research-based discipline. Although the ways in which architecture was characterised as a research-based discipline vary, most positions were united by the assumption that architecture is a field capable of integrating research approaches from different disciplines, while being centred around design.[118] In an article on the disciplinarity of architecture, the historian and cultural critic Jane Rendell defines architecture as follows:

"We could argue that, as a subject, architecture encompasses several disciplines and uniquely brings together modes of research that are often kept apart (historical analysis and material science for example) and so provides possibilities for multi- and interdisciplinary research. We could also suggest that central to the subject of architecture is architectural design, a particular mode of practice-led research whose disciplinary specificity cannot be found in other types of practice or design. We could therefore make the case that architecture is unique as subject and as discipline."[119]

Responding to the critique and claims for acknowledging architecture as a research discipline based on design, the UK research council started to acknowledge designs as research outputs. However, this was not the only adjustment taking place. Architecture schools also began

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[117] Steadman, P. & Hillier, B. (2002): Research Assessment Under the Microscope: Disturbing Findings and Distorting Effects. In *arq: Architectural Research Quarterly*, 6/3, p. 206. A further example of architectural critique of the research evaluations is: Hawley, C. (2002): Undermining the Profession. In *arq: Architectural Research Quarterly*, 6/1, pp. 5-10.

[118] Examples for this position are: Fraser, M. (2017): Preserving openness in design research in architecture. In Nilsson, F., Dunin-Woyseth, H. & Janssens, N. [eds.]: *Perspectives on Research Assessment in Architecture, Music and the Arts. Discussing Doctorateness.* Abingdon: Roultledge, pp. 69-84; Lawson, B. (2002): The subject that won't go away But perhaps we are ahead of the game. Design as research. In *arq Architectural Research Quarterly*, 6/2, pp. 109-114.

[119] Rendell, J. (2005): Architectural Research and Disciplinarity, In *Architectural Research Quaterly* 8/2, pp. 141-147.

adjusting to the situation of being evaluated by introducing new structures supporting the conduct of design-based research.

Reacting to Politics: Establishing Design Research at the UK 1

Reacting to this changing policy context and taking part in the discussions on architectural research, the UK 1 re-invented itself as a school for 'design research'. Confronted with 'bad' evaluation results and a dissatisfied university administration, the architecture faculty began establishing structures to support research centred around design. This in turn created the conditions for the emergence of the culture of Analytical Speculation, which I described above.

The interview partner who explained the relations between evaluations and the institutionalisation of design research at the UK 1 was a professor of architecture at this school, who had also the position of the Vice-Dean of research at faculty of the Built Environment, which the UK 1 was a part of. Being in this position, he was aware of both the university's research expectations towards the UK 1 as well as the actions architects took to establish design research. According to the Vice-Dean, in order to understand why the UK 1 introduced design research the way it did, one needs to go back to the time between the 1980s and early 2000s. During that time, the UK 1 manged to establish itself as a school internationally known for its design faculty and education. For the UK 1 this meant that a school, which had previously just a mediocre reputation for design, became attractive for architects and students alike. To achieve this transition, the faculty of the UK 1established a teaching approach strongly based on clearly discernible design classes, which each had their own design agenda and approach. In this system, different design units built the core of architectural education. In order to graduate from architecture school, each student had to attend various of these units run by different architects. In terms of numbers and design reputation, the introduction of this unit system can be considered as success. The amount of architecture students doubled between 1990 and 2000, and local heroes as well as internationally well-known architects came to teach at the UK 1.

However, as successful as this system might had been in regard to design education, in terms of research, the unit system could not be considered as a huge success. Due to the schools' strong focus on design, they were evaluated rather badly, which the Vice-Dean explained this way:

> "So basically what happened, and this is absolutely true, is that in 2001 there was a terrible REF for architecture, for most schools. The UK 1 did really badly. (…) The university was really angry; the UK 1 was not get any more money for research, blablabla, and all this stuff. (…) If you want the figures now (…): So research gives us like 20%, 25% of our overall faculty income and of that the REF income is about just under a half of that. So it is about 10% of the overall faculty income, so it's not the dominant, but it's big enough. (…) So we thought we are losing at financially. Reputation wise it was terrible. So we decided to do something about it."[120]

In order to better understand how this happened and why a bad evaluation meant not just a loss of money, but also reputation, we need to have a closer look at the evaluation results and the way these results were interpreted.

In the research evaluations of 2001, the UK 1 was rated as a category 4 institution[121]. What this meant in terms of money becomes clear when looking at the distribution rates. In 2001, 85% of the money distributed by the government based on these evaluations went to universities that got ranked as 5* (international excellence in majority of sub-areas) and 5 (international excellence in some sub-areas). The remaining 15% were divided amongst universities ranked in the categories 4 and 3, and the institutions judged as 2 and 1 received nothing at all. Hence, in terms of resources a 4-star ranking meant for the UK 1 that it received just a very small proportion of the money it would have gotten when being ranked as 5 or 5* institution.[122] The loss of reputation going along with a 4-star ranking was related to the growing importance of these kind of evaluations. Actually, in the beginning I thought that the reputational loss can be explained by better evaluation results the UK 1 achieved in the past. Yet, this was not the case. The real reason for this loss was not that the UK 1 or other British architecture schools did better in the evaluations conducted before 2001. As a look into the results of the pre-2001 evaluations showed, architecture was ranked rather low before as well.[123] The reason why a low ranking led to a loss of reputation was the increased importance of the research evaluations. As

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[120] Interview, 16.03.2016, min. 69

[121] See results of the 2001 Research Assessment Exercise, online available at: http://www.rae.ac.uk/2001/results/byuoa/uoa33.htm (19.11.2020)

[122] Brown, R. & Carasso, H. (2013): *Everything for Sale? The Marketisation of UK Higher Education.* Abingdon: Routledge, pp. 54ff.

[123] Results of the 1992 evaluations online available at: https://www.rae.ac.uk/1992/c26_92t35.html; for 1996 evaluations see: https://www.rae.ac.uk/1996/1_96/t33.html (19.11.2020)

the higher education scholars Roger Brown and Helen Carasso explain, since their introduction, the research evaluations had gained more and more attention within British academia and in 2001 the evaluations became understood to be important measure for the status of universities and their departments.[124]

Reading the excerpt of the interview with the Vice-Dean against this background, it makes sense that the university the UK 1 one was part of reacted in such a harsh way, threatening that the school it would not get money for research any longer. Firstly, from the perspective of the university administrators, the UK 1 lost money as it could have done better in the rankings. Secondly, the university the UK 1 was part of what was considered to be one of the leading research universities in the country. If one of their schools just got an average or below average ranking, the reputational loss associated with this ranking did not fit the schools' image.

Confronted with this situation, the architects at the UK 1 decided, as the Vice-Dean mentioned, "(…) to do something about it"[125] and began building a stronger profile as a research institution. Having managed to establish the UK 1 as a well-known design school and participating in the discourse describing architecture as an academic field of research with design at its core, faculty members put energy and effort in introducing structures supporting the conduct of design-based research at their architecture school and beyond. This included the aforementioned lecturer and professor positions dedicated to design research, the PhD by Design Program, the mentoring sessions, conferences and design-focused publication formats that I identified above as part of the social organisation of the culture of Analytical Speculation. Furthermore, faculty of the UK 1 took two additional institutionally important measures to establish design research, which I have not mentioned yet.

Firstly, the UK 1 started providing money for design-based research. Since architectural design research did not exist as a fundable category at any of the UK research councils, the UK 1 decided to establish its own system of financial support. At the time of my stay, every member of stuff who held the position of lecturer, senior-lecturer and professor, received 2000 pounds a year for design research. Additionally, there was the "Architectural Research Fund", which financed various things such as publications or the graphic design of an exhibition catalogue.

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[124] Brown, R. & Carasso, H. (2013): *Everything for Sale? The Marketisation of UK Higher Education.* Abingdon: Routledge, p. 50f.
[125] Interview, 16.03.2016, min. 69.

Furthermore, there was the “Materialisation Grant”, which was dedicated to realising things that traditional science funding would not pay for, such as the development and realisation of design prototypes, installations or exhibitions. In order to receive a grant as well as a fund, the faculty of the UK 1 had to go through an application process. Although to apply for the “Materialisation Grant”, worth 50000 pounds, needed considerably more effort than to make an application for the “Architectural Research Fund” endowed with 3000 pounds, in both cases the applicants had to write a proposal. In these proposals, they had to explain the aims and objectives of their research project, as well as their research questions and methods, the context within which the research takes place, and the dissemination of the research. Overall, the available amount of money was not considered huge. However, the hope that school directors associated with the provision of the funding was to help faculty to make first steps as researchers, to gain reputation and to become able to apply for bigger amounts of funding that are provided by external institutions.

Secondly, the faculty of the UK 1 started to lobby for design as research. To do so, they joined forces with architects at other British universities and formed groups representing the interests of designing architects as well as journals dedicated to design research, some of which I have already mentioned above, such as the “Architectural Humanities Research Association” or the journal “ARENA Journal for Architectural Research”. Furthermore, faculty members of the UK 1 got involved in the activities of the Royal Institute of British Architects (RIBA), in order to be able to nominate evaluators for the evaluations to come. One of the reasons why the evaluations were particularly bad for architecture schools were the evaluators. Although that sounds like a trivial statement it is not. In order to become an evaluator, one has to be nominated by an institution that is acknowledged as officially representing a research discipline or field. These institutions can select people who are then sent to the different subject panels of the evaluations. Since architecture had no research council that could do that, the institution that took over the job of nomination was the RIBA, which actually represents the interests of architects working in practice. According to the Vice-Dean, this led to the following: the RIBA nominated professional architects with no experience in the conduct of architectural research and people who had backgrounds in construction, engineering or environmental research, but no relation to design. This resulted in a rather low ranking of design-based submissions on the part of the evaluation panel for architecture. To counterbalance this tendency, members of the aforementioned universities made their ways into the RIBA and became a nominating body,

which gave them the power to send people to the architecture evaluation panels in 2008 and 2014.

In terms of adapting to changing academic conditions, these activities produced positive effects. At the time of my visit, the UK 1 had 60 PhD by Design students. Furthermore, the results of the evaluations of 2008 and 2014 were more than satisfying, as the UK 1 got ranked among the top research universities in the field of architecture in the UK.[126] Part of this success story was the culture of Analytical Speculation. Growing within and also establishing these institutional conditions, the members of this culture contributed to a transition, through which an architecture school that had a reputation for design teaching became an architecture school for design teaching and design research.

Design Reflection, Artistic Research and the Architectural Book

Relating the political conditions, the institutionalisation of design research at the UK 1 and the culture of Analytical Speculation to each other the way I just did, it appears as if the only reason for the existence of this culture was market-driven university reforms. To be sure, the research topics that the architects dealt with were various and could not be reduced to mere products of a market-oriented science policy. But what about the adoption of scientific modes of organisation and exchange, the introduction of a PhD, the absence of buildings, the specialised knowledge and the funding structures that made this culture so different from professional work? Since the whole idea of design research and a research-driven architecture school was so closely related to architects' reactions to the effects of science evaluations, could we assert that the ruptures between the UK 1 and the profession created by the culture of Analytical Speculation can be attributed to science policymaking entirely? Reflecting on the question of how policymaking and the academisation of architecture are related to each other, from this perspective it could be argued that market-oriented science reforms led to the introduction of a research culture, which had not much to do with a professional architecture school, as it had developed its own kind of practice, knowledge and mode of social organisation. We could conclude then that the marketisation of the university contributed quite heavily to the de-

[126] For the 2008 results, see: https://www.rae.ac.uk/results/qualityProfile.aspx?id=30&type=uoa. For 2014: http://results.ref.ac.uk/Results/ByUoa/16. (19.11.2020)

professionalisation of architecture and that design research as conducted in the culture of Analytical Speculation was not much more than a science policy effect.

Although all of this is not entirely wrong, and in the remains of this chapter I will also problematise the relation between politics and design research, it would not be correct to just reduce the culture of Analytical Speculation to being a policy effect. Actually, when I asked architects belonging to this culture about the institutionalisation of design research at the UK 1, I listened as often to stories about market-oriented reforms as I heard people talking about the wish for inventing new approaches supporting design-based reflection as well as about inspirations by recent developments in the arts and the tradition of the architectural book. Therefore, I want to draw attention to a second political story that was related to the rise of the culture of Analytical Speculation and the ruptures it created. To speak in the terms of Born and Barry, a political story that had more to do with the "logic" of design-based reflection and the "trajectories" of artistic research and architectural publishing then with market oriented university reforms.[127]

In order to understand why and how this logic and trajectories were related to the culture of Analytical Speculation, we need to shortly go back to the 1990s and to remember that this was the time when the UK 1 established itself as a school well known for a rather artistic, design-heavy approach. Also worth mentioning is that, although the 1990s could be considered as a success in terms of student numbers and design reputation, they weren't intellectually. At least not for the architects who started establishing the culture of Analytical Speculation at the UK 1. What many of them had in common was a double education in architecture as well as in a humanities discipline, such as history or cultural studies. Hence, for the founders of the culture of Analytical Speculation it was as least as interesting to design as it was to reflect on design and to write about historical and cultural constitutions of architecture. Here again, I learned a lot about the reasons motivating these architects to establish research in the way they did from the Vice-Dean. Talking about the education centred design unit system as the core of the school in the 1990s, the Vice-Dean articulated his dissatisfaction, saying:

[127] Barry, A.; Born, G. and Weszkalnys, G. (2008): Logics of Interdisciplinarity, In *Economy and Society*, 2, pp. 20-49; Born, G. & Barry, A. (2010): ART-SCIECNE. From Public Understanding to Public Experiment. In *Journal of Cultural Economy*, 3/1, pp. 103-119.

> "(…) well, actually here we got this kind of obviously successful model [design unit system], with a lot of energy, with a lot of creative ongoing, but there is not real kind of deeper thinking behind it. It is actually drawing production."[128]

While historically and culturally minded architects like the Vice-Dean became increasingly frustrated with their very drawing focused architecture school, other British art schools invented practice- and art-based research approaches. At places such as the Royal College of Art, artists and designers began debating if and how design and artistic practice can be understood as research practice. Inspired by intellectual movements such conceptual art, STS research describing science as cultural activity and feminist theories highlighting the positionality of knowledge, artists and designers started discussing what kind of knowledge the arts and design produce, and they questioned popular accounts describing science as the one and only producer of reliable knowledge.[129] According to artistic research scholars, art and design are also capable of producing a genuine set of knowledge through artistic reflection of social, cultural and material life and the introduction of new forms of aesthetic expression. Furthermore, rectors of art schools began building arguments for the establishment of institutional structures supporting the conduct of artistic research, such as PhD programs, in which artistic engagement was understood to be a form of research.[130] Observing these developments, architects at the UK 1 started to come up with the idea of implementing design research, which the Vice-Dean articulated in the interview, saying:

> "(…) certainly in the 90s, the arts subjects began to debate this more… came up with kind of practice based PhDs. So we were aware of those… aware of the things we were having as well. And so then I think that was really when it came to this idea of design research."[131]

Taking this motivating logic for the establishment of design research at the UK 1 into account, I understand the culture of Analytical Speculation and the institutional structures supporting this kind of research as much as an outcome of market-driven reforms as of the logic of design

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[128] Interview, 16.03.2016, min. 23.
[129] For example: Frayling, C. (1993): Research in Art and Design. In *Royal College of Art Research Papers*, 1/1, pp. 1-5. Also see: Candlin, F. (2001): A Dual Inheritance: The Politics of Educational Reform and PhDs in Art and Design. In *Journal of Art & Design Education*, 20/3, pp. 302-310.
[130] For an overview, see: Biggs, M. & Karlsson, H. [eds.] (2012 [2010]): *The Routledge Companion to Research in the Arts.* Abingdon: Routledge; Schwab, M. [ed.] (2013): *Experimental Systems. Future Knowledge in Artistic Research.* Leuven: University Press.
[131] Interview, 16.03.2016, min. 5.

investigation and reflection, which in turn had roots in the humanities and recent developments in the arts.

On a sidenote, I also would like to mention that this trajectory of design research is interesting from a historical perspective. It shows that current design research and the Design Methods Movement of the 1960s do not have much to do with each other. The members of this movement utilized approaches from cybernetics, operations- and market research, behavioural psychology or ergonomics, with the proclaimed aim to improve design decisions. The architects belonging to the Design Methods Movement applied mathematical models to rationalise the distribution of space and asked questions about the inclusion of user preferences into design.[132] This is entirely different to the trajectory of to the culture of Analytical Speculation which is related to developments of the humanities and artistic research mostly rooted in the 1980s.

Design Reflection and the PhD by Design

One example how this more recent desire for a reflective architecture shaped the institutional conditions within which the culture of Analytical Speculation could grow was the PhD by Design program. Asking the director of this PhD program – who was also one of its original creators – about the beginnings of the PhD by Design, he told me that he wanted to establish something that would allow students to combine drawing and design with reading and writing. For him, all of these activities could be understood as a form of intellectual engagement. The model according to which he structured the program and imagined the outcome of the PhD was that of the architectural book. In our interview, he described this to me, saying:

> "(…) the program is very much based on the principle and the history of the 500 years tradition of the architectural book. And so to say the conjunction, the creative independence of writing, of drawing and designing are part of the culture of what architects have done for 500 years."[133]

[132] For a history of the Design Methods Movement see: Bayazit, N. (2004): Investigating Design: A Review of Forty Years of Design Research. *Design Issues*, 20/1, pp. 16-29; Cross, N. (1993) Science and Design Methodology: A Review. *Research in Engineering Design,* 5, pp. 63-69. For the activities of architects in the Design Methods Movement, see: Fezer, J. (2015): A Non-Sentimental Argument. Die Krisen des Design Methods Movement 1962-1972. In Gethmann, D. & Hauser, S, (eds.): *Kulturtechnik Entwerfen.* Bielefeld: transcript Verlag, pp. 297-304.

[133] Interview, 16.02.2016, min. 2.

According to the director of the PhD program, since the renaissance architects have published books in which they depict and reflect design. Thanks to the PhD by Design program, this way of conducting research could also become institutionalised at the university. Giving me an example of one of those architectural books, he mentioned Rem Koolhaas' "Delirious New York". Published in the 1970s, this book contains a semi-fictional account of the architectural and urban development of Manhattan, in which Rem Koolhaas combines history, novel style writing and his own drawings, in order to create a theory about the development of this part of New York City.[134] According to the director of the PhD program, this book is a good example, as: "It combines speculative design, it combines historical research, it often blurs those two as well."[135] Inspired by books like the one of Koolhaas, the director of the PhD established a doctoral program, in which students have to invent new approaches to design or use design as a medium to engage with topics they are interested in, while at the same time describing their activities and contextualising their thinking with literature about historic, cultural or social aspects they understood to be related to their design activities.

To what extent the logic of design reflection also motivated young architects to involve themselves in the culture of Analytical Speculation is shown in the conversations I had with PhD by Design students. I learned about the reasons motivating them to join the culture of Analytical Speculation by asking the students to compare their PhD work to work in an architectural office, as well as to PhD work in other fields, such as history or the social sciences. When describing these differences to me, they also told me why the option of doing a PhD by Design at the UK 1 was more appealing to them than the other options I had mentioned.

Talking with the students about what makes their PhD work different from working in an architectural office, I learned that actually one of the most prominent motivating factors for starting a PhD by Design at the UK 1 was their disappointment with professional work. During their years as BA and MA students, they learned about what it means to be an architect in school-based studios. In order to pass these studios, the students needed invent their own design project. For the ones that decided afterwards to start a PhD by Design, this studio work also included the development of intellectual interests. As they told me, to be in school and to work in studio meant for them to have time to think, to reflect about their design activities and to further develop their design in this way. Something that was not possible anymore when they

[134] Koolhaas, R. (1978): *Delirious New York. A Retroactive Manifesto for Manhattan.* Oxford: University Press.
[135] Interview, 16.02.2016, min. 6.

started working for an architectural office but that a PhD by design could offer. In this regard, one of the students, who worked for an architectural office for several years before he started the PhD by Design, told me:

> "Well, I mean the luxury of the PhD is having the time to think. (…) So even if you are working for one of the best offices in the world, it's still a commercial entity, which has to survive and pay its staff, so that the idea of being able to think really disappears in practice. (…) And I think this is one of the reasons a lot of architects get jaded. Cause essentially you get five years in school, (…) you are doing some crazy [design] project, and then before you know it, you are set in an office working out how the cars are gonna be lined up in a car park, or where the toilets are gonna go. You need toilets, but there is not even room to kind of experiment with what a toilet might be in a commercial office. So you just, you have to work quick and it's about turning in money. So you, yeah, the idea of interrogating anything disappears in practice, in my experience".[136]

Receiving answers like the one above, I asked the PhDs to what extent their interrogations are different to the research conducted in disciplines doing research on architecture. In terms of finding out more about reasons for getting involved in design research, this question was interesting because once architects decided to do a PhD, they had several different options to do research on architecture. Since most UK architecture departments also had institutes dedicated to research in subjects related to architecture, such as material science, sociology or the history and theory of architecture, architectures students could also apply for a variety of different PhD programs that would allow them to analyse architecture. The reason why students chose the PhD by Design program was because it allowed them to stay designers while also providing possibilities to engage with research conducted in other areas. This is something that was not possible in any other PhD program, since these programs did not treat design as research practice.

One student who explained to me the advantage of such as design-driven program was an architect who did a PhD on computer games and whose work I already briefly mentioned when describing the practice of the culture of Analytical Speculation. Amongst other issues, he was interested in the question how the spatial construction of a computer game influences the

[136] Interview, 17.03.2016, min. 41.

behaviour of players. In order to better understand these behavioural aspects, he began engaging with sociological and psychological research that analyses factors prompting behaviour in computer games. However, unlike a psychologist or sociologist, he did not conduct this research on his own but rather utilized the outcomes of this research to further develop design. In our interview, he described this to me by saying:

> "What I am interested in the design research is saying: Okay, well, if people have made research, and made certain identifications about the way that people might react to things, can I then use that as an architect to propose design projects that might utilize that. So, what can I do as a designer, because that's not necessarily what they did. They were kind of reading how people reacted to [name of computer game] and I get that, you know, maybe constructing a taxonomy of terms to describe that, but they weren't necessarily saying, well, what does this mean if we then design from that. (…) I want there to be a really strong basis for the work, but not all of that, you know, that basis is probably coming of people who have got expertise in other fields that I don't have, and it'd kind of be silly to sort of pretend that I did have. Therefore, I am kind of interested in using them as sources, in order to then be able to make architectural informed speculations (…)."[137]

Tacit- and Explicit Knowledge: A difficult Relationship

The statements of the architects and PhD students above have altered my appraisal of science policy's influence on the culture of Analytical Speculation and the ruptures it created. Taking architects' perspectives into account, instead of treating it as a sole effect of UK science policymaking, I now understand that the culture of Analytical Speculation also has a lot to do with three other things: a desire for a more reflective kind of architecture, a kinship with the humanities and a fascination with the history of the architectural book. Though market-oriented science governance and university administrators threatened architecture schools, it would be wrong to assume that the members of the culture of Analytical Speculation did simply do what they were told by policymakers. Refusing to accept a loss of reputation and possible restructuring by their university, they established a new culture of architecture at the UK 1, one

[137] Interview, 11.03.2016, min. 57.

which allowed architects and PhDs to engage in design-based research projects that they could not have realised elsewhere.

Although I think that all of this is true, to understand the culture of Analytical Speculation just as a safe haven for design development and reflection would be as wrong as to assume that this culture of design research is just an effect of science policymaking. Actually, the culture of Analytical Speculation created ruptures that opened up new possibilities for architects as well as ruptures that confronted the architects with problems. I began to understand the problematic side of these ruptures when I more closely engaged with concerns that I understood to be part of the culture of Analytical Speculation. Concerns that had a lot to do with politics and that can give us a more precise impression about problematic relations between design research and science policymaking. Therefore, I would like to end this chapter now by analysing one concern that figured quite prominently among the members of this culture. In order to give an impression of this concern, I want to go back to the early days of my research stay at the UK 1 and to have another look at the event that I described in the very beginning of this chapter: the one where lecturers of the UK 1 presented their design research activities.

At this event, I did not just take notes about how a senior lecturer talked about her use of architectural design for analysing artworks and how she built models representing the spatial construction of movies or installations. I also observed that uncertainty seems to be part of her research practice. At the end of the presentation, she talked about two different ways of understanding, which were both present when she analysed artworks. On the one hand, there was a tacit understanding of artworks that emerged while she did drawings and models. On the other hand, she mentioned a more explicit - she called it an “intellectual” - way of understanding an artwork, which was very much related to writing, reading and presenting her work. She experienced the existence of these two dimensions in her research as challenging, since it was, as she said, “impossible to negotiate” between these two ways of knowing. In order to characterise the relationship between tacit and explicit knowledge, she even spoke about a “fight” that is present in her research.

Even though I treated the above observation as a mere sidenote in the beginning, throughout my time at the UK 1, I learned that many of the architects belonging to the culture of Analytical Speculation were concerned with how to best communicate the knowledge that they generated through design. Similar to the senior lecturer above, they were uncertain about how to build

relations between explicit knowledge that can be verbalized and written down and knowledge they gained by means of designing, which the architects understood to be tacit.

In order to better understand why writing was an issue at all, first of all we need to take into account that the architects belonging to the culture of Analytical Speculation were confronted with the requirement to explicate their design-based knowledge in publications. As already mentioned in my descriptions above, one activity belonging to the culture of Analytical Speculation was publishing. Architecture professors, lecturers and PhD by Design students belonging to this culture wrote about their research activities and published them in books, articles in one of the recently established journals for design research and booklets for a series edited and distributed by the school. In addition to social and historical reflections, in these publications, design knowledge should also be explicated. However, for the architects, the knowledge they generated through design research was incorporated in the objects they produced. It was also considered to be very personal knowledge. One of the architects explained it in an interview like this:

> "(...) the knowledge is embodied in the object, but also in the way the designer interacts [with the object], and the shape that is given to [the object]. And all that is very intimate and personal to the designer."[138]

Doing design-based research leading to this kind of knowledge while at the same time belonging to a culture in which this kind of knowledge should be explicated for publication, many of the architects I met experienced this situation as a tense one. One in which it was difficult to build relations between tacit and explicit knowledge and one in which they were uncertain about what and how to write.

This tense relationship between tacit and explicit knowledge caught my attention, because I have never ever witnessed someone using the concept of tacit knowledge as the members of the culture of Analytical Speculation did. Michael Polanyi had introduced the concept of tacit knowledge in the 1960s.[139] A chemist and philosopher of science, Polanyi defined tacit knowledge as personal, pre-logical and sensual knowledge that is part of all creative acts and new discoveries, but that can never be fully rationalised. According to Polanyi, all explicit

[138] Interview, 30.01.2016, min. 29.
[139] Polanyi, M. (1966): *The Tacit Dimension*. Chicago: University Press.

knowledge rests on tacit knowledge, which he famously expressed in the phrase "(…) we can know more than we can tell".[140] Against the background of this concept, it was not a surprise to me that the architect identified her design-based knowledge as tacit. Examining design activities of architects, the STS scholars Potthast as well as Ewenstein and Whyte, describe design as a visual and aesthetic practices, and the knowledge produced in architectural design as embodied in the architect as well as in the object produced by architects.[141] Taking this visual and embodied dimension of architectural design into account, it made sense that the senior lecturer and her fellow architects made a distinction between a tacit way of knowing related to design, and more explicit ways of knowing related to reading and writing. However, that the concept of tacit knowledge could be used to identify a "fight" between tacit and explicit knowledge was something new to me, and I could also think about a more peaceful co-existence of tacit and explicit forms of knowledge. The question that I kept asking myself for a long time after I had made these observations was: why do text and design relate to each other in such a tense way in this culture? Wasn't there any other way to publish design research, or was there another explanation for this concern?

My answer is that this concern actually tells a lot about the relation between politics and design research. What I mean is that the concerns of architects have at least as much to do with the incongruousness of text and design as with science policymaking and the marketisation of British universities. In order to understand the political dimension of the tension between tacit- and explicit knowledge, we need to have a look at what working on a design research publication involved.

When members of the culture of Analytical Speculation worked on publications, they did various things ranging from the preparation of photos, images and sketches of their design activities to writing texts in which they describe their design activities and reflect on the historical, political and/or social dimension of their research activities. None of this was unusual. Since the early history of the discipline of architecture, architects were involved in collecting, describing and publishing their work. This history was also part of the culture of Analytical Speculation. As shown above, the PhD by Design program was based on the history

[140] Ibid. p. 4.
[141] Ewenstein, B. & Whyte, J. (2009): Knowledge Practices in Design: The Role of Visual Representations as `Epistemic Objects'. In *Organization Studies*, 30/1, pp. 7-30; Potthast, J. (1998): Sollen wir mal ein Hochhaus bauen? Das Architekturbüro als Labor der Stadt. *Discussion Paper FS-II 98-502.* Berlin: Wissenschaftszentrum, p. 63ff.

of the architectural book. Furthermore it needs to be mentioned that architectural journals existed already before anyone spoke of design research as mediums to communicate about design.[142] According to the sociologist Magali Sarfatti Larson, these publications are important for architects because there discussions on the quality, cultural significance or aesthetic and formalistic relevance of architectural designs take place.[143] The people who write these publications are either the architects whose designs get published or journalists, fellow architects and academic scholars – mostly with a background in the humanities – who comment and reflect on architectural designs. Through these publications, architects and their designs became part of the discourse on architecture and, in this way, they could also gain recognition within the wider realms of the profession. According to Larson, these publications can be understood as "(…) the imaginary museum of architecture. They provide tangible raw material for the canon, the system of interpretation and justification that consecrates buildings as architecture."[144]

When I compared these architectural publications with the design research publications that the members of the culture of Analytical Speculation produced, however, I noticed some differences. Even though a lot of the research publications communicated about design, they also had a kind of extra layer making their design activities visible and understandable as research I found in none of the professional publications. One example of this kind of research publication were the booklets that got published by the UK 1. In these approximately 50 pages long booklets, architects did not just depict their design activities and reflected on the ideas that went into their designs. Additionally, each of these booklets was subdivided into the chapters: "introduction, aims and objectives, research questions, context, methods and dissemination". Hence, next to describing their designs, architects had to find ways to articulate their activities according to categories that the sociologist of science Rudolf Stichweh considers to be important for guiding and communicating the research activities of empirical scientific disciplines rather than professions, such as architecture.[145]

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[142] Stevens, G. (1998): *The Favored Circle. The Social Foundations of Architectural Distinction.* Cambridge, MA: MIT Press, pp. 208ff.
[143]Sarfatti Larson, M. S. (1993): *Behind the Postmodern Façade. Architectural Change in Late Twentieth-Century America.* Berkely: University of California Press, pp. 3-20.
[144] Ibid., p. 11.
[145] Stichweh, R. (2013 [1994]): *Wissenschaft, Universität, Profession. Soziologisch Analysen.* Bielefeld: transcript Verlag, ch. 1, ch. 2 & ch. 12

Asking about the reasons why all of these booklets contain these sub-chapters, I was told that they were produced in order to have publications to submit to the research evaluations. Since the architects at the UK 1 and other architecture schools had the problem that design was not recognized by the evaluators as research, they started developing publication formats in which design was communicated as research. Talking with the director of research about the different chapters of the booklets, she told me:

> "(…) these headings help us to communicate the [design] work to the REF panel, because the REF panel has engineers, architects, people coming from other disciplines, who don't understand design language or design processes."[146]

In order to be able to write these publications, architects at UK 1 were asked to start documenting their work in writing, which they had not necessarily done or been required to do before. The director described this to my, saying:

> "So my efforts have been, first of all, how can we unpack the [design] project every time (…) and look at the process, and say, okay what were the research questions, what were the methods, and getting to the habit of documenting absolutely everything, getting to the habit of collecting this information. Because often designers… there is so much research and work behind the project, but it disappears in meetings and in drawings and in models and budgets. And nobody knows that. And so a lot has to do with bringing all this information together and reflecting upon it. Then publishing it. And by making it more formal and more recognizable, hopefully people then can realize that it is worth funding."[147]

This relation to policymaking was also present in the process of initiating publications. Especially from my conversations with more longstanding members of the UK 1, I understood that to work on publications had been something optional within the world of architecture. If they wanted to, architects who felt inclined to write could do that, but there was no need for writing about design activities. However, since the establishment of design research at the UK 1, architects were increasingly expected to produce publications documenting their research activities. Institutionally articulated was this expectation in research mentoring meetings taking

[146] Interview, 09.02.2016, min. 55.
[147] Ibid., min. 00.

regularly place at the UK 1, in which faculty members should encourage and support each other with writing publications.

Talking with the members of the culture of Analytical Speculation about how they experienced this situation, they told me that this kind of research related writing as something challenging. Due to the rather optional character publishing had before the introduction of design research, many of the architects I met during my time at the UK 1 had just little experience with that kind of work. They got educated mostly in professional schools, with a curriculum focused on design. Writing played just a marginal role in the architecture schools they graduated from. This was even more true for writing in relation to the articulation of research questions, methods or research objectives. Since the architectural texts that already existed did not include this kind of research reflections, they could not be used as guideline for how to explicate and describe design processes and knowledge along categories of the empirical sciences. Therefore, even some the more experienced architectural writers struggled with writing this kind of publications.

When I collected my notes about how the members of the culture of Analytical Speculation reflected on their writing activities, I had the feeling that they entered a rather new and unknown territory when it came to the formulation of research questions or the description of design research methods. In this territory no guideline existed for what a good research question could be or how a suitable methodological position could be articulated. This was also reflected in the sheer breath of research questions and methodological descriptions that I found in their design research publications. They ranged from questions, like “How do representational techniques which combine a physical artefact with a digital projection generate and capture architectural ideas and design?” and “How should the interrelationship between biological and steel structures be achieved?” to methods, such as “Environmental design techniques” or “Generating experimental technologies and design interventions that engage with the specific cultural contexts of occupation in the land.”

From the perspective of STS, what has happened at the UK 1 is that acts of policymaking began to change and transform practices. In accordance with Müller and De Rijcke, we can say that the marketization of universities, especially the introduction of the science-steering instrument

of research evaluations, had epistemic impacts this architecture school.[148] Yet, the effects that market-oriented policy had on architecture schools were different than the ones they had on science departments. In their work on the marketisation of universities, scholars such as Popp Berman, Mirowski and others are critical of the introduction of laws allowing scientists and companies to patent research results, of evaluations, or of initiatives fostering science industry collaborations because they gradually replace science's institutional logic of the search for truth and reliable knowledge with motives of generating economic profit.[149] Within the culture of Analytical Speculation, however, it is not so much the replacement of the logic of science that I understand to be problematic but the adaption of categories and practices form the sciences due to political reasons.

In order to understand the whole range of consequences this had, I want to point out that, for some architects, to become involved in the business of writing and publishing even meant to do things that they actually don't want to do. Talking with a faculty member about one of her design research projects and the writing that she did, she described to me the situation like this:

> "Yeah, I worry the whole time that I have to write something up about it. So at some point, this idea will become words and that worries me, because that's not, that isn't a skill that neither [name of design partner] or I have or want to have particularly. So that's always a real drama. But, because we have this constant mentoring system, they always… there is always someone saying, ‚Yeah this is really good for you, this helps you make international contacts, this is a really interesting vain of research, I can see how that fits something that the [UK 1] does not yet do.' And then someone on that panel would say, 'Do you think you could write a paper about that?'. You know. So they are always trying me and [name of design partner] to write papers about what it is to design. But I am not interested in unpicking that."[150]

Although this was one of the more extreme positions that I encountered, and though I also met architects who were much more eager to write about their design activities, I got the impression

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[148] Müller, R. & de Rijcke, S. (2017): Thinking with indicators. Exploring the epistemic impacts of academic performance indicators in the life sciences. In *Research Evaluation*, 26/3, pp. 157–168.
[149] Brown, R. & Carasso, H. (2013): *Everything for Sale? The Marketisation of UK Higher Education*. Abingdon: Routledge; MacGettigan, A. (2013) *The Great University Gamble. Money Markets and the Future of Higher Education*. London: Pluto Press; Mirowski, P. (2011): *ScienceMart. Privatizing American Science*. Cambridge, MA: Harvard University Press; Popp Berman, E. (2012): Creating the Market University. How Academic Science became an Economic Engine. Princeton: University Press.
[150] Interview, 26.02.2016, min. 67

that the architect above was not alone in being critical about writing in the way it was done at the UK 1 and within the culture of Analytical Speculation. Against the background of British science policymaking and the institutional adjustments this caused, I think that it is actually not surprising that concerns about the relation of text and design started to emerge. Furthermore, I could very well understand why architects found it difficult to write about their design activities. Describing their knowledge and explaining their design research activities in the style of the empirical sciences was something they had no experience in. Although no one mentioned that explicitly, I got the impression that, by marking their design activities as tacit, they drew a boundary between knowledge that can be judged by research evaluations and knowledge that cannot and should not.

The Culture of Analytical Speculation and the Academisation of Architecture

The main interest driving this thesis is to find out how the rise of design research might have altered architecture school's relation to the profession of architecture. In this regard, especially design research's academic tendencies caught my attention. Since the 19th century architecture schools in the western world have had the role of professional schools, in which architects working in offices have taught the practice of building design to students. In the institutional discourse related to the introduction of design research, however, architecture is described as an academic discipline and design as core research practice of this discipline.

In order to learn more about the consequences of the introduction of design research at the UK 1, I analysed the activities of one group of design researchers that I identified as belonging to the culture of Analytical Speculation. Comparing their activities with the historic and social scientific literature on professional architectural work and education, I have described this culture of Analytical Speculation as one creating ruptures between their architecture school and the profession, in regard to practice, social organisation and knowledge. Instead of working on building designs, as architects in offices or students in design studios do, its members focused their attention on the reflection, analysis and development of aspects of architectural form and style in circumscribed areas of interest. To conduct research architects belonging to this culture engaged with literature form the social sciences and humanities. Above all however, they utilized design practices as tools to architecturally analyse and speculate about the topics they were interested in. One of the main means of communicating research outcomes were

publications in which the architects distributed their designs and described their research interests and -approaches. Part of the culture of Analytical Speculation was a PhD by Design program offered at the UK 1, in which various members of this culture supervised students on matters of design-based analysis and speculation. To organise this culture, its members included various principles and structures known from scientific communities, such as a university based mentoring systems and publication formats as well as funding schemes and conferences.

Merely to describe this separation was not the only aim I had with this thesis. Wanting to problematize ruptures created by institutionalisation of design research, in this chapter conclusion, I want to ask what exactly can be criticised about the separation of design research and the profession that I identified to have taken place in the culture of Analytical Speculation.

Reflecting on the question what the emergence of this culture means its architecture school's relation to the profession, one problematic tendency can be identified by taking seriously the concerns that were part of the culture of Analytical Speculation. I think that analysing these concerns showed that, for some architects, to be part of the culture of Analytical Speculation meant to become involved in activities they did not want to do and often lacked experience in. I am specifically referring to the effort that architects had to invest in writing publications and taking part in faculty meetings in which they were encouraged to write publications. As I have shown above, the work of writing about design research caused great concerns among architects belonging to the culture of Analytical Speculation, and some of them were also critical about the idea writing about design altogether. Keeping in mind architecture schools' professional heritage and the importance design has played so far at these schools, I have to say that I fully understand these architects. Why should they actually become involved in writing? Why is it not enough to be an architect doing interesting design? The problematic aspect of writing becomes even stronger when having a closer look at the design research publications. As I have shown above, the work of explicating design procedures and knowledge along categories of the empirical sciences, was something that most of the architects I met had no previous experience in. To not be misunderstood, I am not criticising the culture of Analytical Speculation here for having members who like to write. Considering the history of the architectural book and the written work of architects like Koolhaas, I do not find it problematic when architects write about their design activities. However, as writing became mandatory and embedded within research community structures, and as it had to be done along criteria that were not actually rooted in architecture, my point is that we can critically ask what that might to do architecture

schools. For example, does that mean that architects who are willing to participate in a research community and are well versed in including science categories in their writing have a better chance at getting a university position? As just mentioned, of course I am aware that the history of architecture is full of people who designed buildings and wrote. However, I think that we should not forget that the history of architecture is also full of great architects whose work had not much to do with categories of the empirical sciences, who were not part of university-based research communities and some of them even did not write all. So what I am asking is, what happens to these architects? Assuming that design research is a phenomenon that is currently getting more important at architecture schools and that cultures like the one I described in this chapter are likely to become more important, it could mean that architects, no matter how successful they are as professionals or how big their design talent is, don't get jobs at universities, because they have no publications to show and don't belong to a university-based research community. If this happens, then the rise of design research makes it difficult, if not impossible, for many professional and gifted architects to enter university and to pass on their experience to students.

Another aspect that I am critical of was not actively problematized in my interviews. I am referring to the many ruptures between design research and professional education that the culture of Analytical Speculation had created. Through comparing interviews and observations on design research with those on architecture education, I came to the conclusion that the professional BA and MA programs at the UK 1 and the practice and knowledge constituting the culture of Analytical Speculation did not have much to do with each other. While the core of the professional study programs were studios in which students learned the craft and art of building design, which should allow them to work at an architecture office after graduating, the members of the culture of Analytical Speculation were engaged in different activities and forms of exchange. For me, this is problematic, because people belonging to this culture acted as teachers in the BA and MA design studios, having the consequence that architects without much professional knowledge and skills taught students in programs dedicated to professional education. Taking into account these differences between professional practice and the culture of Analytical Speculation, it can be asked to what extent the members of the culture of Analytical Speculation were equipped to prepare students for professional careers.

A final critical remark can be made about the relation of politics and the problematic aspects going along with the academisation of architecture. As I have shown in this chapter, the

establishment of this culture of design research and the structures within which this culture could be established can be understood in many ways as a reaction to British science policy efforts for creating market driven universities. Drawing on the work of Elizabeth Popp Berman, we can say that market policies created the conditions within which the culture of Analytical Speculation and the challenges it brought along could emerge.[151] With respect to the concerns that members of the culture of Analytical Speculation associated with building relations between text and design, I could even identify a direct relation between the practice of design research and science politics. Describing the connection between politics and the culture of Analytical Speculation in this way, we can say that British science policymaking contributed to the creation of problematic ruptures between the profession and architecture schools. These ruptures sometimes became challenging with regard to the professional reproduction of these schools and the educational role architecture schools play for the profession of architecture.

However, despite the existence of all the problems these ruptures created, we should not lose perspective and avoid understanding design research and the culture of Analytical Speculation as one that deserves nothing more than critique. Therefore, I want to end this chapter by mentioning aspects of this culture that cannot easily be problematized. To make a start, let's not forget that science policymaking cannot be held entirely responsible for creating this situation. Hence, it would be wrong to treat design research and the ways the culture of Analytical Speculation differ from professional architectural work and education as nothing more than effects of a science governance wanting to transform academia according to market principles. Considering architects logics motivating them to participate in design research, I would say this disconnection between professional teaching and design research had as much to do with the policy conditions as with the culture of architects' desire to create a realm for non-profession-based design activities. In this regard, we should keep in mind, that many architects participated in establishing and conducting this kind of design research because it opened up new possibilities for reflection and design development they would not have had without the existence of this culture. Especially the PhD students wanted to participate in this kind of design research because they were frustrated with the limited space for reflection, thinking and design development that a professional career would give them. For the architects with a more long-standing academic engagement, to be part of the culture of Analytical Speculation meant to have new options to combine humanities-based reflections with design

[151] Popp Berman, E. (2012): Creating the Market University. How Academic Science became an Economic Engine. Princeton: University Press.

activities, to engage with formal and aesthetic aspects of all different kind of topics and to further develop the design capacities of their discipline. Considering the history of the architectural book, architects understood the culture of Analytical Speculation as one enabling forms of design-based investigations that have been part of architecture for a long time, but that lack institutional support.

Taking into account the logics motivating architects to establish and conduct design research as well as the critical remarks, I think the culture of Analytical Speculation can be characterised as one that was as much related to the marketisation of universities as it was inseparable from architects' desires for introducing a more reflective culture to the discipline of architecture. Therefore, when thinking about the question of what kind of ruptures design research created between architecture schools and the profession, it is important to bear in mind that ruptures can be problematic and productive at the same time. In case of the culture of Analytical Speculation, they created both: new opportunities for design-based investigations that neither an office nor at drawing focused architecture school could offer as well as concerns and disconnections that affected professional education, reproduction and communication.

The Culture of Social Context Exploration

In April 2016, I arrived at the architecture department which I will call the UK 2. Interested in finding out about the culture of design research in architecture at different places, the UK 2 was an ideal case for comparison. Both the UK 2 and the UK 1 were located at architecture departments that had a high reputation for their research activities, and both were part of universities that considered themselves world leaders in research. Furthermore, British research evaluations considered the UK 2 and the UK 1 to be among the best places for architectural research within the UK. Therefore, I assumed that research played an important role at both institutions, and that I would be able to make observations and conduct interviews about my specific interests. Yet, despite these similarities, the institutional setting within which design research was conducted at the UK 2 was very different to the UK 1. First of all, it needs to be noted that the UK 2 was actually not an architecture school in the same way the UK 1 was. Actually, the UK 2 was a comparably small architecture department running a BA and MA in architecture. Unlike the UK 1, which was an architecture school belonging to a bigger department of architecture, the UK 2 was an architecture department offering architecture education. The UK 2 was about a third of the size of the UK 1. Its architectural BA and MA programs were attended by 300 students, and the whole department had 50 staff members. Furthermore, the institutional position of design research was different at the UK 2. Unlike at the UK 1, where design research was conducted by faculty members and PhD students, at the UK 2 design research happened within education realms. To be precise, design research was congruent with the activities taking place in the architecture MA program. This MA program was 2 years long and was certified by the Royal Institute of British Architects (RIBA) as a professional degree. The students who graduated from this course could call themselves architects and were allowed to work as such in the UK. That said, it is important to mention that research at the UK 2 was not limited to the MA program. Actually, almost all faculty members of the UK 2 conducted research related to architecture and the built environment. However, the MA program was the only place where the research was called design research. This is why I decided to focus my attention on the activities of students and teachers in this education program.

My first meeting with the director of the MA took place already on the day I arrived, right after I moved into one of the many small dorm rooms available at the campus of the UK 2. My room had a bed, a desk, a tiny bathroom, and a window with an expansive view over a large meadow with trees and short cut grass. I can still remember how it felt to enter the UK 2 for the first time. In contrast to the industrial flair of the UK 1, stepping into the 19th century Victorian building in which the UK 2 was located, I had the feeling of entering someone's private home. With its fitted carpet, its wooden stairway and doors, and the many small rooms on its three floors, I imagined a family living here. The MA program director's office was on the second floor of this building, opposite the design studios of the MA students. When I arrived, she welcomed me and handed me a set of keys to this office. As the director spent most of her time outside of this office, she said I could use it any time I would like. Thankful for this offer, I took the keys looked around and thought that her infrequent use of the office could explain why it did not contain much more than a chair, a desk, which was basically a drawing plate on two table legs, and two shelves with books and documents on them.

Apart from these more interior related observations, there was something else I realised during this first meeting. Unlike in the culture of Analytical Speculation, in which design was the core research practice, at the UK 2, research was more closely associated with methods from the social sciences. This realisation occurred to me when the director of the MA program asked me, "What do you do tomorrow?". I answered that I had no appointments, but that I had planned to prepare myself for fieldwork by going to the university library. For the director, that meant I had time. She responded, "So then, I would like you to come to the department tomorrow at 1pm and teach my students something about ethnography. Do you think you can do that?" Rather overwhelmed by this question, I replied with a simple "yes, sure". Happy about my willingness to teach, the director told me that I came to the UK 2 at the right time. One half of the MA students were in the midst of preparing for their fieldtrip, and some knowledge about ethnographic methods would be of great help to them. Furthermore, she explained to me that this trip is mandatory for every student of the MA program, and that the students are supposed to do it at the end of their first and beginning of their second year of education. Altogether it should last between six and nine months and take place outside of the town the UK 2 is located in. A lot of students even decided to leave the UK to conduct their fieldtrips abroad.

When I asked the director to what extent ethnographic methods could be of any use to the students, she told me that ethnography fits the purpose of the fieldtrip quite well. After the

students worked for almost one year on developing a building design project, they should leave the studio. In this regard, the students were expected to go to the place where they have located their design project in order to find out more about the site and its cultural context. The results of this research should then be related to the students' architecture projects, since they were expected to refine their designs in accordance with the knowledge they gained on site. For reasons of giving the students some guidance for the conduct of research, the director deemed the methods of the social sciences and ethnographic approaches as particularly helpful. Since I have had already some experience in doing this kind of on-site research, she told me that it would be a shame if I didn't tell her students something about how research is done in the social sciences and especially in ethnography.

Although this task ruined my plan to use the first week of my research stay to prepare myself for my own fieldwork, I was glad about the unexpected chance to get to know more about the students and their design research activities so quickly.

Teaching Ethnography

The next day, I arrived at the UK 2 ten minutes before my lecture started. The director welcomed me in our now shared office and told me that she would give some input to the students for the first half hour, and then I should take over. After this brief preparation, we went together into the studio room of the students who were in the first year of the MA studies. Each student had a desk and several shelves for storing models, drawings and books. In front of approximately 15 students, the director of the MA talked about what she expected the students to do to prepare themselves for their fieldtrip. As I gathered from her presentation, the students' tasks encompassed the following: After the students had decided where they would like to go, they needed to find a place that was close to their chosen destination where they could establish an affiliation. This could be an architectural office where they would work as interns or another university program that would accept them as visitors. Once they got that done, they needed to make sure that their host institution understands that their task is not just to work as interns or to participate in an ongoing educational program. Hence, they should inform their hosts that they need to conduct research. Furthermore, the director wanted the students to prepare themselves for the conduct of research before they left the UK 2 for their fieldtrip. To provide the students with an overview of the different tasks they had to fulfil, she gave them a handout called "How Do I Look?". On this handout she had listed various different things that the students should have a look at in order to prepare for their research. Sitting at one of the tables

in the studio of the 1st year students, which were all positioned adjacent to each other in the middle of one big room, the director told the students what she expected from them. For their research, the students had to identify two "academic areas" that can be related to their site and the content of their design project. In order to document this research, they needed to make a list of the most relevant literature in these areas. Furthermore, she asked the students to define their research interest, to come up with research questions that should guide their fieldwork activities. Related to these demands, she described some research methods that the students could use, which ranged from photography to interviews, observations, discourse analysis and archival research. The way how she described these methods made me, as someone who studied sociology, think that the director wanted the students to use them in a social scientific way. For example, she told the students they should not make photos that are just taken because they are aesthetically pleasing, but because they document life in and around their site of interests. The same was true for interviews and discourse analysis, which were presented as tools to find out more about people's perspectives, or the way topics of interest to the students are discussed in social media, newspapers or on television. Listening to these descriptions, I was reminded of my time as Bachelor student, when the tutors tried to teach my fellow sociology students and me how to identify the academic literature that fit the topic we wanted to do research on, as well as how to ask the right questions and how to define what methods we are going to use.[152]

Having familiarized the students to their tasks, the director introduced me by saying that I will give some input on social scientific methods and especially on ethnography. Then she left the room. Uncertain about what to expect about this teaching session, I decided to prepare myself for two different scenarios. In case the students would have no clue about the social sciences, I would give them a first overview of the basics of empirical research and explain to them the difference between quantitative (statistics) and qualitative (interviews, observations) research methods and the position that ethnographic research has within the social sciences (a mix of different qualitative research methods).[153] In case they had already some knowledge about research in the social sciences, I would get more specific and discuss with them about their planned research activities and to what extent they could use ethnographic approaches to do fieldwork. I ended up doing a combination of both, first providing an introduction and then

[152] For anyone interested in what being introduced to sociology means, the book that my fellow students and I spent the most time with in order to familiarize ourselves with the subject was: Giddens, A. (2006): *Sociology.* Fifth Edition. Cambridge: Polity Press.

[153] One book I recommended to the students to familiarize themselves with ethnography was: Emerson, R. M.; Fretz, R. I. & Shaw, L. L. (2011): *Writing Ethnographic Fieldnotes.* Chicago: University Press.

answering the questions students had about conducting ethnographic research. It was possible to go beyond the most basic introduction and discuss questions with the students because they already knew some of the fundamentals of empirical research in the social sciences. As they told me, they had taken an introductory seminar into some of the basics of social scientific research.

Building on this foundation, I did my best to answer the students' questions. For example, I discussed with one student about new perspectives that ethnography could open up to her. Being interested in what she could contribute to increase the quality of life in a North English town, which had shrunk considerably in recent years due to a declining industry, she was sceptical about the role of architecture. According to her, it would be a problematic move to tell people what they should build and how this affects their lives although she had never lived in this area. Discussing that the aim of ethnographic interviews and observations is to understand the perspectives of other people, we agreed that she could use some of these methods to better understand what people in this particular city like and dislike about living there, and what kind of new architecture the locals would appreciate. Another student asked how he can build relations between the literature and the insights gained from onsite ethnographic research. I told him that a lot of sociologists would answer that you read literature in order to learn about the research results of others and to ask yourself what you can contribute the already existing knowledge. However, I also discussed with the students that there is nothing like a 'view from nowhere' and that the literature you read of course changes the way you understand and analyse the world.[154]

A Focus on the Social Sciences

After an hour of teaching, the lecture was over. Glad about this opportunity to get a first impression of design research at the UK 2, and at the same time tired from my lecturing experience, I had the feeling that it wouldn't make any sense to conduct more research on this day. Instead, I went straight to my dorm room and scribbled down some fieldnotes in order to document this event as well as I could. Comparing this teaching experience with the data that I gathered on the culture of Analytical Speculation, I asked myself if I had perhaps encountered a different design research culture here. Form what I have seen during these first two days, I got the impression that, unlike in the culture of Analytical Speculation, where architects tried

[154] This methodological position is closely related to: Law, J. (2004): *After Method. Mess in Social Science Research.* London: Routledge.

to establish a design-based research culture, at the UK 2, research was more closely associated with approaches from the social sciences. Due to the fact that I was immediately invited to teach research methods, and based on the conversations I had with the students, I wondered to what extent the social sciences are a constituent part of design research at the UK 2.

Interested in examining different cultures of design research, I decided to dedicate the upcoming weeks of my research stay to finding out more about the role the social sciences play in the practice and social organisation of this design research MA program. Furthermore, I wanted to learn more about the position of the social sciences in design research due to my interest in ruptures. Since I came to know the culture of Analytical Speculation as one that organised itself as a design focused university-based research community, which cut off various of the ties that connected architects to the profession at university, I was curious about the ruptures that the social sciences might produce at the UK 2.

In order to find out more about these things, I spent as much time as I could with the MA students. As the cohort of students I taught left the university for their fieldtrips shortly after I met them, I decided to find out more about the research activities of the students who had just returned from their fieldtrips. Fortunately, it was not too difficult to establish contact. As the whole MA program consisted of two cohorts of 15 to 20 students each (simply called 1st year students and 2nd year students), the atmosphere was rather casual and private which made it easy to get to know each other. Furthermore, some of the 2nd year MA students knew me already. As the studios of both, the 1st and the 2nd year students, were located adjacent to each other, the students had either heard from their 1st year colleagues about me or the director of the program had informed them already about my research stay. Beyond the time I spent with the students, the director of the MA program and her tutor were open towards my research and generous with their time. This openness was of tremendous help. Since the director was not just the person who put together the curriculum of the MA program, but also the main teacher of the MA, who instructed students in design as well as in research, being able to spend time with her allowed me to gather various impressions of the conduct and organisation of design research at the UK 2. The same was true for the tutor. He was the right hand of the director and supported her in all matters of teaching. During my stay, the director as well as the tutor allowed me to follow them while they were teaching and to take fieldnotes. Furthermore, they were patient enough to give me interviews about their takes on design research and their activities in the MA program.

The outcomes of my research activities led me to the conclusion that a culture of design research existed within this MA program in which the social sciences played a crucial role in regards to the practice, knowledge and social organisation of design research. I decided to call this culture the culture of 'Social Context Exploration'. In order to give a more detailed impression of this culture and to explain why I decided to give it this name, on the following pages, I will describe the curriculum of the MA and what students did in terms of research, and I will reflect on the role the social sciences played with regard to supervision. For the sake of providing a lively example of the knowledge produced in this culture, I will also have a closer look at one design research project conducted by a student in the MA program.

Fieldtrips and Design Contexts

Altogether the MA program took two years, which were split up in three stages. During the first months, the students spent time at the UK 2, during which they were expected to produce two things: designs of a building project on different scales and a proposal for a research topic, which should be related to their design project. In order to come up with a first research proposal and to explain what their research interests and their design project have to do with each other, the students needed to gather background information on the site where they intended to localise their design project. For the students this meant that they had to conduct research on various aspects of their building project. Which aspects, depended on individual interests, and hence a wide variety of data were gathered.

During my time at the UK 2, I encountered students working on various different topics. One student, for example, worked on a restoration design project in Italy. Her chosen site was Renaissance buildings in a small Italian town, which had been severely damaged or destroyed by an earthquake in the year 2009. In her design project, she wanted to develop design proposals for the renovation and reconstruction of the damaged and destroyed buildings. The data she gathered in her research ranged from images of the city before the earthquake, to information on the history of the development of Italian laws regulating the protection of heritage buildings. Another student worked on designs of a country club in Essex. His research activities encompassed the collection of documents such as the 'Essex Design Guide' or books and

articles on the so called 'Essex Man'.[155] The Essex Design Guide was a policy document produced in the 1970s, aiming at giving a set of design principles to developer led housing projects, in times in which the local government worried about the erosion of Essex's regional identity. The Essex Man, on the other hand, is stereotypical figure popularised in the 1990s. As I learned from the students, someone is considered to be an Essex Man when he has a working class background, was born or lives in Essex and managed to acquire a high standard of living, due to making a career in fields such as the financial services or banking. For the student this stereotype was interesting as it was also associated with consumerism and flamboyant architectural style, which could be related to the design of his country club.

Once the students had gathered this kind of data and developed an idea about what they would like to design, their task was to explain the relationship between their research topic, the information they had gathered on it and their design interest to the director and the tutor. To do so, the students often gave short presentations in which they described their research interests and met the director and tutor for individual feedback sessions.

The fieldtrip constituted the second stage of the MA program. After the students spent the first months of their education developing design ideas and conducting research by gathering information, they needed to start preparing themselves for leaving the UK 2. According to the director, the aim of this trip was to conduct research in order to get a better understanding of the design project in terms of its, as she called it in one of our conversations, "socio-political objectives".[156] As already described above, in order to do so, the students had to invent an empirical research project in the style of the social sciences. This encompassed the definition of research questions and methods as well as the conduct of interviews, observations, and so on, once the students arrived at their chosen destination. Although my first impression was that the students had to conduct a full-blown ethnographic research project throughout this fieldtrip, I realised that neither the literature nor the methods the students utilized for research were strictly limited to the social sciences. During my time in at the UK 2, I met students who collected philosophical texts as well as literature from engineering, and who used methods from engineering and geography. Hence, a lot of students ended up combining different research approaches during the fieldtrip. One example was the student working on the damaged Renaissance buildings. On the one hand, she conducted interviews with local politicians as well

[155] For more information on the Essex Design Guide, see: https://www.essexdesignguide.co.uk/ (11.04.2021)

[156] Interview, 27.05.2016, min. 18.

as inhabitants of L'Aquila, as she wanted to understand their take on restoration and how should be dealt with the demolished buildings. On the other hand, she analysed the materials the damaged buildings were made of, and she tried to find out what kind of building fabric would be needed in order to avoid future damage.

The reason I decided to call this culture the culture of Social Context Exploration was the central position the social sciences had in all of this. Although research was not limited to the social sciences, I encountered the social sciences to be the binding element of this MA and its research efforts. Actually, almost all the students I met used methods from the social sciences in one way or another. In order to do follow the MA director's instruction to gather knowledge about the socio-political objectives related to their design projects, students needed to do interviews, to observe interactions of people and to think about these data in political and social terms. One further feature of this culture was the contextual status of the research-based knowledge. Since the students needed to combine their research activities with a building project, they understood their research activities to provide them with new insights about the contexts their design projects are embedded in. To leave the UK 2 and to find out more about social-political aspects meant for the students to better understand the social world surrounding their building projects.

After the students returned from their field trips, the third phase of the MA began. During this third stage, the students needed to build relations between their research and their design project. This stage started once they arrived at the UK 2. After the students gave presentations about their time away from the university, the director expected them to draw on their research in order to rethink the initial design proposal they had worked on before they left and conducted research. According to the director, the students should use their research knowledge in order to "(…) question the assumptions that you have made [in the initial design project], and then revise and expand upon it."[157] For the students, this meant that they had to re-design what they so far developed and show to the director and the tutor via drawings and models how their research informed the architecture projects they have started to develop during their first months at the UK 2.

The final outcome of the MA course consisted of two parts, which had to be submitted during the last months of studies. One of these parts was dedicated to the student's design activities,

[157] Ibid., min. 27.

the other one to their research. On the one hand the students had to hand in a design portfolio, in which they included designs from every stage of their project. On the other hand, they had to submit a "design thesis", of 15000 words length. This thesis should be based on short essays, that the students wrote throughout the course of the MA program. These essays should help the students elaborating and documenting their research interests and activities and in these texts the students needed to fulfil various tasks. In one essay, they had to formulate their research interests in relation to the design project, and in another, they wrote about possible research methods that speak to their interests. Furthermore, the students had to work on an "implementation essay" in which they needed to write about ways how their design projects could be realised by reflecting on legal, economic and social aspects related to their designs and to the site where their design project should be realised. In their thesis, the students could use these essays to make a bigger argument that relates the literature they read, their research interests, their design project and their research activities during the fieldtrip to each other.

Supervision and the Social Sciences

The central position of the social sciences was also reflected in the social organisation of the culture of Social Context Exploration. After I quickly became involved in the teaching activities of the UK 2, one question that I asked myself was to what extent this reflected parts of this culture? Did other non-architects like me teach the students, or did the inclusion of the social sciences into this culture work differently?

The answer I found is that people with experience in conducting social scientific research played an important role in this culture. Next to the director and her tutor, faculty members of the UK 2 with experience in using research methods of the social sciences were also involved in teaching and supervising students of the design research MA program. Although the director and the design tutor had both an interest in social and political questions, both of them were trained architects and both of them had spent most of their work live either as design teacher or as professional architects or as both. Hence, they did neither have formal training in the social sciences or experience in conducting social scientific research. The ones who had this training were the faculty members. So, next to being taught by the director and the tutor, each student had a thesis supervisor from the faculty, who could give advice on how to conduct research as well as on matters of literature research and writing.

This relation to the faculty of the UK could be established because many of the UK 2's faculty members were acquainted with the social sciences. That does not mean that just sociologists and cultural anthropologists belonged to the faculty of this architecture department. Rather, the social sciences theories and empirical research methods of the social sciences were utilized by faculty members with all different kind of academic backgrounds and interests. During the time of my visit, research of faculty encompassed topics, such as: urban development in the global south, conflict in cities, the relation of city infrastructures and inhabitants' movement patterns, effects of natural disasters on urban building stock, thermal comfort in buildings and new possibilities of digitally visualising and narrating architecture. As varied as the research topics were the disciplines that faculty associated their research activities with. Asking the researchers to what kind of field their research belongs, they mentioned disciplines such as urban studies, engineering, history, anthropology and visual studies. However, as in the MA program, despite this heterogeneity, there was one element that most of the research activities had in common: an orientation towards social and political questions and research methods of the social sciences. Even faculty dealing with the effects natural disasters have on urban building stock employed, next to methods from engineering, approaches from the social sciences. In order to show how, I would like to briefly describe the research of one faculty member at the UK 2.

In an interview about her research activities, this faculty member told me how she deals with natural disasters, such as earthquakes, the damage they do to the built environment and the question how this damage is related to people getting injured or dying. Having a background in geotechnical engineering, she was interested in finding reasons why buildings collapse during natural disasters and she went to places where these disasters happen to do a so-called "damage assessment".[158] If for example and earthquake happened, then she would try to find out more about the why and how this earthquake caused damage to buildings. This means that she analysed whether buildings broke down due to landslides triggered by an earthquake for example, or due to the shaking of the ground. Additionally, the researcher was interested in the engineering and material components of architecture and in the question why particular buildings broke down and others did not. This involved the analysis of the materials used for building purposes as well as the building techniques. But this engineering based approached was not the only one that she made use of. Beyond analysing the material reasons for building stock damage, her research was influenced by the social sciences. On her fieldtrips, she talked

[158] Interview 19.05.2016, min. 15.

to the people who experienced and survived an earthquake, in order to find out how they reacted to an earthquake and how they survived. In particular she wanted to know more about the reasons of peoples' survival, and to what extent this was related to factors such as the protection of the built environment or the ability of the inhabitants to protect themselves by hiding under a desk or running outside. Related to that she examined the activities of local authorities and government responses to disasters. In this regard she wanted to know more about whether the victims of a disaster were helping themselves or whether they had been told what to do by governmental authorities. The outputs of this kind of research ranged from presentations and papers to reports for audiences, such as the scientific community of engineers, governments or international institutions like the UN.

UK 2 faculty members were involved with the MA program and the design research conducted in this program in two main ways. On the one hand, they had to give lectures in which they introduced the students to the topics and issues they dealt with in their research. These lectures took place before the students' fieldtrips and were intended to give students an overview of possible research topics and methods. On the other hand, every student was assigned to a thesis supervisor belonging to the research faculty of the UK 2. The thesis supervisor was supposed to support the student while she or he prepared and conducted research. This meant that they supervised students regarding the tasks of defining areas of interest, finding academic literature, building a research perspective for the fieldtrip, defining research methods and writing about their research in the thesis. Against this background, me being invited to teach ethnography was maybe a bit unusual, since I was just a visitor and not a member of the faculty, yet it was not something tremendously exceptional.

Social Context Knowledge

As already briefly mentioned above, the research-based knowledge in the culture of Social Context Exploration was considered to be knowledge about the socio-political context of building sites. The person from whom I learned most about this epistemological dimension of the culture of Social Context research, was a student of the MA program, who came back from his fieldtrip while I conducted my own fieldwork at the UK 2. Having a Greek-Cypriot background, he decided to work on an architectural project related to the conflicts between Greek Cypriots and Turkish Cypriots in the capital of Cyprus, Nicosia. In his research, he was

especially interested in Nicosia as a divided city and in the buffer zone that separates the Turkish and the Greek parts of the town. This buffer zone was established in the 1960s by the United Nations (UN), in order to prevent a further escalation between the Greek and Turkish population of Cyprus in the aftermath of British colonialism. The student was supervised by a faculty member belonging to a research group at the UK 2 which examined conflicts in cities. The people belonging to this group analysed, as they called it, "immaterial" cultural and ethnic aspects of conflicts in cities as well as their material architectural dimension. The student's research went in a similar direction.

In an interview he told me how he did research on two aspects of the divided city. On the one hand, he wanted to know more about the material and geographical aspects of the buffer zone dividing Nicosia. On the other hand, he was interested in the cultural dimension of the conflict. In this latter regard he was curious about a range of topics, encompassing an analysis of which parts of the population live where in this city as well as questions about how the UN understands its mission in Nicosia, how Turkish- and Greek Cypriots perceive each other and what makes them cross borders and interact with each other. To find out more about the different aspects of Nicosia as divided city, the student conducted various different forms of research.

Before he went on his fieldtrip, he used methods of visual mapping, which were developed by the conflict in cities group to find out more about the geographical aspects of the conflict. Applying these methods to Nicosia, he gathered a wide variety of data, ranging from statistical information on the spatial distribution of Turks, Greeks and ethnic minorities in Nicosia to data on the location of infrastructure, such as the sewage system, hospitals, football stadiums and so on. For him this was valuable information, since it provided a first impression of the spatial distribution of ethnic groups and crucial infrastructure. One example he gave in our interview was about a social media analysis he conducted. In order to find out how much ethnical mixing takes place in the city, he downloaded social media postings from platforms like Twitter or Flickr. After he had analysed whether they were sent from Greek- as well as Turkish Cypriots and where the postings were sent from, he then overlaid these data with a map on Nicosia. This allowed him to visualize which areas of the town are shared by both groups and which are more separated, in terms of the presence of Greek- and Turkish Cypriots.

For his field trip, he arranged a 6-month residency at the department of architecture at the University of Nicosia. Once he had arrived in Nicosia, the student dedicated his time to

ethnographic research on the division of the city as well as on bi-communal events and the activities of institutions supporting the mutual exchange between Greek and Turkish Cypriots. This research encompassed video and photo recordings of the checkpoints and barriers out of which the buffer zone was built, as well as interviews with members of NGOs organising bi-communal events, people attending these events, local politicians and UN representatives. Furthermore, he collected documents and literature on the division of Nicosia and the history of the buffer zone.

Curious about whether this knowledge had any consequences for his design activities, I asked him how his research and the design project that he had to realise for the MA course are related to each other. In his response to this question, he told me that his research mattered in so far as his design project should be a contribution to establish friendly relations between the Greek and the Turkish community in Nicosia. Hence, to know more about the division of the city and how people organising and participating in bi-communal events manage to overcome this division would help him by inventing architecture that could build bridges between the different ethnic groups. In terms of his design project to engage with this kind of topic meant that "(…) it becomes not about creating a meeting space or an interaction space in the middle, it is also about encouraging cooperation."[159]

Asked for examples of the relationship between research and design, he told me that the research knowledge influenced both the decision of where to localise his design project and what it could be about. Actually, it also changed his initial design proposals he had developed before he started his field trip, in which designed a shared civic infrastructures, such as a park bridging the buffer zone. For the first time he got a new sense of direction in terms of what his design project could be about through spending time with people such as the ones belonging to the 'Home for Cooperation'. This NGO was founded by Greek- and Turkish Cypriot Educators, who wanted to re-write the history of Cyprus, from one which highlights the elements separating the different ethnic groups to one showing the many connecting and shared elements that were part of this history. Interested in their activities, the student spent time in the headquarters of this NGO that was located in the buffer zone. Although he enjoyed being there and talking to the Greek- and Turkish Cypriots he met there, he also realised that the Home for Cooperation mostly attracted people with high formal education who already held positive

[159] Interview, 08.06.2016, min. 17.

attitudes about overcoming boundaries. Due to his own history as Greek-Cypriot as well as from the observation of nationalist protests and conversations with people on both sides of the buffer zone, the students knew that crossing the buffer zone was usually not done regularly, neither by Greek- nor by Turkish Cypriots. The prejudice as well as the hatred were often stronger than the curiosity of getting to know better the life on the other side. This made him realise that he did not want to design a shared civic infrastructure, such as the park, and he also decided that he did not want to do another shared public institution like a museum instead. Such buildings would attract again people who are anyway open towards other ethnic groups. In our interview, he articulated this saying:

> "And then, I guess, I started thinking, what are the ways I can encourage like crossing the boundary, and like some sort of cross-cultural communication. I really wanted to avoid making a project about like, a shared civic facility or a shared library or a shared museum, or stuff like that. (…) Like, I mean people will go to it, but the people that will go are the ones that want to learn, and they are like each other, or they are more convenient with approaching the other, while the more nationals, who like never go there, and they might like be aggressive towards the building. So I was thinking what are other ways I can bring like more people that are not comfortable with being with Turkish Cypriots or Greek Cypriots in a space."[160]

Another observation that influenced the student's design decisions was related to his social media analysis. Visualizing the location of social media activities of Greek and Turkish Cypriots, he found out that the big shopping streets north and south of the buffer zone showed the highest degrees of inter-ethnical mixing. These results were also backed by the people of the 'Urban Segregation and Conflict Studies Research Lab' at the University of Cyprus. As the student told me, by means of on-site observations and the generation of digital models of the movement patterns of Nicosia's inhabitants, the researchers of this lab came to the same conclusion as he did: the two big shopping streets are the city's most ethnically mixed areas.[161] For him this meant that an architecture offering the possibility of commercial activities could be one way of bringing Greek- and Turkish Cypriots together. One further piece of information that became part of the student's design project was a football field located in the middle of the

[160] Ibid., min. 8.
[161] For an example of this kind of research see: N.Charalambous, N. & Hadjichristos, C. (2011): Overcoming Divisions in Nicosia's Public Space. In *Perspectives on Urban Segregation, Built Environment,* 37/2, pp. 170-183.

buffer zone. People from the UN told him that for several years a football field existed in the buffer zone that was used by Turkish Cypriots. In order to get to know more about this field, he went there and took pictures of it and he started to draw the field as well as its access routes from various perspectives. Doing so he realised that the field was close to a former airport of the UN. He also realised that a Turkish- as well as a Greek Cypriot checkpoint were nearby the football field, which would allow people from both sides of the city to access it. Due to its central location, its closeness to the airport and the checkpoints, and because the football field was not used anymore, he made the decision to place his design project exactly there.

Beyond relating research and design in terms of first ideas and the location of the building site, the student also considered his research when making decisions about the content of his final design project: a new airport located at the football field within the buffer zone. Form all that he has learned about the conflict and the division of the city, an airport had many advantages in bringing people together. First of all, the student hoped that people in the north as well as in the south of Cyprus would accept the airport. As it was neither placed in the Turkish- nor in the Greek Cypriot area, no one would need to cross the buffer zone in order to get there. Also he expected the people to not be bothered too much by showing their identification at one of the checkpoints they had to cross to get to the airport in the middle of the buffer zone, as "(…) you are going through that anyway in any airport in the world."[162] Secondly, an airport would attract not just people who are positive towards bi-communal activities such as the members of the Home for Cooperation, but everyone who needed or wanted to take a plane for whatever reason. Thirdly, an airport had a "consumerism attitude"[163], as the student called it, and offered a lot of opportunities for creating shopping space. Since the research of the University of Nicosia as well as his own social media analysis had shown that the shopping streets were the most ethnically mixed places in Nicosia, the student assumed that also a shopping space at an airport "(…) mingles people together."[164] Fourthly, it would be feasible to build an airport at the area of the football field as the student learned from his buffer zone visits that a former UN airport was located next to the football field. Although this airport was out of use, he could still reactivate the old runway, which was still perfectly usable. Finally, the student decided to design an airport, not only because he could relate such an architectural project to his findings, but also because he could create evidence that an airport would be a building that supports the

[162] Interview, 08.06.2016, min. 48.
[163] Ibid., min. 47.
[164] Ibid, min. 88.

process of bi-communal interaction. This evidence was provided by Charis Psaltis, a professor of psychology at the University Nicosia, who studied conditions under which intercultural contacts can help reducing prejudices. This professor also introduced the student to the intergroup contact theory.[165] As the student explained to me, in this theory several conditions are identified that need to be met when contacts between members of conflicting groups should contribute the reduction of prejudice. In regard to his airport, he could identify multiple of these conditions to be present, such as: "an overarching institutional presence" (the airport authority), "a common goal" (the goal of getting into the airplane) and "to require the assistance of others" (the procedures that one has to go through in order to enter a plane).[166]

Design Research: A Multicultural Phenomenon creating Multiple Ruptures

Having encountered the culture of Social Context Exploration as one closely related to the social sciences, I think that it is not too far of a stretch to say that my discoveries at the UK 2 speak for the existence of another culture of design research. In order to show to what extent this culture is different from that of Analytical Speculation, now I want to briefly compare the culture of Social Context Exploration with the one I just described, with regard to their practices, knowledge and social organisation.

Starting with practice, one of the most obvious differences had to do with the role design played in both cultures. In the culture of Analytical Speculation, design was a core research practice and members of this culture made drawings or models to analyse as well as to speculate about all different kind of topics they were interested in. The outcomes of these research activities were novel design artefacts, such as images, sketches, computer games or installations. Communicated was this kind of research in exhibitions as well as in books, booklets and journals created by the members of the culture of Analytical Speculation. In these publications, architects described their design research activities and outcomes along generic categories of the empirical sciences. In the culture of Social Context Exploration, on the other hand, design had no epistemic status. Instead of conducting research through design, the members of this

[165] For an example of professors Psaltis research see: Psaltis, C. (2012): Intergroup trust and contact in transition: A social representations perspective on the Cyprus conflict. In Marková, I. & Gillespie, A. [eds.]: *Trust and conflict: representation, culture and dialogue. Cultural dynamics of social representation.* London: Routledge, pp. 83-104.
[166] All quotes: Interview, 08.06.2016, min. 18f.

culture drew on approaches form the social sciences, such as interviews and observations, in order to generate knowledge about the "socio-political" context of building design projects. In this regard, I want to mention that also the architects belonging to the culture of Analytical Speculation built relations between their work and the social sciences for contextual reasons. In order to better understand the historical, political or social dimension of their design-based research, they engaged with literature form the social sciences and humanities. However, unlike the architects belonging to the culture of Analytical Speculation, the members of the culture of Social Context Exploration went beyond literature research. They conducted ethnographic case studies, located at the site of a building project. The research outcomes of this culture were texts, in which the members described their research activities and outcomes. They also used their research outcomes to rethink their design projects. These practical differences were also reflected in the knowledge produced in both cultures. The members of the culture of Analytical Speculation produced mainly design based knowledge about matters of form and style and about the possibilities this knowledge opens up for architectural design development. The students belonging to the culture of Social Context Exploration, on the other hand, produced knowledge about socio-political contexts of building sites. As shown in the example above, this ranged from knowledge about urban conflicts and human behaviour in cities to knowledge about cultural differences and milieu specific perceptions. As different as the practice and knowledge was also the social organisation of both cultures. While the members of the culture of Analytical Speculation built their own research community, which consisted mainly of architects as well as PhD students, the culture of Social Context Exploration was entirely teaching focused and had strong ties to professors and lecturers utilizing methods from the social sciences to conduct research.

Taking all these differences into account, I think it is important to acknowledge that design research is a multicultural phenomenon. From an STS perspective, this is already an interesting finding. So far, cultural differences have been more associated with different scientific sub-fields. For example, drawing on laboratory-based observations and interviews with scientists, Knorr Cetina describes molecular biology and high-energy physics as different "epistemic cultures".[167] In greater detail, she shows the differences between the two analysed fields in regard to their knowledge production practices, their interpretation of the objects they analyse, and their modes of interaction. While Knorr Cetina analyses two different scientific fields to

[167] Knorr Cetina, K. (1999): *Epistemic Cultures. How the Sciences make Knowledge.* Cambridge, MA: Harvard University Press.

discover cultural differences, I discover cultural differences within the single field of design research.

This raises the question of what this analysis of the culture of Social Context Exploration tells me about the ruptures that design research creates between architecture schools and the profession. While the culture of Analytical Speculation created a rupture between the UK 1 and the profession in regards of practice, knowledge and social organisation, what kind of ruptures did the culture of Social Context Exploration actually create?

Professional Education: Overlaps and Ruptures

In order to better understand what the culture of Social Context Exploration and the professional architecture school have to do with each other, as well as to understand the areas in which they do not overlap, let's once more consider what we know about architecture schools. As mentioned in the first chapter with reference to social scientists like Cuff and Sarfatti Larson, I understand architecture schools as institutions that are traditionally closely related to the profession of architecture. Cuff describes these schools as places where students need to engage with a wide range of topics important for becoming architects, from construction techniques and building statics to historic, legal and social aspects of architecture.[168] Most importantly though, at the architecture schools Cuff describes, the novice architects learn to invent, represent and discuss the designs of buildings. The place where design is taught at architecture school is the educational design studio, which is mostly run by professional architects who lead or work in offices. According to STS scholars who analysed the design work of architects, they produced knowledge about a building to be.[169]

Against the background of these descriptions, the culture of Social Context Exploration shows similarities as well as differences with the practice and social organisation of the professional architecture school. In regard to the similarities, it is worth noting that the students attending the design research MA program at the UK 2 had to do building designs. Hence, the basic professional education function of the design studios at architecture schools did still exist within

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[168] Cuff, D. (1993 [1991]): *Architecture: The Story of Practice.* Cambridge, MA: MIT Press, pp. 63-66; 118-129; Sarfatti Larson, M. (1995 [1993]): *Behind the Postmodern Façade. Architectural Change in the Late Twentieth-Century America.* Berkley: University of California Press, ch. 1. See also: Stevens, G. (1998): *The Favored Circle. The Social Foundations of Architectural Distinction.* Cambridge, MA: MIT Press, pp. 168-187, 212-214.

[169] Yaneva, A. (2005): Scaling Up and Down: Extraction Trials in Architectural Design. In *Social Studies of Science*, 35/6, 867–894; Yaneva, A (2009): *The Making of a Building: A Pragmatist Approach to Architecture*. Oxford: Peter Lang.

this culture. Yet, to do design research in the analysed culture meant to do more than design buildings. It also meant to leave the studio, to learn about and use methods from the social sciences in order to generate knowledge about social building contexts and to be supervised by faculty experienced in conducting this kind of research.

Reflecting on these insights about the question of how design research academizes architecture schools and, in doing so, how it changes the relationship architecture schools have to the profession, I think that the culture of Social Context Exploration created two ruptures. These two ruptures partially separated the profession from the UK 2 in matters of education. One of these ruptures was of a more temporary nature, the other one more permanent. The temporary rupture concerned practice. Because the students had to do a fieldtrip of six months, in which they needed to utilize methods of the social sciences to conduct research, they had to stop being designers for a while in order to become ethnographers. This included the time the students had to spend preparing themselves for conducting social science research, the months they spent away from the design studio in order to do actual on-site research and the time they had to invest in summarizing their research activities in the thesis they had to submit at the end of their studies. The more permanent rupture had to do with the culture's social organisation. Instead of being mainly supervised by architects, which would have been the case in architecture studios more closely related to the profession, the students research activities were supported by full time academic faculty having experience in the conduct of social science research.

The Marketisation of the British Universities and Design Research at the UK 2

After I have described the culture of Social Context Exploration and identified two ruptures it created, in what follows, I want to draw attention to the political conditions within which this culture and the ruptures it created emerged. Very similar to the culture of Analytical Speculation at the UK 1, at the UK 2, design research and the marketization of the British universities had a close connection. In order to better understand that connection, I tried to use my time at the UK 2 to find out more about the event that I considered to be important in many ways for the institutionalisation of design research at the UK 1: the research evaluations, which the British government conducts approximately every six years.

In the previous chapter, I identified these evaluations as tool of policymaking that was introduced in the 1980s and that contributed to the deregulation of the relationship between the state and its universities by creating a quasi-market for research.[170] On this market, the better the research performance of a university is evaluated the more money it receives from the government. Since these evaluations gained more and more importance in terms of funding and reputation around the year 2000, a lot of architecture schools got under pressure, because they did not achieve the results that their university administrations hoped for. The cause a lot of British architects gave for these undesirable results was the nature of architecture schools.[171] Unlike the vast majority of other academic departments, architecture schools were not just places of research but also of design and professionally oriented education. Hence, to a lesser degree than fully research-based disciplines, architecture schools submitted much less outputs to these evaluations that were considered as research based, such as peer-reviewed papers. Instead, they handed in designs, which were often not judged very highly by the evaluators.

Talking to faculty members who had been at the UK 2 for more than two decades about these evaluations, I have heard again and again that the situation of the department of architecture had not always been an easy one. The university the UK 2 belonged to considered itself as a place of outstanding research, and the university administrators perceived architecture as a rather applied discipline, which does not fit neatly to the university's mission of conducting ground-breaking research. To make things worse, the results of the research evaluations had not always been as good as they were during the time of my visit.

Very similar to the UK 1, also the UK 2 was affected by the research evaluations of the year 2001. As various different long-standing members told me, in 2001 the department did not get the evaluation results that the rectorate at the university deemed as desirable and the members of the UK 2 had to make sure to achieve better results in the next round of evaluations in order to avoid consequences. Asking faculty members about the consequences these 'bad' evaluations had in terms of research, they told me that the negative reactions of the university to these results lead to an expansion of the UK 2's research activities. In order to understand

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[170] Bence, V. & Oppenheim, C. (2005): The Evolution of the UK's Research Assessment Exercise: Publications, Performance and Perceptions. In *Journal of Educational Administration and History*, 37/2, pp. 137-155; Brown, R. & Carasso, H. (2013): *Everything for Sale? The Marketisation of UK Higher Education.* Abingdon: Routledge, pp. 46ff.

[171] Hawley, C. (2002): Research Assessment: a flawed exercise. In *arq: Architectural Research Quarterly;* 6/1, p. 5; Rendell, J. (2004): Architectural research and Disciplinarity. In *arq: Architectural Research Quarterly*; 8/2, pp. 141-147; Steadman, P.; Hillier, B. (2002): Research assessment under the microscope: disturbing findings and distorting effects. In *arq: Architectural Research Quarterly*; 6/3, pp. 203-207.

what ‘expansion’ means, we need to take into account that at the time of my visit almost no practicing architects belonged to the faculty.

Apart from this information, many of my conversation partners gave me one piece of advice: If I want to find out more about the difficult times of the department and design research, I should speak to the person who had the position of the head of the UK 2 in the year 2001. Since the university was particularly unhappy with the results of the evaluations of 2001, the person responsible for running the architecture department at that time could tell me a lot about the relation of these evaluations to the re-organisation of the UK 2. One faculty member even told me that this head referred to the evaluations as “the life or death of the department”.[172]

Thankful for this hint, I wrote the former head, and asked him to meet me for an interview. In order to prepare myself, I also did some background research about his activities at the UK 2, and found even two newspaper articles describing the time after 2001 at this architecture department. The first article I found appeared in a local newspaper of the region the UK 2 was located in in the year 2008.[173] In this article the head of the department got portrayed as the person who saved the UK 2 from being shut down by the university. The reason for this threat: the department did not attract enough money for research, and the department head was the one who managed to save the department from closure by increasing its research performance. The second article was published four years earlier in a one of Britain’s nationally read newspapers.[174] This article sheds some more light on the reasons for the almost closure of the department by drawing connections between a - from the university administration’s point of view - not sufficient result in the research evaluations of the year 2001 and intentions of shutting the department down completely. In this regard, the article quotes the university’s pro-vice chancellor of personnel, who said that the department had "made insufficient progress towards meeting [name of university] standards in terms of research quality" and that "the status quo cannot be allowed to continue". However, the article gives also word to the head of the department of architecture. Countering the arguments of the pro-vice chancellor, the head argued that the reason for the planned closure was not the performance of the architects, but the results of the research evaluations and the decrease in public funding that was associated with that. Since the results of the researcher evaluations were tied to the distribution of public money

[172] Interview, 01.06.2016, min. 86.
[173] Newspaper article, UK 2, 31.12.2008.
[174] Newspaper article, UK 2, 29.10.2004.

for research, a low rating meant a loss of money. Instead of receiving 30000 pounds per staff member per year for the highest possible rating (5 star), the UK 2 was rated in the category below (4 star) and received just 10000 pounds per year and staff member until the next round of evaluations. Furthermore, the head argued that it would be wrong to read out of these evaluation results that the department of architecture did bad work would be wrong. As it is written in this article, the former head of the UK 2 also joined architects from other universities in the UK, who criticised the government and the evaluators for neglecting the design activities of architecture schools.

Having read these articles, I was happy to receive a positive answer to my interview request from the former head of the department and that he invited me to meet him in his former office. Asked about the relations of policymaking and research, the former head told me that the UK 2 has always had a difficult position within the university. This is because the directors of the university understood it as a place of world-leading research. Within this environment, the department of architecture has always had problems in justifying their existence. Instead of being solely dedicated to research and teaching, it offered professionally oriented education and had practitioners as members of their faculty and not just researchers. These difficulties became particularly bad after 2001. After the results of the research evaluations of 2001 got published, the former head told me that, "(…) the university decided to close us down, which was a real serious problem."[175] The main reason why this did not happen in the end was due to a deal the former head of the UK 2 made with the university administration. He promised

> "(…) that I will get rid of all the permanent stuff which were connected to only practice. You see. Because they [rectorate of the university] thought, and this is a very important issue here in [name of the university], which still have not accepted.. they think this university is an academic university, is not for… to form profession."[176]

In order to achieve this transformation, the former head of the department managed to either get early retirements or to find new teaching positions for the professional architects at the department. Six out of twelve faculty members were replaced. The six who stayed were permitted to do so because their work was already considered to be research driven. When I asked the former head with which kinds of people he was looking to fill the gaps, he told me

[175] Interview, 03.06.2016, min. 18.
[176] Ibid., min. 19.

that potential candidates needed to be "(…) people who have done good PhDs, younger people, with a track career in publications."[177] Hiring these people worked. In the research evaluations of 2008, the UK 2 got ranked in the highest possible category, and as belonging to the best architecture departments in the UK.

What does all of that have to do with the design research and the culture of Social Context Exploration as it existed in the MA of architecture at the UK 2? According to the former head of the department, part of the deal of making the department of architecture more research bound was to add a research component to the MA degree, which was previously also oriented towards professional education. As he put it in our interview:

> "Architecture had not only the undergraduate, which they [university administration] were happy with that, but they had on top the diploma, which is a professional course. And they did not like that."[178]

This means that, while the university was fine with the department of architecture's keeping the Bachelor of Architecture entirely as a professional degree, the MA had to be different. In order to make this happen, the UK 2 started to hire professional architects on a temporary basis, in order to teach design on the BA level. On the MA level, they established a program in which design and research were part of the curriculum. According to the former head of the UK 2, the university reacted to this development in a positive way, saying, "Well fine, if it is research content it is okay, we will allow that."[179]

The person responsible for setting up such a MA curriculum was the same person occupying the position of the director of the MA program at the time of my visit. Talking with here about what she did in order to establish a design and research-driven MA, she told me that she needed to think about a way to go beyond design focused architecture education. To do so, she began establishing connections to the researchers at the UK 2 and the wider university. In our interview, she described this, saying:

[177] Ibid., min. 44.
[178] Ibid., 22.
[179] Ibid., 42.

> "And I started to considered what architecture could be as a graduate course. So what is graduate study within architecture, rather than just being larger [design] projects? And apart from that I thought it would be an intelligent thing to use the resources of the university, (…) to use the expertise that was kind of around us within the university. And then that gave way to the idea that one should be able to conduct graduate research in architecture as one would conduct graduate research in another topic."[180]

Reading the statement above while considering the role that science steering instruments, such as the research evaluations, played in raising the importance of research shows that, similar to the UK 1, also at the UK 2 design research had a close connection to market-oriented science policymaking. Analysed from this perspective it made sense that research had such a prominent role within the MA program and that there was a close connection to practices and supervisors from fields other than architecture. Since not many practicing architects were left after the reforms the former head implemented at the UK 2, and since the university wanted to have a research driven MA program, it would have been probably also very difficult, if not impossible, to establish an entirely profession-based MA program. Hence, I could also very well understand why design research at the UK 2 created the ruptures it did between the profession and architecture education.

However, while learning more about the ways the culture of Social Context Exploration, science policymaking and the reactions of the UK 2 were related to each other, I began asking myself why the culture of design research at the UK 2 was so different from the culture of Analytical Speculation at the UK 1. Since the political conditions and problems the architects at the UK 2 faced were so similar to those faced by the members of the UK 1, why did the members of the UK 2 not do something similar to the architects belonging to the culture of Analytical Speculation at the UK 1? Why didn't they establish a research culture which was more closely related to design? Maybe this would have even allowed them to keep more of their old faculty.

In order to understand where these differences came from, I needed to engage more with the logics which motivated the director of the MA program and her students to establish and

[180] Interview, 27.05.2016, min. 3.

participate in design research and the historic trajectories of these logics.[181] Doing so showed that, unlike the UK 1, the UK 2 had a strong connection to a history in which the social sciences and architecture are related to each other. This in turn affected the overall implementation of research at the UK 2 and the culture of design research as present in the MA program. In that sense the ruptures created by the culture of Social Context Exploration can be attributed to the marketization of universities as well as to the architecture department's relation to the social sciences. Before I give an impression of the social scientific logics and trajectories, I want to write a few words about the ways that the people at the UK 2 rejected parts of the public discourse of design research as it was present in the UK.

Rejecting Design as Research Practice

When trying to answer the question of why, at the UK 2, a design research culture emerged that was very different from the one I described in the previous chapter, it was of foremost importance to me to recognize that the faculty of the UK 2 and the members of the culture of Social Context Exploration both rejected parts of the prevalent discourse on architectural design research. As I have shown above, in this discourse, architecture is described as an academic discipline and design as its core research practice. Although faculty and students at the UK 2 agreed with the discourse's central claim that architecture can be seen as an academic research discipline, they were rather critical about the role of design in it.[182] Unlike the architects I have described in the culture of Analytical Speculation, who fully participated in this discourse, the faculty and students at the UK 2 did not understand their design practices as research practice.

I realised this for the first time when I interviewed the person who was the acting head of the UK 2 at the time of my visit. Having spent 3 months with members of the culture of Analytical Speculation prior to my arrival at the UK 2, for me it was almost a given that design is understood as research practice within the world of architectural design research. Yet, at the UK 2, I learned that this was not necessarily true for all places where design research got

[181] Barry, A.; Born, G. & Weszkalnys, G. (2008): Logics of Interdisciplinarity. In *Economy and Society*, 2, pp. 20-49.; Born, G. & Barry, A. (2010): Art-Science. From public understanding to public experiment. In *Journal of Cultural Economy*, 3/1, pp. 103-119.
[182] For examples of this discourse, see: Fraser, M [ed.] (2013): *Design Research in Architecture. An Overview*. Farnham: Ashgate.

conducted. Asking the acting department head about the role of design in design research, she responded:

> "Well, let me be clear about that, because it is something that I think is extraordinarily important, but I don't think design and research can be amalgamated easily, and that's, you know, I think we need to be realistic about what design is and what research is. (…) I mean, I hear more and more about courses and interest in design research, and people very quickly say: yes, we gonna have to bring the two together. And that's where I am sceptical. I think ontologically they are two different things, it's very, very different to make a design project, and the outcome is very different. The simultaneity of space is quite different than the linearity of an argument that you get in a written piece."[183]

My interview with the former head, who was responsible for increasing the research activities of the architecture department, shows that this was not just a singular opinion at the UK 2. Asked about role design plays in research, he distinguished research from design like that:

> "Research is general, it's from the particular to the general. Design is the opposite, it's from the general to the particular. (…) So it's totally opposite, design from research."[184]

The director of the MA program also shared this opinion, making clear that:

> "(…) the research process and the design process are radically different."[185]

Just after I realised the people at the UK 2 rejected the idea that research can be done through design, I began grasping that the logics and trajectories of the culture of Social Context Exploration were different to one related to the culture of Analytical Speculation. The logic motivating the members of the latter culture to establish and participate in design research was based on to the idea of engaging in reflective design processes unconstrained by professional demands. As I learned during my time at the UK 1, this logic was connected to developments in the arts, such as artistic research, in which artists began considering artistic practices as research practices and the arts as producers of new knowledge. Compared to these more art-

[183] Interview, 17.05.2016, min. 26.
[184] Interview, 03.06.2016, min. 28.
[185] Interview, 27.05.2016, min. 16.

and design-based motives and history, the culture of Social Context Exploration was much more closely related to the history that architecture shares with the social sciences.

The Need for Social Science Research, the 1960s and the UK 2

When I asked the students as well as the teachers belonging to the culture of Social Context Exploration why research was important, very often I received an answer that went like this: research is important because architects have the duty of designing buildings, which incorporate ideas about the potential inhabitants and their needs as well as the larger political context within which these buildings are built. In order to be able to do this kind of design, architects have to have knowledge about the social and political issues related to the buildings they work on and the places the buildings are located.

For the director of the MA program, this meant that she needed to establish a curriculum that enabled the students to build relations between design and social science research. Ideally their research activities would enable students to create building designs, as the director put it in one of our conversations, "(…) whose material logic stems from an understanding of all those social aspects that came out in their research".[186] But to design socially sensitive buildings was not the only output the students should ideally produce. Although the director never explicitly mentioned that, I got the impression that she wanted the students also to create designs which could make an architectural contribution to social and political discourse. At least this is how I interpreted the director's, as she called it, "dream" of educating students, who, at the end of the MA, produce:

> "(…) confident, complex, intelligently refined pieces of architecture, that have allowed them to think very broadly and have ideas that are relevant to the specific area of discourse, be that the commercialisation of the suburbs or the role of the woman in the home."[187]

To the students, the idea that architects conduct research for the sake of creating socially and politically sensitive architecture was especially appealing. For them, research was of value

[186] Ibid., min. 23.
[187] Ibid., min. 25.

because they could generate knowledge about the socio-political contexts of design projects which they otherwise would not have. In a conversation I had with a group of students about research in architecture at one of the pubs located near the department, we talked about what doing good design research means to them. Reflecting on their fieldtrip, they came to the conclusion that only by leaving the studio architects get an idea of the place where a potential architectural project is realised. This was important as the students considered architects as having a responsibility towards the people who use, inhabit or are affected by buildings. Therefore, architects need to understand local social and political conditions and the viewpoints of those for whom they are building.

By articulating the reasons why the conduct of research is important in these ways, I understand the members of the culture of Social Context Exploration to be related to a trajectory that is at least 150 years old. Already in the 19th century, architects such as Gottfried Semper took a stand for the inclusion of anthropological thinking and the study of the culture of buildings and dwellings into the young and forming profession of architecture.[188] Empirical social research about building contexts, as it happened in the culture of Social Context Exploration, entered the university then in the 1960s, during the heydays of student protests against academic institutions. In countries such as France, Germany, the UK or the USA students wanted to open up universities. Hierarchies of academic institutions should be flattened and the university should become more socially responsible, more environmental friendly and more heterogenous in terms of its research approaches.[189] In 1968 these protests found their way into the world of the built environment. Architecture students, started to articulate dissatisfaction with their education and the understanding of architecture they were confronted with by their teachers. As shown by the art historian Tom Holert, art and architecture students at the Hornsey College in London demanded:

> "We regard it as absolutely basic that research should be an organic part of art and design education. No system devoted to the fostering of creativity can function properly unless original work and thought are constantly going on within it, unless it remains on an opening frontier of development. As well as being on general problems of art and design

[188] Buchli, V. (2013): *An Anthropology of Architecture*. London: Bloomsbury, ch. 1.
[189] For a sociological account of the situation in the UK see: Lipman, A. (1970): Architectural Education and the Social Commitment of Contemporary British Architecture. In *Sociological Review*, 18/1, pp. 5-27. For an overview of the situation in the USA, see: Mcleoad, M. (2012): The End of Innocence: From Political Activism to Postmodernism. In Ockman, J. & Williamson, R. [eds.]: *Architecture School. Three Centuries of Educating Architects in North America.* Cambridge, MA: MIT Press, pp. 161-201.

> (techniques, aesthetics, history, etc.) such research must also deal with the educational process itself… It must be the critical self-consciousness of the system, continuing permanently the work started here in the last weeks [June, July 1968]. Nothing condemns the old regime more radically than the minor, precarious part research played in it. It is intolerable that research should be seen as a luxury, or a rare privilege."[190]

According to students making claims like the one above, architecture school and its education was too elitist, too focused on governmental and economic interests and not concerned enough with the world outside of the studio. Instead of receiving design instructions from their professors, the students wanted to get out of the university in order to engage with the world around them.

During this time, approaches from the social sciences became attractive to students. Taking up social science research methods such as interviewing and observing, students wanted to get to know the local cultural as well as spatial properties of an environment before starting a design project. The design studio that is still regarded today as one of the prime examples of a social sciences-inspired architecture education was called "Learning from Las Vegas".[191] This studio was taught by the British/American architects Robert Venturi, Denise Scott Brown and Steven Izenour at the Yale School of Architecture in 1968. Together with their students, the architects travelled to Las Vegas, in order to conduct research on the city. Criticizing modernist architecture for its fascination with the monumental and heroic and its ignorance of the mundane and every day, the architects and students taking part in this studio decided to document architectural aspects usually not taken into account by modernists. By documenting various parts of Las Vegas, ranging from its lighting system and parking lots to the design of casino and hotel facades, they attributed architectural value to a place that most architects regarded as a non-city and generated knowledge about aspects about which architects did not know much before.

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[190] Holert, T. (2009): Art in the Knowledge-based Polis. In *e-flux journal*, 3. Online available at: https://www.e-flux.com/journal/03/68537/art-in-the-knowledge-based-polis/ (11.12.2020).
Here Holert quotes: Notes Towards the Definition of Anti-Culture. In Students and Staff of Hornsey College of Art [eds.] (1969): *The Hornsey Affair.* London: Penguin, pp. 128-129.

[191] Venturi, R.; Scott Borwn, D. & Izenour, S. (1977 [1972]): *Learning From Las Vegas. Cambridge,* MA: MIT Press.

The Social Sciences and the UK 2

I could identify two interrelated reasons why this trajectory of empirical social scientific research in architecture could established so prominently within the culture of Social Context Exploration. First, also the UK 2 had historic links to the social sciences. Second, in order to increase the research activities of the UK 2 these links became more important.

As the more long-standing members of the UK 2 told me, in the 1960s and 1970s also the architects of this department became interested in social question. On the one hand, they began to take the social problems that occurred in and around the British post-war tower blocks seriously.[192] Reacting to increasing crime rates, vandalism and social segregation happening in and around these often cheaply built high-rises, some of the architects at the UK 2 tried to come up with alternative design solutions for social housing projects. On the other hand, there was a link to social theory. In this regard, I was told that faculty of the UK 2 belonged to leading architectural theorists in the areas of architectural hermeneutics and cultural analysis.

This history became relevant during the time of the policy-induced departmental crisis. After the professional architects had to leave the department of architecture, scholars with a track record in academic research needed to be found, in order to fill the open positions and increase the research performance of the UK 2. In our interview on the changes the department went through around the year 2000, the former head of the UK 2 said that one of his aims was to hire people who could continue topics and strands of research that already existed at the department. Hence, scholars with backgrounds in social sciences research needed to be found. This does not mean that the remaining faculty looked exclusively for sociologists or cultural anthropologist. As I have already mentioned when describing the supervision of the MA students, through interviewing the new faculty members, I learned that scholars with various backgrounds got hired whose research was closely related to architectural topics. However, what most of them had in common was a connection to the social sciences. So, after 2001, scholars engaging with topics such as urban life in slums and conflicts in cities as well as academics, such as the engineer conducting research on the ways people experience and react to natural disasters, I wrote about above, joined the UK 2.

[192] For an impression of problems these tower blocks, see: Power, A. (1997): *Estates on the Edge. The Social Consequences of Mass Housing in Northern Europe*. London: Palgrave Macmillan.

Becoming aware of this history as well as of its increased importance, I better understood why design research was so closely related to the social sciences. Not just did historic ties exist between the social sciences and the UK 2, due to the science policy reforms this history became also more important. Since the hiring of scholars versed in methods of the social sciences and the increase of the research components of the MA program happened in close temporal proximity, it is at least no surprise that a MA program got established, in which the social sciences became important and in which the new faculty acted as research supervisors. One of the people connecting the 'old' history of the UK 2, its more recent research and the culture of Social Context Exploration was the director of the MA program. Having been herself a student at the UK 2, the director of the MA program got in touch with the social sciences early on in her career. In our conversation she also repeatedly told me that she had been interested in research in disciplines such as sociology ever since. As she was also the person responsible for establishing the research-based MA curriculum, for me, the director of the MA can be considered as the person that established links between social thought, as it started to emerge at the UK 2 in the 1960s, the department's current faculty and design research in architecture education as it got conducted in the culture of Social Context Exploration.

The Culture of Social Context Exploration: Old Wine in new Skins?

While I learned more about the historic dimension of the culture of Social Context Exploration, one question that started bothering me is to what extent I observed anything new at the UK 2? Since the social sciences and architecture have had various relations to each other already long before design research became a hotly debated topic, was there anything new about the way how students conducted research in the culture of Social Context Exploration? Furthermore, I asked myself to what extent it would be feasible to assume that there is a relationship between policymaking, the culture of Social Context Exploration and the ruptures this culture created between the UK 2 and the profession. Maybe, the ruptures that I identified above were already part of social science related architecture studios before the introduction of design research. So maybe I am wrong when I draw connections between the marketization of British universities and the ruptures that the culture of Social Context Exploration created. Taking the history of the social sciences in architecture education into account actually shows that just the fact that the students of the culture of Social Context Exploration left the design studio to conduct research did not make this culture different social sciences inspired studios of the past. From this perspective we could argue that design research is nothing more than a new label for academic tendencies that already existed before at architecture schools. Just, this would leave

out some important details. Actually, a closer look at the historic examples I gave shows that they overlapped more with the profession and modes of professional architecture education than the culture of Social Context Exploration.

For example, in the studio taught by Venturi, Scott Borwn and Izenour in the 1960s, students spent ten days on a research trip in Las Vegas. Within the culture of Social Context Exploration, fieldtrips took around six months.[193] Furthermore, even if the fieldtrip of an architecture studio was inspired by the social sciences, often methods of research practices were not as directly related to the social sciences as they were in the case of the culture of Social Context Exploration. Instead of visiting the site of their design project for the sake of conducting interviews and ethnographic observations, as the students of the UK 2 did, students and tutors belonging to studios like Learning from Las Vegas often did group tours, in order to gather impressions of particular buildings or the architectural and spatial constitution of selected urban or rural settings by means of photography, sketching or note taking. These differences were also visible with regard to the social organisation of teaching. While, Venturi and Scott Brown were architects, who, next to teaching, ran an office, the research activities of the students belonging to the culture of Social Context Exploration were mainly supervised by scholars with experience in the conduct of social scientific research but without any professional affiliation.

Taking these differences into account, we can say that, although the integration of the social science into the architecture studio is not new, the degree to which this happened in the culture of Social Context Exploration cannot be attributed to the past. Analysing these differences from the perspective of Popp Berman, studios like Learning from Las Vegas, can be understood as predecessors of the culture of Social Context Exploration.[194] In order to explain the differences between the culture of Social Context Exploration and its predecessors, we need to have a look at politics. As I have outlined above, the social sciences gained importance at the UK 2 due to policy reforms and pressure from university administrators. In accordance with Popp Berman, we can argue then that policies creating the market university provided ground for the increased use of the social sciences in architecture education. This in turn had effects on the relation of the UK 2 and the profession of architecture. In the culture of Social Context Exploration, social sciences became integrated to such a degree that this culture produced ruptures between the UK

[193] Venturi, R.; Scott Borwn, D. & Izenour, S. (1977 [1972]): *Learning From Las Vegas.* Cambridge, MA: MIT Press, pp. xi-xiv.
[194] Popp Berman, E. (2012): Creating the Market University. How Academic Science became an Economic Engine. Princeton: University Press.

2 and the profession by making architecture students part-time ethnographers and by having mainly scholars with backgrounds in the social sciences supervising the research of students.

When too much Research leads to bad Design

In this last analytical part of this chapter, I would like to reflect about one problem that the ruptures introduced by the culture of Social Context Exploration caused for the students as well as design teachers. In the previous chapter I showed how architects belonging to the culture of Analytical Speculation struggled with the question how to describe design-based research activities in publications. For them this question was important, as they needed to be able to communicate the knowledge that was produced though design in a way that research evaluators would treat it as valuable research. Since the culture of Social Context Exploration was education based, its members did not struggle with these kinds of tensions. Instead, they had problems with maintaining the design quality they would expect from an MA program in architecture. As I could witness during my time at the UK 2, the students struggled in building relations between their research activities and design in a way that would lead to designs, which they as well as the design tutors would understand to be of satisfactory architectural quality.

In an interview about research in architecture education at UK 2, the head of the department told me that design quality is something important in an architectural MA program and that she does not "(…) want to see a student presenting design work that is just a very poor design, and everything is left in the research."[195] Unfortunately that is what happened to various students at the UK 2. As the director of the MA program repeatedly mentioned, she was concerned to not "educate second rank geographers" instead of good architects.[196] This statement was based on the experience she had with current as well as previous MA courses she taught at the UK 2. For the director, a big challenge of this MA program was that the students had difficulties with finding their way back into being designers after they conducted research. According to her, some of the students got so enmeshed in the literature or data they collected about their site that they lost track of their design idea and found it difficult to continue designing their architectural project. Hence, the result of thorough research could be a bad design project.

[195] Interview, 17.05.2016, min. 37.
[196] Interview, 27.05.2016, min. 22.

For the first time I realised that the students had difficulties in switching from research to design when the director of the MA program came out the room of the 2nd-year students and told me that she was not satisfied with their design performance. After I replied that I am sorry to hear that, she kept on telling me that the students don't have much time until the end of their studies, and that they have to better hurry up if they want to get good grades on their designs. One example she gave was the student who designed a new airport in Nicosia. According to the director, his airport drawings looked just like the Gatwick Airport, although his designs should have been created for a very different cultural context.

Interested in learning more about these kinds of concerns, I talked with the student about the challenges of conducting design research. His problem was that, even though he could identify various relations between his research activities and the design project, it was difficult for him to use his research results to make design decisions. Hence, he got stuck and did not make any major progress with the design after he completed his research. When I asked him why this was difficult for him, he told me that design and research are different activities requiring different states of mind:

> "Because your mind, when it is on research it is really pragmatic and it thinks like in really rational way, while my mind on design needs to be more playful, and I need to break the rules and play with stuff and sometimes things might not be rational (…)"[197]

For the student, this tension between design and research was especially strong after he had returned from the field trip. Right when he and his colleagues arrived back at the UK 2, they had to deal with different tasks. They had to write their master thesis, which meant that the students had to combine the literature they read with the insights they gained during their fieldtrip, in order to write an analytical text about their time abroad. Furthermore, the director asked them to start designing again, and to make a series of A4 sized drawings of their architectural projects on different scales. In order to start designing the student did the following:

> "(…) I was very arbitrarily throwing basically pieces of Gatwick into my site, because I felt I needed to produce something and that was like the easiest way to produce stuff

[197] Interview, 08.06.2016, min. 56.

while my mid was on research basically. And I really wanted to produce a meaningful piece of writing, and I felt it was difficult to do that while doing design at the same time."[198]

Yet, to just cut and paste pieces of already existing architecture together does not mean to do good architectural design, and this was also why the director wasn't happy about the student's design project. The way how the student dealt with this feedback was to cut off the relations to research and to, as he told me, "(…) don't be constrained by what you know."[199] Instead he started to reflect on his project in terms of its spatial qualities and to think about questions such as "what is a nice airport terminal to go to?", "which sorts of airports do I like?", "how do light and lightness come into play?"[200]. As he designed his airport next to a wall separating the Greek- from the Turkish Cypriot part, he told me how started to think less about the conflict and more about different options of designing the airports relation to the wall.

Hearing about these kinds of difficulties from the student, I could very well understand how difficult it must be to build bridges between doing design and social science research. However, my analytical appraisal of the concerns does not fully concur with the understanding of the problem articulated by the student. Actually, I don't share the student's perspective that just knowing to much makes design difficult. From my point of view the difficulties had a lot to do with a lack of experience and time, which would have been needed to conduct research and to work on design projects in a way satisfying to the students and teachers. This lack of time in turn, had a strong political dimension.

Before I explain why and how, I want to mention that I surely agree with the student that designing a building and doing social science-style research are different things. As I have already shown in the chapter above referencing STS studies, the epistemic dimension of building design can be characterised as visual knowledge[201] produced in acts of sketching and model building, and expressed in drawings and models of a building to be.[202] This is of course

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[198] Ibid., min. 56.
[199] Ibid., min. 57.
[200] All quotes: Interview, 08.06.2016, min. 58f.
[201] Ewenstein, B. & Whyte, J. (2007): Beyond Words: Aesthetic Knowledge and Knowing in Organisations. In *Organizational Studies* 28(05); pp. 689-708.
[202] Houdart, S. (2008): Copying, Cutting and Pasting Social Spheres: Computer Designers' Participation in Architectural Projects. In *Science Studies* 21/1, pp. 47 – 63; Potthast, J. (1998): Sollen wir mal ein Hochhaus bauen? Das Architekturbüro als Labor der Stadt. *Discussion Paper FS-II 98-502,* Berlin: Wissenschaftszentrum; Yaneva, A. (2005): Scaling Up and Down: Extraction Trials in Architectural Design. In *Social Studies of Science,*

not the same as conducting interviews, doing observations, reading social theory and writing texts relating theories to these kind of research activities. Hence, to combine these things is difficult. However, during my time at the UK 2, I came to the conclusion that this difference is not the only explanation for the concerns I encountered within the culture of Social Context Exploration. Due to my teaching experience at the very beginning of my research stay and my conversations with students, I got the impression that most of them had no previous undergraduate training in the social sciences and that a lot of the students were engaging with methods of empirical research for the first time. Since they needed to prepare an ethnographic fieldtrip of several months, research related to the social sciences consumed a considerable amount of energy and time. Time they could not spend on further elaborating their designs. Taking this into account, I think that, next to making differences between design and research processes responsible, it also needs to be considered that students belonging to the culture of Social Context Exploration struggled with building relations between design and research because they made their first experiences with social sciences research, while having at the same time to realise a building design project. Furthermore, it is important to consider why the students were in this situation. As I have shown above, in order to understand why research plays an important role within the curriculum of a MA in architecture at the UK 2, one needs to be aware of science policymaking in the UK. In that sense, bad design had as much to do with the difficulties of building relations between design and research as with politics.

The Culture of Social Context Exploration and the Academisation of Architecture

In this chapter I identified a second culture of design research, which I called the culture of Social Context Exploration. As shown above, this culture is education based and closely related to the social sciences. This does not mean that students belonging to this culture did not design buildings anymore. Since this culture was part of a professional MA program, allowing students to work as architects after graduating, to learn to invent and design buildings was still important. However, the same was true for the conduct of interviews and observations, which the students did for the sake of better understanding the socio-political context of building projects, and for supervisors with backgrounds in the social sciences. Thinking with these kinds of insights about the question what my analysis of the culture of Social Context Exploration tells me about a

35/6; pp. 867-894; Yaneva, A. (2009): *The Making of a Building: A Pragmatist Approach to Architecture.* Bern: Peter Lang.

design research induced academisation of architecture at the university, this chapter made four main points.

Firstly, comparing this culture to the one described in the chapter above, it shows the importance of acknowledging that design research is not one homogenous culture. Instead we need to think about design research as a phenomenon made up of cultures of design research, which are different to each other in terms of practice, social organisation, education and epistemology. Did the members of the culture of Analytical Speculation establish a research culture in which design counted as the main epistemological practice, the people belonging to the culture of Social Context Exploration relied on social scientific methods when conducting research. These differences were also visible in the social organisation and education of both cultures. The architects belonging culture described in the chapter above built their own research community containing PhD students as well as faculty members. The culture of Social Context Exploration, however, was mainly located within an educational realm and had strong ties to scholars with experience and knowledge in the social sciences. Writing this, I don't want to imply that there are no common tendencies of academisation identifiable in both cultures. Actually, the members of the culture of Analytical Speculation as well as the ones of Social Context Exploration drew on ideas, practices, outputs and principles of the sciences in order to conduct and organise their research activities. While it is possible to identify this overall tendency of academisation by drawing attention to the multiculturality, this thesis wants to highlight that it would be wrong to assume that this inclusion of the sciences led to one big transformation of architecture schools. Instead, each of the two cultures I identified built its own kind of relations between the sciences and architectural ways of working and educating students. With regard to my interest how design research changes architecture schools, this means that each culture reshaped and transformed architecture schools differently, and that each culture produced its own ruptures between architecture schools and the profession.

This latter statement immediately leads me to my second remark about the problems produced by the ruptures that the culture of Social Context Exploration created. In order to critically engage with design research at the UK 2, I showed that design teachers as well as students belonging to the culture of Social Context Exploration were worried that too much research leads to bad design. This concern was present because the students had difficulties with building relations between their research and design activities, which often resulted in poor design projects. Since, above all things that the students need to learn in order to become professional

architects, design is the most important one, a professional MA degree that cannot uphold design standards raises several questions. In this regard we can critically ask what it means if architecture schools or departments do not live up to design quality standards that are expected from then? Do they become something else then? And if so, what would be their mission in terms of education? Taking the perspective of the profession, we can furthermore ask who else could or should take over the task of design education if architecture schools do not? Are there other institutions that would have the capacities of educating architects that are capable of designing buildings of high spatial quality? Although I do think it is too early to come up with definitive answers to these questions, since design research is still a young phenomenon and we don't know yet how faculty and student will come to terms with these problems, we can get a sense of the larger problems that design research could create. What these questions show is that the introduction of design research, as conducted and organised in the culture of Social Context Exploration, can undermine both, the role architecture schools play for professional reproduction and their position at the university.

Thirdly, I described how much policymaking contributed to the problems I just associated with design research. In particular, I showed that the tension between design and research present in the culture of Social Context Exploration had a lot to do with market-oriented science policymaking and decisions by university administrators. Being threatened with closure due to 'bad' research evaluation results, the UK 2 needed to make sure to increase the research activities of its faculty as well as of its MA in Architecture program. In order to include a strong research component, the director of the MA program established a curriculum that built up on the close relation the UK 2 had to the social sciences. Due to the political conditions within which this happened, the social sciences became so prominent in terms of practice and supervision that the students as well as the director found it difficult to maintain the architectural design quality they would have expected from a MA course. Against this background, we can hold market-oriented science policymaking responsible for having contributed to the creation of ruptures, which cause serious problems when thinking about the role architecture schools play for professional education.

Fourthly, in this chapter I provided one further argument why, despite all its problematic effects, it is wrong to explain design research solely as an effect of political reforms contributing to the marketization of British universities. My research showed that the logic motivating the establishment of and the participation in design research can be traced back at least to the 1960s

and the student protests of this time. In line with the motives of this time, the logics for establishing and participating in the culture of Social Context Exploration were closely related to the ideas of a socially reflected architecture and of architects leaving the studio to thoroughly engage with the social life and political conditions surrounding their building sites. By taking also this dimension of design research into account, it should have become clear by now that design research induced ruptures produce problems as well as new possibilities to further develop architecture. In that sense, I want to close this chapter by highlighting that the culture of Social Context Exploration contained both, problematic effects of market driven science policymaking as well as practices of social reflection and the desire to create architecture that is sensitive to its political environment.

The Culture of Prototype Buildings

The sun was shining bright and the air felt fresh when I stepped out of the US 1 and entered the campus of the university the architecture school was located in. Due to the US 1's position right in the middle of this campus, I was surrounded by a big plaza, trees and allies as well as the mix of 19th century and post-world war 2 buildings, this university was composed of. Actually, the fact that I managed to get a visiting scholarship allowing me to spend time at this impressive campus, in order to study design research at this architecture school, should have made me more than happy. The US 1 was one of the leading research and teaching universities on North America's East Coast. Furthermore, it was a well-regarded architecture school, with more than 400 students, staff members coming from all around the world and internationally renowned architects who belonged to its faculty. Design research also played an important role at this architecture school. According to the research I conducted in order to prepare myself for this fieldtrip, almost all of its 150 architectural staff members present themselves as conducting research on the university's webpage. Furthermore, I learned that the US 1 maintained various design research laboratories and that design research was also part of the three-year-long professional architectural master's program offered by this architecture school.

Although I should had been excited about the opportunity to learn more about design research at one of the most influential architecture schools in the Western world, I wasn't. At least not after I had just exited the building the US 1was located in. The reason for my disappointment: I just failed again in finding out more about design research at this architecture school.

Because I was afraid about not making enough progress with my research, I decided to walk through each and every corridor of the US 1, in order to search for the architecture school´s research laboratories. Although I conducted interviews and observations already during the first weeks of my research stay in the USA, I had the impression that I did not find anything. Instead of describing and showing me their design research activities, the architects I met presented the work they do as professionals and talked about the effort they put into designing and realising buildings. Afraid that I would leave the US 1 with unusable observations and interviews, I decided to search for the architecture laboratories on my own. To my surprise, I did not find

one single lab. There was not a single doorplate labelling one of the rooms at the architecture school as ‘lab’ or ‘laboratory’, nor could I find any kind of trace of a space where people conduct research. What I found instead were lecture halls, seminar rooms and the studios where the students worked on their designs. Furthermore, I spotted a café in the basement that was heavily frequented by students, professors and guests of the school alike. However, where and how design research was conducted did not become clear to me by just by sneaking through this building.

While I was disappointed at first, in hindsight this failed attempt to find out more about design research at the US 1 was an important step towards better understanding a culture of design research that I have not encountered yet. Apart from wondering why it was so difficult to find anything useful, I began questioning my own perspective and I wondered whether all these impressions, ranging from the absence of laboratory space to the conversations about professional practice, told me something about design research at the US 1. Asking these kinds of questions, I step by step realised that I arrived in the USA with some strong ideas what design research is and what it isn’t, which made it difficult to be sensitive to the local circumstances. Ideas that were very much framed by my time in the UK.

At the two architecture schools I visited in the UK, the topic of design research was very present. Due to the many ways it departed from professional architectural work and the ruptures it created between architecture schools and the profession, design research was a matter of concern to architects as much as it opened up new opportunities for action. Also design research was a publicly debated issue amongst architects and due to its close connection to science steering instruments, such as the research evaluations, it was a topic of politic discussions too. Furthermore, design research was visible at the universities, since there were MA and PhD programs and conferences as well as research projects and professor- and lecturer positions that were dedicated to design research. In other words: design research was not difficult to find in the UK. I even could identify two different cultures of design research there, one that I called the culture of “Analytical Speculation” and one I labelled as the culture of “Social Context Exploration”.

Without consciously noticing, I had built up the expectation that design research at the US 1 would be similar to design research in the UK in terms of its visibility, the ruptures it creates between the profession and architecture schools and its political implications. This was not the

case. In many regards, design research at the US 1 was much more closely related to professional practice. The political conditions within which design research became a topic were also different in the USA. As this chapter will show, due to a more decentralised approach of introducing market principles to universities in the USA, policymaking less directly shaped the conduct of design research than in the UK. Altogether it took me two months to realise that design research at the US 1 was so different to what I had witnessed in the UK, that I did not even notice it at first. I arrived at the East Coast of the USA in the beginning of January and in the middle of March I began adapting to this new situation.

Drawing on interviews, observations and collected documents, in this chapter I will identify the culture of 'Prototype Buildings' as one closely related to the practice, social organisation, education and knowledge of the profession of architecture. This chapter gives another example of what I previously called the 'multiculturality of design research'. I decided to call this culture the culture of Prototype Buildings as its members developed and worked on building designs and were involved in the realisation of building projects. The term 'Prototype' belongs in the name of this culture because of the often preliminary status that building designs and buildings had within it. Architects belonging to this culture often worked on buildings they understood to be first preliminary versions of building design, which could lead way for bigger building trends to come. Research encompassed the work needed to develop and invent these novel buildings.

However, this chapter is not just about the similarities between the profession and the culture of Prototype Buildings. I also understand this culture to be another example of how design research contributes to an academization of architecture schools, just to a slightly lesser extent than the two cultures I described in the UK. In this regard, I will show how architects often established relations to science- and technology-related fields and how they included knowledge and materials developed in this area in their design proposals. How this kind of design research was done, what that means in terms of ruptures and how this academization of architecture is related to the USA based version of the market university will be as much a topic of this chapter as the identified differences between the UK and USA.

Again, as in the previous chapters, I want to mention that this account of the culture of Prototype Buildings does not aim at accounting for all the different design research activities present at the analysed architecture school. Rather it describes one culture of design research that was present alongside other research approaches. At the US 1, I also met architects doing design

research that was more closely related to art production or strongly intertwined with humanities-based reflection and exhibition making. For me there were various reasons, why I decided to analyse the culture of Prototype Buildings. Most importantly, during my time at the US 1, I had the impression that this professionally oriented culture of design research had a strong presence at this architecture school. Various professors belonged to it, it was present in design education and the US 1 supported this culture of design research by dedicating so called research laboratories to it. Furthermore, this culture had strong relations to logics of patenting, industry collaboration and technology-based science funding, which made it an interesting case to gather new impressions on the relations between design research and the marketisation of the university. Finally, an examination of the culture of Prototype Buildings can be understood as an analysis of a tendency in US based architecture, that goes beyond the walls of US 1. As historians and architects point out, research as conducted in this culture is not just limited to the confines of the US 1, but part of a bigger trend shaping US based architecture going back to developments in the 1990s.[203]

Laboratories without Walls

Before I describe the culture of Prototype Buildings and its political dimension, let me solve the mystery of the missing design research laboratories. One of the first things that struck me about design research at the US 1 was the spatial constitution of the design research laboratories. Actually, the design research laboratories that were part of this school were not laboratories in a physical sense. Did I ask myself in the beginning of my stay at US 1 where the research laboratories that I found on the architecture school's webpage were physically located, I learned from interviewing some of the laboratory members that there was no physical laboratory space at the US 1. This even meant that there was no single space where these labs were located in. There were neither walls separating different parts of these laboratories, nor was there an entrance with a sign next to it saying 'Lab'. Instead, these design research laboratories were located in the workplaces of architects as well as in the offices of start-up companies and the laboratories of scientists, the architects often collaborated with when conducting design research. In terms of practice these laboratories consisted out of the activities of the architects

[203] Allen, S. (2012): The Future That Is Now. In Ockman, J. [ed.]: *Architecture School. Three Centuries of Educating Architects in North America*. Cambridge, MA: MIT Press, pp. 203–229; Furjàn, H. (2007): Design/Research. Notes on a Manifesto. In *Journal of Architectural Education*, 61/1, pp. 62–68; Lally, S. (2009): Potential Futures. In *Architectural Design*, 79/3, p. 88–97.

and their employees when they worked on design proposals for novel types of buildings, and their partners' activities when conducting research related to these buildings.

To become aware of this multilocality of laboratories was crucial for getting a first impression of the peculiarities of the culture of Prototype Buildings. For someone like me, having a background in STS, this multilocality of laboratories was actually something rather new and it took me a while to conceptionally as well as empirically grasp the implications that had for my own research. Within STS the laboratory has had a special position since the very beginning of the discipline. According to lab studies scholars such as Latour, Woolgar or Knorr Cetina laboratories need special attention as they are the places were facts are constructed and made durable.[204] More than that, in his article "Give me a Laboratory and I will Raise the World", Bruno Latour even describes laboratories as place reconfiguring society by developing and distributing new objects, knowledge and procedures to generate knowledge throughout society.[205] This position got adapted by scholars studying art and design from an STS perspective. In a recently published volume on the studio, its editors describe studio spaces as the art and design equivalent to the scientific laboratory, writing that they:

> "(…) imagine the studio as the laboratory's cultural analogous: a space that harbours and manifests the conditions in which prototypes, models, designs, media and visualizations are conceived, planned, tested, synthesized into coherent, bounded and affective forms."[206]

The challenging question that I had to deal with while examining the design research laboratories at the US 1 was: What to do when research is not conducted in multiple locations and when the laboratories I want to know more about do not even exist as physical entities?

Actually, this question was already on the table when analysing the culture of Social Context Exploration. As the students belonging to it left their design studio for several months to conduct research about the socio-political dimensions of their building design sites, even before

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[204] Latour, B. and Woolgar, S. (1979): *Laboratory Life: The Social Construction of Scientific Facts*. Beverly Hills: Sage; Knorr Cetina, K. (1999): *Epistemic Cultures. How the Sciences make Knowledge.* Cambridge, MA: Harvard University Press, esp. ch. 2.
[205] Latour, B. (1983): Give me a Laboratory and I will Raise the World. In Knorr Cetina, K. & Mulkay, M. [eds.]: *Science Observed. Perspectives on the Social Study of Science.* London: Sage, pp. 141–169.
[206] Farias, I. & Wilkie, A. (2018): Studio studies: Notes for a research programme. In Farias, I. & Wilkie, A. [eds.]: *Studio Studies. Operations, topologies and displacements.* Abingdon: Routledge, p. 2.

I came to the US 1, I needed to find ways to collect data about design research without being able to visit all of the places where it was conducted. In the USA, however, after realising that the laboratories as physical spaces did not exist at all, I began to reflect on the question of what this means for STS research.

Above all, this absence of one physical space of research had methodological consequences. Instead of spending time in laboratories or studios as an ethnographer documenting research practices, equipment and interactions among researchers working in these spaces, I had to rely on interviews. Since many of the design research laboratories and studios I encountered consisted of different research practices conducted at different places, and the laboratory as such existed as a symbolic space produced in discourses, to get a better understanding of this kind of research, I increasingly found myself asking architects questions about the different places where their research takes place, the different partners involved in the conduct of research and the relations between the practices and partners.

As the following chapter shows, to get a sense of the distributed character of research was of paramount importance to my research. Throughout my time at the US 1, I found this multi-local way of conducting research also to be present among members of this culture, who did not consider their work to be laboratory based. Therefore, I consider multilocality to be a constituent part of the culture of Prototype Buildings. The following descriptions are as much an effort to come to terms with the multilocality of the culture of Prototype Buildings as they are attempts to describe this culture in terms of practice, social organisation and education, its relation to the profession and its political implications.

Research for (future) Buildings

In order to describe the research practice of the culture of Prototype Buildings, it is first of all important to reflect on the status that buildings had within this culture. Having talked with various members of this culture about their research and having analysed documents related to their work, I came to the conclusion that buildings and building design were the focal point of their activities. Above all, to conduct research within this culture meant to work on building designs and to engage with ways to actually materialise and build these designs. The centrality of buildings in this culture was expressed in sentences like the following one from a professor

of architecture at the US 1. Asked about the aim of all her design-based research, she told me: "I mean the short answer is: The ideal output would be to build one of the [design] projects that we have been working on (…)"[207].

In regard to practice, this orientation towards built work was also the strongest overlap with the profession of architecture. As I have shown in the chapters above, historians, sociologists and anthropologists of architecture associated the profession of architecture closely with the practice of building design.[208] Architects working in offices design buildings for clients and at the university they teach building design to students. Therefore, there is not much difference between belonging to the culture of Prototype Buildings and working as a professional architect. Actually, I think that we can even say that, in many regards, professional work and design research in the culture of Prototype Buildings were the same activity and indistinguishable.

Yet not every activity related to building design was considered to be an act of research. In order to understand the particularities of this culture, it is important to notice that not every professional architectural activity and not each and every building design is counted as research within this culture. As already indicated above, the reason I called this culture the culture of Prototype Buildings is because the architects belonging to it designed buildings they understood to be first representations of a novel type of building that could, one day, be realised. This is also true for buildings that actually got built. When architects belonging to this culture created designs that were materialised, they often described these buildings to me as early or first versions of building types which have the potential to pave the way for bigger architectural building trends to come.

My interview partners expressed this overlap between research and the development of novel buildings in various ways. Asking them when they consider their design activities as research, some of the architects talked about the invention of new design approaches opening up, "(…) a fundamentally different way of working through a [building design] project (…)"[209]. Others highlighted that they consider their design activities as research when it contributes to the

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[207] Interview, 03.02.2017, min. 15.
[208] E.g.: Cuff, D. (1993 [1991]): *Architecture: The Story of Practice.* Cambridge, MA: MIT Press; Kostof, S. (2000 [1977]): Preface. In ibid. [ed.]: *The Architect. Chapters in the History of the Profession.* Berkley: University of California Press, p. xvii-xx; Yaneva, A. (2009): *The Making of a Building: A Pragmatist Approach to Architecture*. Oxford: Peter Lang
[209] Interview, 11.05.2017, min. 12.

introduction of new perspectives on architectural topics. One architect for example highlighted the research aspect of his team's work on an urban mixed used development containing housing, commercial retail and office space by saying that they "(…) were not necessarily interested in the traditional typologies and the traditional methods of urban design, but how might thinking about space differently (…) inform urban design, how might that inform architecture."[210]

To invent this new kind of design approaches and perspectives, members of the culture of Prototype Buildings relied on research that I consider to be belonging to the world of 'science and technology'. This meant that they drew on recent developments in the natural sciences and technology related fields, in order to create new types of buildings. One important reason why the architects considered this kind of engagement to be important was the culture of Prototype Buildings' focus on environmental topics. For its members novel buildings were often created through integrating sustainable building material or a new technology into their design considerations.

To get the right impression of architects' involvement in this kind of science and technology research, it needs to be mentioned that they were not just passive receivers of new technologies or advancements in the natural sciences, who 'just' used research results of others for design purposes. Actually, architects themselves often initiated science- and technology-related research. Depending on the building they aimed at designing, they searched for collaboration partners who could support them in developing new technologies or supply them with the skills and knowledge needed to realise their visions. These partners often belonged to the natural and technical sciences as well as to the science- and technology-related industries. Sometimes architects also participated in technology development projects. This happened when they further developed already existing building materials or means of design, such as digital software.

In order to understand how research was done in this culture however, it is important to keep in mind that all this engagement with technologies had the purpose of realising new buildings. This did not mean that every research project had to lead to the construction of a building built to last for decades, yet it meant that a building design or a small-scale version of a building

[210] Interview, 03.03.2017, min. 26.

should be realised at least. Talking with one architect about the research that he put into developing a novel kind of building material, he made this clear to me, saying:

> "I tend to do research that is for a specific project and that involves making something out in the world (…). So, when I say exploring new materials, I mean not in the lab, but bringing those materials out into the world, in some kind of construction. It may be temporary, it may be more of a pavilion than a finished building, but it involves and invites the kind of friction of making it real and putting it out there."[211]

While being at the US 1, I was able to talk to various members of this culture about their research activities and I could learn about various different research projects they conducted.

One example was building designs using a novel, more environmentally friendly source for lightning these buildings up. In this project an architect and an environmental engineer of the US 1 collaborated in exploring the potentials of anaerobic decomposition for architectural lightning. The engineer and his team examined how microbes decompose organic matter under oxygen free conditions. In case he and his team would manage to develop and use such an anaerobic approach for architectural lightning purposes, they would have created a new kind of technology. For the architect, the potential existence of such a new technology raised the question how architecture would look like using this kind of technology and she worked on design prototypes representing and integrated this technology in different ways.

Another example I encountered was the work of the architect working on new building materials I just cited above. In his research he collaborated with a company developing bricks out or plant-based material. Compared to conventional bricks this novel building material had several ecological advantages. The plant-based bricks needed less energy for production than bricks out of clay and they had the advantage of being decomposable once they were out of use. Interested in what can be done architecturally with this kind of building material, the architect designed and realised a tower constructed almost entirely out of these plant-based bricks. In order to actually use these bricks for this kind of building purpose, he also collaborated with the company producing the bricks on improving the durability and strength of each brick. To do so, the architect joined the engineering laboratory of the university the US 1 was part of in

[211] Interview, 02.02.2017, min. 6.

order to test the strength of these bricks. Furthermore, he and his team adapted existing computer software to generate a digital tool that could use the strength measurements for calculating and visualising possible heights and shapes of towers that could be built out of the bricks.

Between Office and University

The social organisation of the culture of Prototype Buildings can be described as positioned between academia and the profession. This means that architects belonging to this culture worked as professional architects as well as professors and tutors at the US 1. For a professional architecture school, this mode of organisation was something rather common. As already mentioned several times above, since their establishment in the 19th century big proportions of the architectural faculty had one foot in the university and one food in practice.[212] To understand how research was organised on the intersection of university and the office, let's first of all have a look at work the realities of architects at the East Coast and take into account that there was not just one way of being an architect. From my conversations with architects at the US 1, I learned about three different ways one could be a professional architect depending on the office she or he worked in.

Firstly, there were architects working for big established firms acting all around the globe. These firms employed often more than a thousand people, ran offices at several continents and realised big projects, such as skyscrapers or new city quarters, and offered services ranging from architectural design, to urban planning and engineering. Firms like these got hired by clients due to their experience in realising big projects and know-how in calculating and keeping the budget. Architects working for these firms often did long hours and could expect to have stable work conditions as the big firms usually had enough projects commissioned to keep employees busy. Secondly, there were architects working for aspiring medium sized firms. These firms were considerably smaller in size and employed 'just' several hundred people. They often had between 5 and 2 offices in different countries. Unlike the big firms, they didn't offer a range of different services but focus their work mostly on the realisation of architectural

[212] Cuff, D. (1991 [1993]): Architecture: The Story of Practice. Cambridge, MA: MIT Press, pp. 22-35;
Stevens, G. (1998): *The Favored Circle. The Social Foundations of Architectural Distinction*. Cambridge, MA: MIT Press, pp. 168-187, 212-214.

building projects and on getting known for a certain aesthetic style or a specific approach to architecture. Architects working for these firms were able to involve themselves in various different projects on different scales. However, the conditions under which they work could be precarious at times as they often had to do long hours, in order to meet project deadlines. Furthermore, the architects working for these offices could not always be certain if a new project order would arrive in time allowing them to get paid and to keep their job. Thirdly, I learned about small firms which were often run by 5 people or less and located mostly in one of the bigger East Coast cities, such as New York, Boston or Philadelphia. Although the people working in these offices were often local residents, the projects they realised were not limited to one place or area, but span the whole globe. The reason why someone founded on office like this or started working for such a firm was not based on the desire to become a big company. Rather, to work in such a setting allowed architects to choose their clients more freely and to have more creative freedom when it came to the design and realisation of a building project. This also meant that the architects who worked in such a small office often realised projects that they were themselves interested in and not just given to them by their superiors. Part of this more open work was the conduct of research and collaborations with start-ups and other companies developing new materials, technologies or services. Most of the architects that belonged to the culture of Prototype Buildings worked for or ran this kind of small sized offices and design research was often congruent with the work they conducted in their offices and together with their collaboration partners.

I identified the social organisation of the culture of Prototype Buildings to be located between the profession and academia because the research did not happen entirely within architectural offices or in collaboration with business partners. As already indicated above, the architects belonging to this culture also collaborated with scientists. At universities, they reached out to scholars from other disciplines, in order to learn more about research conducted by these scientists or to initiate research projects on new technologies or building materials, which they could be used for the creation of novel types of buildings. Hence, research was conducted as much in the laboratories of universities as it was in the studios of an architectural office. The organisational form these collaborations took was mostly project based and architects and scientists worked together for a limited amount of time, with project durations ranging from several months to a few years. The division of labour in these collaborations could take different forms. Sometimes the scientists were responsible for conducting research in their laboratories and the architects were the ones using the knowledge produced for design purposes. At other

instances, architects themselves got involved in the research activities of the scientists. This happened when architects were strongly involved in setting the agenda of a research project and building related tasks, such as material testing.

This position between academia and the office affected also the ways how design researchers exchanged with each other as well as with researchers from other disciplines. Asking the members of the culture of Prototype Buildings to what extent they had the feeling of belonging to a research community, they either told me that they are part of an interdisciplinary community of scholars interested in similar topics, or that they sometimes participate in events organised by the disciplines they collaborated with. One architect, who drew in his work on research in the field of biology, descried his exchange with an interdisciplinary community of researchers as "(…) participating more in a dialogue about these [design research] ideas, in conferences, panels, symposia, through lectures."[213] He also told me why this kind of participation was important for him and the colleagues working with him because:

> "(…) it allowed us to share some of the work we did, for example with a community of people who are working on the combination of biology and design. (…) And it's helped us to both, share what we did, also see it in the context of other work, and ultimately refine our own reflection on what is important about what we are doing."[214]

These kind of interdisciplinary forms of exchange, however, did not stop architects' from participating in more architectural settings. In order to specifically exchange with other architects, the design researchers more or less relied on the established communication channels of the professional architecture school. As I have shown in the previous chapters with reference to the sociologists Sarfatti Larson and Stevens, professional architecture schools were, next to teaching, also places for architectural discourse.[215] In this discourse, designs and buildings were introduced "into a system of interpretation and justification" [216] by members of the profession as well as by people, such as architecture critics or historians.

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[213] Interview, 19.04.2017, min. 11.
[214] Ibid., min. 11.
[215] Sarfatti Larson, M. (1995 [1993]): *Behind the Postmodern Façade. Architectural Change in the Late Twentieth-Century America.* Berkley: University of California Press, ch. 1; Stevens, G. (1998): *The Favored Circle. The Social Foundations of Architectural Distinction.* Cambridge, MA: MIT Press, p. 204ff.
[216] Sarfatti Larson, M. (1995 [1993]): *Behind the Postmodern Façade. Architectural Change in the Late Twentieth-Century America.* Berkley: University of California Press, p. 5.

During my time at the US 1, I could witness various presentations and discussions this kind of discourse was prevalent. In public lectures, workshops and symposia, architects presented their work and discussed it with other architects, architecture students as well as members of an interested public. I actually cannot recall a single week during term time at the US 1, in which not at least one architect presented the work that she or he did for clients or talked about teaching related activities in the main auditorium of the school. In addition to these presentations, I could also witness how groups of architects gathered in one of the smaller lecture rooms to present and discuss their takes on different topics, ranging from US federal politics to climate change-related challenges architects will face in the future. What made this way of exchange different to the one I identified to be present in the culture of Analytical Speculation is that these exchanges were less structured according to the principles of a research community dedicated to design research. Hence, there were no conferences in which design researchers discussed research challenges, methods or questions, nor did meetings exist in which design researchers at the US 1 informed each other about research publication opportunities, as they did at the UK 1 for example. Being more closely tied to the profession, in the lectures and gatherings at the US 1, talk about research and about professional work happened, so to say, through the same 'channels'.

Design Research as Professional Education

In accordance with its practice and social organisation, design research education in the culture of Prototype Buildings overlapped heavily with the profession and professional education. [217] The members of the culture of Prototype Buildings taught design in the three-year-long professional Master of Architecture course offered by the US 1, which allowed students to work as architects once they graduated. Like many of the architects teaching professional design, the members of the culture of Prototype Buildings were hired on a part time basis next to their work in office. At the US 1, this meant that they occupied the positions of adjunct- or associated professor, who had the obligation to supervise students' while they learned what it means to design buildings.

[217] For literature on professional architecture education, see: Cuff, D. (1993 [1991]): *Architecture: The Story of Practice.* Cambridge, MA: MIT Press, pp. 63-66; 118-129; Stevens, G. (1998): *The Favored Circle. The Social Foundations of Architectural Distinction.* Cambridge, MA: MIT Press, pp. 168-187, 212-214.

In my interviews the members of the culture of Prototype Buildings considered their research part of education. Similar to the work the architects did when conducting design research, the architecture students had to work on an individual design project, in which they needed to deal with novel technologies, topics of sustainability and science related knowledge. Due to this close relation between professional work, design research and professional education in the culture of Prototype Buildings, I consider design research education in this culture as a form of professional education. However, this does not mean that students in each and every design studio were considered to do design research as it was done in the culture of Prototype Buildings. In order to give a more detailed account when and how this kind of design research education took place, I want to first of all reflect on the position design research had within the educational curriculum of the US 1, before giving an example of the way research got conducted.

One thing I got to know rather early on was the location of the studios of this MA program. I stumbled upon these studios while walking across the building the US 1 was based in searching for the 'missing' design laboratories. Although I never found these laboratories, I learned more about the whereabouts of the educational design studios. These studios were located on the 2nd, 3rd and 4th floor of the school building. In several big rooms, accommodating up to 40 students, with windows opening up a view onto campus, students worked on their designs. Walking through these studios, I experienced them to be spaces packed with various materials, tools, computers, drawing tables and printers. In these studios, each student occupied one working desk. The students who were taught by the same professors sat in close proximity to each other and arranged their desks head to head and side by side. Furthermore, I realised that there was a hierarchical studio structure present, which was expressed through the location of the design studios in the school building. The second level of this building was dedicated to the students and who attended the so called "core-studios" of the MA program. These core-studios were more or less the first design steps an architecture student had to take in her or his MA education. Within the structure of the whole Master of Architecture degree, out of altogether six terms, three were dedicated to the core studios and in each of those semesters the students had to attend a different studio. In these three core studios architecture students were introduced to design in a step-by-step process. They had to develop drawing skills and subsequently gain experiences in using these skills in architectural ways by designing an institutional building and by going beyond the single building and designing a whole housing project. On level 3 and 4 of the school building were the students who attended the "advanced studios", which had to be taken

in the remaining three semesters of the MA – again one each term. Compared to the core studios the advanced studios were more open with regards to the topics and design approaches students could chose to engage with. The aim of the advanced studios was that students should start to develop an individual approach to architecture, in terms of design as well as in terms of how they conceptualise and present their architectural work. During my time at the US 1, there were more than 20 advanced studios conducted in parallel. Each of these studios was run by one or two professors, who also defined the topic the studio was dedicated to and the architectural approach the studio took. The topics and approaches of each studio were closely related to the professional architectural work of the professor. The students chose a particular advanced studio because they were interested in the work and approach of the professor offering it. But the design studios were not the only spaces where architecture education happened. Throughout my time at the US 1 I could witness how students also had to visit lecture halls and seminar rooms, in order to attend classes in five areas of study: the history and theory sequence, in which they had deal with the history of architecture form various perspectives and to read and write texts; the building technology sequence, where the students learned to understand the structural and material consequences of their design decisions; the visual studies sequence, in which the students were introduced to the latest visualisation tools in architecture; and the professional practise sequence, which familiarised students with legal and managerial aspects of architectural projects. However, the design studios were the heart of the school. There the students spent actually most of their time, there they met with professors and teaching assistants to discuss their work and there they stayed days and nights working on design projects.

The studios were also the places where the students conducted design research. This was especially true for the advanced studios. After the students got familiarised with the most important design topics and skills in the core studios at the beginning of their education, they were expected to develop their own research projects during the final three terms of the MA. This research orientation was articulated in various of the documents describing the curriculum of these studios by highlighting the need to “explore”, “experiment with” or “investigate” new architectural approaches.

Curious what that might mean within the culture of Prototype Buildings, I talked to students and professors and visited design studios as observer. Doing so, I learned that student driven design research was closely related to the design research of the professors teaching the studios. In a nutshell, the relation looked like this: In their office, the architects developed or realised a

research project. As professors teaching design studios at the US 1, the architects used aspects of their research projects in their teaching, in order to introduce students to their way of working. One architect described this to me saying:

> "(…) the teacher creates their own set of issues, their own kind of schedule, in bringing the students through an exploration, and their own site and program for the students to work on. So I have very much brought some of what I think are the most interesting parts of the research out in the world into things that the students are working on."[218]

Introducing students in this way to research, the members of the culture of Prototype Development can be considered as the "typical studio instructor", who Dana Cuff defines as:

> "The typical studio instructor is a practicing architect who provides a living example of what it means to be a designer. In a studio, students gather the individual instructor's method and Weltanshauung [sic] (…)."[219]

For the students to attend the studio of an instructor belonging to the culture of Prototype Buildings meant to learn to deal with novel materials or technology, which the studio instructor used in her or his practice. As already mentioned above, the students were considered to be doing design research when they developed a design project, which integrated the materials, knowledge or technology introduced to the studio by the instructor. Such a student run design project ended once it passed the final critique, which usually happened at the end of each term at the US 1. In these critiques, the students had to present the designs they were working on throughout the term and they got feedback on it from their professors as well as from guest critics that the professor invited.

Design Research for the Environment

To give a more detailed impression of the conduct of this kind of design research in the MA of Architecture, I want to add some of my observations about the way how design research was conducted in one advanced studio at the US 1. This studio was part of a cluster of altogether seven studios at US 1. Together with the school administration the professors have decided to foster exchange between the studios and students by setting a shared agenda. To do so, the

[218] Interview, 02.02.2017, min. 30.
[219] Cuff, D. (1993 [1991]): *Architecture: The Story of Practice.* Cambridge, MA: MIT Press, p. 121

professors asked the students to dedicate their work to the topic of "Environment", which they described in the syllabus of the studio cluster like this:

> "In the context of climate change, [name of the studio cluster] will develop a multi-scalar, environmental framework for designing the materials, architecture, cities, infrastructure, and landscapes of the future. The semester will focus on some of the most critical and forward-looking issues of architectural education and practice. It will move beyond default responses to environment and explore fresh possibilities for design. [Name of the studio cluster] will emphasize a common discussion across the class, while allowing each of the seven studios to explore unique ideas and approaches. Critics and students will develop critical positions and formulate thoughtful, design-driven answers to the question: What is your position on environment?"[220]

I could gather more detailed impressions about one of these studios, thanks to a professor, who invited me to join two review sessions of the studio he taught, in which fellow architects of the professor acted as guest critics providing the students with feedback on their work. Furthermore, I managed to talk to several of his students about their research activities during the time of my stay.

Asking the professor to what extent research is part of his teaching, he told me that the students in his advanced studios should "(…) pull an idea and experiment all the way through into all of its implications." For example, if a student just came up with the idea to use a new technology for designing a building, that professor would tell the student that this is not enough and start to ask questions like: "What does that mean? What kind of new architecture could you make? What could that mean for labour? What would that mean for aesthetics?"[221]

In the studio he taught, this kind of design work was done at the site of an old Navy Yard belonging to the city the US 1 was located in. Since this area had suffered for a long time from decreasing employment rates, the students got the task to come up with an educational facility that could put people back to work or offer re-training for people, whose professional occupation is in danger of not being needed any longer due to an increasing automation of work tasks. Furthermore, the professor asked the students to use "generative design" as a tool to for

[220] Syllabus, Studio Cluster, US 1, p. 1.
[221] Interview, 02.02.2017, min. 32.

designing their buildings. This technology had rather recently entered the field of architecture and the professor could gather already some experiences with in his own architectural work. In a nutshell generative design can be described as set of algorithms that are fed with parameters - for example the size and shape a building should have as well as the number of rooms and floors that it could contain. These algorithms calculate then possible permutations of a design solution, which allows the architect to choose an option that she or he identifies to be the most suitable.[222]

Within the given topical frame, the students used methods of generative design to calculate the spatial distribution and shape of design projects covering a wide range of topics. One student re-designed a meat-packing factory adjacent to the harbour. In the reviews that I witnessed, she presented a facility in which research, education and production of "cultured meat" takes place. This is meat that is not gained by slathering animals, but it is "grown" in a laboratory setting through tissue engineering technology originally developed in regenerative medicine. In her design drawings, the student represented the old meat-packing factory as the place where the production of this meat takes place. According to the student, this new facility does not just create new jobs, it also helps to reduce prejudice towards not "naturally" grown meat. This is why she designed the meat production factory as a space with many open fronts and glass walls through which visitors could observe and learn about the meat production process. Another student proposed to re-use the old Naval Hospital as rehabilitation centre, where navy yard workers can access health care resources and safety training. Part of her building design was a scaffold structure, which she integrated in the rehabilitation centre. In order to save energy and to support the constant economic and ecological improvement of the hospital building, this scaffolding structure was designed to be a permanent part of the building allowing for the constant repair and revision of the old hospital. A third example I could gather was the work of two students. As a team, they designed building that was dedicated to research, education and production related to alternative energy. The rational of their project was based on increasing environmental pollution as well as increasing unemployment rates amongst unskilled labourers. In order to act against both, they designed a factory located in the navy yard, which contained, as they called it, "systems" of energy production and environmental cleaning. According to the students, these systems had never been related in a way as proposed by them in one factory building and contained the following: A waste to energy incineration system, a station to

[222] For an introduction to generative design in architecture see: Agkathidis, A. (2015): *Generative Design. Form + Technique.* London: Laurence King.

cleanse black water, a system to produce algae biodiesel and system that produces so-called yellow grease from used cooking oil which is used to feed livestock or to produce soap, rubber and products alike. Their idea was to use this factory for both research and production purposes, as well as to train unskilled labourers how to use these systems and to open up new job opportunities for them.

Building Knowledge

In her book "Mapping Controversies in Architecture", Albena Yaneva describes the realisation of a building as a process in which various actors are involved.[223] Local politicians need to give permissions, clients have to agree to and pay for architects' design proposals, building laws and safety requirements have to be met and without engineers and their calculations no one could be sure if a building actually won't break down after it got built. Analysing the knowledge produced in the culture of Prototype Buildings, I found this knowledge to be about these different components of architectural work and their relations. When the architects belonging to this culture work on their prototypical building designs or the realisation of a building, they garneted knowledge about various aspects of these buildings ranging from design to engineering issues.

In order to give an impression of this kind of building knowledge, now I want to present one research project that I already shortly introduced while writing on the research practice. In this project, an architect and his team engaged with novel building materials and digital design techniques in order to realise a temporary pavilion. As an assistant professor, this architect taught architectural design at the US 1. He was also head of a small architectural office, which realised projects in close relation to new developments in the biosciences and digital technology. During my time at the US 1, I met the architect for two interviews, both of which took place in the main social hub of the architecture school, the cafeteria, where students and teaching assistants as well as professors meet during the day. Located in the basement of the school's building, the cafeteria was usually very crowded with students and professors getting snacks and drinks and meeting for breaks. While I sat with the architect at one of the white

[223] Yaneva, A. (2012): *Mapping Controversies in Architecture.* Burlington: Ashgate

round tables in this cafeteria, I asked him if he could describe one of his architectural research projects.

The one he chose to talk about was the temporary pavilion, which was commissioned by one of the city's biggest art museums and was realised recently by the architect and the members of his office. In our interview, the architect told me that the pavilion got installed for two months and that it had the purpose of providing cooling in the backyard of the museum during summertime. As events and parties took place every week during this time of the year, the pavilion had to be built in a way so that it would allow access to shade for as many of the approximately 5000 visitors of each party as possible. In total this pavilion was 12 meter high, had a 14-meter-wide base, and it appeared as three conjoined cylinders. Each of these cylinders could be entered through three A shaped arches. Once inside, visitors could see that the sky is visible as each of the towers of the pavilion had an opening of approximately 4 meters.

For the architect most of the research in this project was related to finding ways to using a novel kind of material for the purpose of building this pavilion. As he told me, the pavilion was made out of biodegradable material that was entirely compostable after the pavilion's deconstruction. The main building component this pavilion was made of was mycelium, which are the cells we consider to be the roots of mushrooms. In combination with plant based agricultural waste products, such as corn husks, the mycelium worked as a filament element. When filled into brick shaped forms, the mycelium binds the corn husks, and the outcome is a brick that is stable and strong enough to be used for building purposes. The knowledge the architect created working on this project was very much related to two tasks that must be completed to build the pavilion. As the architect told me, realising this project meant to "(…) learning new things about construction, about material long longevity, about structural engineering, about ecosystems of energy and material flows."[224] The two tasks I understood to be the most important ones in regard to yielding new knowledge were related to issues of compliance and the actual construction of the pavilion.

In the first regard, the architect and his team had to find ways to deal with the fact that the pavilion had to be built within governmental safety rules and regulations, which define how buildings have to perform under extreme weather conditions, such as hurricane like winds. To

[224] Interview, 02.02.2017, min. 17.

be sure about a building's compliance with regulations, architects usually start a rather standardised procedure. They send detailed designs of the building they intend to construct as well as the materials they want to use for building purposes to an engineering company. The engineering company then takes the information given by the architects and digitally calculates how the material would perform once it is built. This means, they calculate the weight of the whole structure under gravity, and how it would behave under hurricane-level wind loads. In case of the pavilion, this process did not work though. In order to be able to do these kinds of calculations, the structural engineers need to know the specific properties of the materials used for building. Usually, to get this information is no problem, as the structural properties of the material used for building are known and already built into the computer programs doing the calculations. The pavilion however was built out of a material that had never been used for a building of the size of the pavilion before. Hence, the structural behaviour of the material was unknown. Thus, the architect had to find out more about whether the building material already complied with safety rules and regulations or if it needed to be adapted or developed for the kind of building purposes he intended it to use for. To do so he teamed up with three collaborators. The first one was a start-up company developing mycelium based material having the technical capacities to build the amount of bricks needed for constructing the pavilion. The second collaboration partner was an engineering company specialised in calculating the structural performance of building designs. The third one was the engineering laboratory of the university the US 1 was part of.

Research happened in exchange with these partners and in our interviews the architect talked about "seven rounds of testing", which involved the architect's office, the company and the structural engineers. Together they found ways to calculate the structural behaviour of the building material and to further develop the material until it fulfilled the governmental safety demands. The start-up company produced sample bricks, which were tested in the engineering laboratory. In this lab, members of the architect's office tested how the bricks behave under compression and how far they could be bent. Then they sent this data to the engineering company, which used the data to calculate the bricks performance under hurricane conditions. In my interview, the architect described this process saying:

> "We worked with the start-up company (…) and said, we want a brick that has certain strength and a certain durability and we changed a couple of variables with the manufacturing of the brick, such as the amount of growing time, the exact ratio of

> agricultural waste to living mycelium, the amount that we would chop of the agricultural waste. So we would grow an iteration of bricks, bring that exact set of bricks down to this testing lab, crush it with a machine designed for this thing, so we could measure the amount of displacement, and create a kind of stress-strain curve that would tell us about the performance. We would actually do this for multiple bricks, cause we wanted to see if there was variation within a batch, and then we would get all of that data and use it with the structural engineers who ran the digital model."[225]

As I managed to find out by looking at some of the documents describing the material testing process, one way of doing the tests in the engineering lab was to put single bricks in a testing machine that compressed the bricks. By pressing a metal plate onto them from above they could measure under which pressure the bricks started to break. Another version of testing was to find out when the mortar that was used to hold the bricks together breaks. In this regard pressures was applied on two bricks that were attached to each other by the mortar that the architects intended to use for building their pavilion. On one brick the pressure was applied on from above and on one brick from below, which allowed to measure the pressure under which the mortar starts to delaminate. These data were then sent to the engineering company, where they got used to calculate how the pavilion – with given material properties – would behave under load and wind. In case the outcome of this calculation showed that the material would break already before the load and wind threshold set by the government was reached, then the material development cycle needed to be continued.

Once a strong enough material was developed, the second phase of research began for the architect and his team. This phase was dedicated to the work of actually building the pavilion. This was challenging because the architects had to know how to position each brick already before they began building the pavilion. Since it took the company at least five days to produce new bricks, it was crucial to know already in advance how many bricks would approximately be needed for building the pavilion, in order to be able to finish the building before the deadline given by the museum. To do so, the architects first of all had to find out how the bricks needed to be stacked. This was a rather delicate task. As the calculations of the engineers did not tell them anything about how to exactly stack the bricks in order to comply with the governmental safety regulations, the architects had to make sure to arrange them in the most structurally sound

[225] Interview, 02.02.2017, min. 19.

way. In order to do so, they had to go back into the engineers' material testing lab. There the architect and his team examined the strength of different wall mock-ups. After trying several different stacking techniques, they found out that enough stability is provided when they arranged the bricks in a running bond pattern, where one brick is positioned so that it sits on top of two other bricks.

This produced another challenge though. Would the bricks be laid in a naïve way, by simply stacking one after the other, it could happen that at the end of one course a gap will remain that is too small to be filled with a single brick. If this happens several times, the whole wall could lose its stability. If one builds a wall with bricks out of brick earth, as they are available on the market, this is usually not a problem. These bricks can simply be cut in half or quarter on the construction site, and then used to fill gaps. Yet, with the mycelium-based bricks that the architect used this was not possible. Other than bricks out of brick earth, which are as stable on the outside as on the inside, the pavilion's bricks had a solid layer on the exterior but were rather weak on the inside. As the architect explained to me, this is because the bricks were, "grown" and not burned, like the ones usually available. In order to produce the pavilion's bricks, the mycelium and corn husks were put into a brick shaped form, and the mycelium started to spread and to build a solid layer that covered the corn husks. If such a brick got cut, it revealed a rather soft mix of mycelium and agricultural waste products on the inside. So once it got cut, it lost its stability. To make things worse, the pavilion had a cylindrical form, which meant that each course of bricks had a different length. Hence, it was very challenging and difficult to calculate the amount and size of all the bricks needed for the whole pavilion. In our interview, the architect described this challenge saying:

> "So every course of bricks is a different length, so you have a kind of problem with fitting bricks with a certain fixed shape. But then you also have a problem three-dimensionally, because every brick has to sit properly on two other bricks below it, with the two inch overlap."[226]

The architect addressed this challenge by developing, as he called it, "(…) computational methods to figure out how to stack bricks."[227] This meant that he and his team digitally visualised the position of each brick before the pavilion got built. Furthermore, they added a

[226] Interview, 19.04.2017, min. 10.
[227] Ibid., min. 10.

variety of discrete modules to the digital model of the pavilion, such as full, half and quarter sized bricks. The digital algorithms that the architect's team created, were able to calculate and visually represent various versions of the digital model of the pavilion complying with the stability requirements. After having calculated all of that on the computer, the architect could tell the start-up exactly the number and size of the bricks needed to build the pavilion. Due to the accurateness of the calculations, it took no longer than three weeks to actually build the pavilion.

Cultural Similarities and Differences and a Question about Politics

In the introduction of this chapter, I have identified the culture of Prototype Buildings as a third example speaking to the multicultural constitution of the phenomenon of design research. Furthermore, I made the claim that the culture of Prototype Buildings was more closely related to the profession than the cultures of design research I described in the UK. Now, after I have given accounts of the practice, social organisation, education and knowledge of this culture, I want to be more precise about these assertions. To do so, I will first have a look at the things that the culture of Prototype Buildings shared with the cultures I have analysed in the previous chapters. Then I will highlight the differences.

With regard to similarities, I want to draw attention to the research practices present in the culture of Prototype Buildings and in the culture of Analytical Speculation and highlight that in both cultures design had the status of research practice. The members belonging to the culture I described in the first chapter of this thesis utilized design to analyse spatial aspects of topics they were interested in and to make design proposals in which they, as they called it, "speculate" about what architecture could become and how it can be done differently. In similar way also the members of the culture of Prototype Buildings created designs, which should pave new ways for architectural developments in the future. Also, members of both cultures were sometimes interested in similar topics. For example, the architect conducting research architectural ceramics belonging to the culture of Analytical Speculation as well as the one working on the pavilion, I described in this chapter, engaged with novel building materials. But there was also something that the culture of Prototype Buildings shared with the culture of Social Context Exploration: the proximity to research from other disciplines. While the members of the culture I identified in the UK utilized practices from the social sciences to

conduct research, the ones in the culture I describe in this chapter were close to the natural- and technical sciences.

Taking these similarities between the different cultures into account, one could ask how I came to the impression that the culture of Prototype Buildings is more akin to the profession of architecture than the other two? In order to understand why, it is important to be precise about two relations. First, the one to acts of building design. Second, the way how research practices from other disciplines got taken up by architects.

In the first regard, one needs to keep in mind that acts of speculation in the culture of Analytical Speculation did not necessarily have much to do with building designs or built work. Architects who belonged to this culture speculated when creating designs that should open up novel ways of architecturally dealing with all different kind of topics. This could mean that they generated architectural computer games addressing issues of urban development or created new types of ornaments. Furthermore, practices such as writing and publishing articles in journals or books belonged to this culture. In the culture of Prototype Buildings however, the building played a more important role and to introduce novel ornaments – to take the example I have just mentioned above – without including this knowledge into the design of new buildings would have been not considered proper research. As I have mentioned already several times in the chapters above, historians, sociologist and anthropologists of architecture associate the profession of architecture closely with the practice of building design.[228] Therefore, I identify the practice of the culture of Prototype Buildings as being more closely related to the profession of architecture as the culture of Analytical Speculation. In regard to research practices from other disciplines, it needs to be acknowledged that architects of the culture of Prototype Buildings did not adapt practices from other disciplines to the same degree as the members of the culture of Social Context Exploration did. Unlike in the UK based culture, where architecture students became part-time ethnographers for half a year, the people belonging to the research culture of Prototype Buildings stayed architects. Although the members of this culture sometimes supported their collaborations partners with their research activities, they did that for weeks and not months. Hence, they never stopped being architects realising design projects.

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[228] Cuff, D. (1993 [1991]): *Architecture: The Story of Practice.* Cambridge, MA: MIT Press; Kostof, S. (2000 [1977]): Preface. In ibid. [ed.]: *The Architect. Chapters in the History of the Profession.* Berkley: University of California Press, p. xvii-xx; Sarfatti Larson, M. (1995 [1993]): *Behind the Postmodern Façade. Architectural Change in the Late Twentieth-Century America.* Berkley: University of California Press.

To get a full impression of the cultural differences, it is important to recognize that these practical differences were also reflected in the social organisation, education and knowledge of each culture. While the members of the culture of Analytical Speculation worked on establishing their own university-based research community and the culture of Social Context Exploration was entirely education based and closely related to supervisors with backgrounds in the social sciences, the culture I describe in this chapter overlapped to great degrees with the profession. The members of the culture of Prototype Buildings ran or were part of architectural offices next to being professors at the US 1 and the students mainly engaged with the design of individual buildings during their time in the studio. These practical, social and educational differences affected also the knowledge produced in the different cultures. While the members of the culture of Analytical Speculation yielded knowledge about aspects of from and style, and the people in the culture of Social Context Exploration generated knowledge about the socio-political surroundings of building sites, the ones of the culture of Prototype Buildings knew more about what it takes to design and realise buildings that utilize novel building materials or technologies.

A Question about Politics

While I learned about the culture of Prototype Buildings and its differences to the design research cultures I analysed in the UK, a question started bothering me: to what extent can I apply one of the most central conclusions I drew from my time in the UK to the USA? For me, one of the most important insights had to do with identifying relations connecting science policymaking, the UK based cultures of design research I just mentioned above and the ruptures they created between their architecture schools and the profession. Since the discourse of design research describes architecture as an academic discipline, I wanted to know how the institutionalisation of design research might transform professional architecture schools and the political dimension of these transformations. Describing the different ways how the culture of Analytical Speculation and Social Context Exploration deviated from the profession while increasingly relying on practices and organisational principles form the sciences, I came to the conclusion that they partly disconnected their architecture schools from the profession. One of the reasons why this happened was science policymaking. Drawing on the work of the sociologist and historian Elizabeth Popp Berman, I showed that the marketization of the British

universities provided the institutional conditions for the rise of the two cultures of design research and the ruptures they created between architecture schools and the profession. [229]

Prepared to analyse similar relations between design research and policymaking in the USA, I arrived at the US 1. Yet, due to the culture of Prototype Buildings' much closer relation to the profession of architecture, I had to ask myself if it was feasible to assume that a relation between design research, ruptures and politics existed. By recognizing the culture of Prototype Buildings and the profession of architecture as so closely related to each other, I needed to question to what extent I could also assume that actions of science policymakers in the USA contributed to a transformation of architecture schools as they did in the UK at all.

As a closer look at the political conditions showed, there has never been a direct link between design research, policymaking in the USA and the culture of Prototype Buildings in the way this link existed in the UK. However, this did not mean that there was no relation between design research and science policymaking in the USA. In order to describe the relations the culture of Prototype Buildings had to science politics, first of all I want to give an impression of the political differences between the UK and USA. Subsequently, I will characterise the political conditions within which design research became at topic at the US 1, and I will also show why I think that, although it did not look like that at first sight, the culture of Prototype Buildings can still be understood as creating ruptures between the architecture school it is part of and the profession.

The Non-Politics of Design Research in the USA

The main difference between the UK and USA when looking at the politics of design research was the absence of research evaluations conducted by the US government. As I have shown in both of the chapters above, one important reason why design research became a big topic at architecture schools in the UK was the establishment of science evaluations. These evaluations assessed the performance of universities and their departments according to measures such as publications and distributed funding according to the results of these assessments. Due to architecture's professional orientation, architecture schools received rather low ratings in these

[229] Popp Berman, E. (2012): Creating the Market University. How Academic Science became an Economic Engine. Princeton: University Press.

evaluations. However, since the amount of public funding a university receives as well as the reputation of universities has become increasingly tied to the outcomes of these evaluations, architecture schools needed to react. In the UK this led debates about the research conducted at architecture schools as well as to the introduction of new MA- and PhD programs, lecturer positions and funding streams dedicated to design research. In the USA, however these evaluations did not exist; and that made a difference.

Writing about these differences, I don't want to imply that US universities did not go through a process or marketisation since the 1980s and that this did leave architecture schools untouched. The US-based universities also saw cuts in direct governmental funding in the 1980s, and university-based scholars in the USA increasingly needed to compete with each other for research funding. This also affected architecture schools. In 1990, the architect and president of one of the USA's largest networks for university based architectural research, the Architecture Research Centres Consortium, John Templer, described the situation in which architecture schools have increasingly found themselves since the 1980s as follows:

> "A measure of faculty success in many places was (and is) determined in terms of research dollars generated. This began to emerge as a significant component of promotion and tenure deliberations, and architecture schools were not exempt. If architecture schools are to be embedded in universities, then why, it was asked, should architecture faculty turn their back on the general university community expectations of scholarly research and publication?"[230]

However, while the architects in the UK reacted to this question with critique and the establishment of a discourse and structures supporting design-based research at the university, I got the impression that their colleagues in the USA remained rather silent.

Why did the North American architects react in that way? Were they entirely uncritical or not interested anymore in design? My answer is that none of these reasons are applicable. Much more do I think that the marketisation of universities was achieved in a way in the USA that triggered much less debate around the topic of design research in architecture. As Slaugther and Leslie show in their analysis of different national versions of academic capitalism, the US-

[230] Templer, J. (1990): Architectural Research. In *Journal of Architectural Education*, 44/1, p. 3.

based science policy reforms of the 1980s were to a lower degree initiated and controlled nationally than in the UK. [231] Since the research and education policy of the 1980s was mainly the responsibility of the different US states, the market university was created through a mix of reduction of funding, various different incentives for industry collaboration and the abolishment of laws, such as patenting regulations. A federal science steering instrument, like nation-wide science evaluation, however, did not exist in the USA. Unlike in the UK, where science evaluations' and university administrators' threats of closing architecture schools gave way to critique and the implantation of institutional structures supporting the conduct of design research at universities, in the USA there was nothing comparable. Hence, also no policy related discourse around design research and its implementation at universities emerged.

Instead of debating the role of design as research activity worth supporting, the USA architecture schools went into other directions. Above all, they expanded the activities of their science faculty. Like at many architecture schools and -departments in the western world, also in the USA faculty at architecture schools consisted of architects as well as scholars with backgrounds in disciplines, such as the social- natural- and technical sciences. Due to the increased importance of research, this part of the architectural faculty experienced a strong upswing. In this regard Templer asserts that:

> "(…) particularly those with a background in the sciences, this new emphasis on research was opportune, and they quickly found ways to tap funding agencies. Their academic strengths in building science, psychology, and human factors suddenly acquired an unusual level of respect from the university and school administrations; with this esteem came influence in the affairs of the schools. They tended to jump through tenure and promotion hoops with ease. The university institutions found their careers and research to be comfortably coincident with that of most university departments."[232]

Although this weakened the position of professional architects at the university, it did not change the perception of architecture schools in a similar way as in the UK. Unlike in the UK where architecture schools got increasingly understood as research units, in which architects

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[231] Slaughter, S. & Leslie L. (1999): *Academic Capitalism. Politics, Policies, and the Entrepreneurial University*. Baltimore: Johns Hopkins University Press, pp. 64ff.
[232] Templer, J. (1990): Architectural Research. In *Journal of Architectural Education*, 44/1, p. 3.

had to become themselves researchers in order to be allowed to stay, in the USA architects at universities were still understood to be professionals. While the university administrators in the USA considered the research active faculty to be contributing to the reputation of the university through outputs such as publications and acquired funding, they increasingly expected from architects to also make contributions through creative work and to deliver "research equivalents"[233]. In the early 1990s, for example James Mayo, professor of architecture at the University of Kansas, observed that:

> "Architecture faculty must demonstrate their creative capabilities if they are to receive tenure, promotions and annual pay increases. (…) If there are no architectural awards won, then the faculty member has produced no reputational capital that can be converted into a demand for resources from university administrators."[234]

Taking these US policy conditions into account, it makes sense that architects in the USA did not start to debate and institutionalise design research in the same way as their colleagues in the UK. Furthermore, it explains why the culture of Prototype Buildings remained closely related within the realms of the profession. Since architecture was still understood and institutionalised as professional activity, why should architects leave their professional territory.

Actually, this could had been the end of my analysis of the culture of Prototype Buildings. No ruptures and not policy relations meant that my hypothesis about connections between the marketization of the university and design research induced transformations of architecture schools was not applicable to the USA. Yet, it wasn't as easy as that. My time at the US 1 showed that, although it did not look like that at first sight, similarities between the UK and the USA were present. There was a connection between market-oriented science policymaking and the culture of Prototype Buildings. Furthermore, by more closely examining these relations, I also realised that this culture created ruptures between the profession and the US 1, just in a different way and to a different degree than in the UK.

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[233] This observation was made by Strand, D. (1998): *Research in the Creative Arts.* Report by the Department of Employment, Education, Training and Youth Affairs, Canberra School of Art, The Australian National University, p. 39.

[234] Mayo, J. M. (1991): Dilemmas of Architectural Education in the Academic Political Economy. In *Journal of Architectural Education*, 44/2, p. 83.

Absent Buildings, High-Tech Architects and Blurred Boundaries

I kept looking for this relationship between politics and design research, because the longer I stayed at the US 1, the more I began recognizing that, despite its professional orientation, the culture of Prototype Buildings had created two ruptures between the US 1 and the profession.

On the one hand, I realised that design research in this culture often meant to work on artefacts, which were actually not built at all or just built for limited amount of time. These projects also often had no client, in the sense that there would be someone commissioning a design and then pay for it to be materialised as building. Frequently the building designs architects talked about when describing their research existed on the webpages of the architects' offices or in books presenting building designs. Other buildings were rather reduced and temporary versions of architectural structures. One example of such a building is the pavilion I described above, which was not built to last for years to come, but just for two months.

To make this clear, I do not consider each and every unbuilt design and 'short term' building as creating a rupture between the US 1 and the profession and as making the culture of Prototype Buildings part of the tendencies of academisation I mentioned before. Actually, in all kinds of architectural offices and professional architecture schools, architects work on designs that do not get built. This happens in educational studios or when architects want to imagine and develop new types of buildings without having to bother about professional constraints, such as building laws or client wishes. According to Sarfatti Larson to work on this kind of designs is nothing unusual amongst architects and it can be seen as part of an architectural discourse, in which architects invent and exchange about styles, looks and new spatial ideas by visual means.[235]

Hence, a design that is not built is not a rupture. However, I got the impression that research in the culture of Prototype Buildings was, if not exclusively, but still regularly associated with designs that did not get built or just built for a limited amount of time. When we further assume with Sarfatti Larson that – paper architecture aside – the most important "(…) canon of architecture consists of beautiful or innovative built exemplars"[236] and that built design was

[235] Sarfatti Larson, M. (1995 [1993]): *Behind the Postmodern Façade. Architectural Change in the Late Twentieth-Century America.* Berkley: University of California Press, p. 10ff.
[236] Ibid., p. 5.

something unavoidable, if someone wanted to be recognized as professional architect, then the culture of Prototype Buildings' turn to unbuilt and temporary design can be understood as rupture.

Furthermore, I made this second observation, which, in combination with the first one, gave me the impression that the members of the Culture of Prototype Buildings began leaving the realms of the profession. What I mean is that the natural and technical sciences played an important role in this culture. As I have shown above, members of the culture of Prototype Buildings collaborated with scientists or high-tech start-ups to realise research projects and often building design proposals took knowledge of the natural sciences or new technological developments as their starting point.

For me, the combination of both the close connection to the sciences and the not-so-close connection to built work did not fit neatly into the image of a professional culture of architecture, in which architects work on building designs for clients and teach these design experience with students in the studio. Rather, I came to understand the culture of Prototype Buildings as one in-between the profession and academia. Instead of being the designers of the built environment, I considered the members of this culture as the designers of a high-tech environment that might be fully built one day. In order to explain the political dimension of the ruptures this culture created between the profession and the US 1, let us take another look at US based science policymaking.

Blurred Boundaries

One thing that was key for better understanding the relations the culture of Prototype Buildings had to policymaking was to learn more about research funding. Once I came to know the culture of Prototype Buildings as one departing from professional realms, I started asking myself the following question: since architects belonging to this culture often collaborated with actors in science and technology related fields, and since they often worked on buildings that do not get built and that no client commissioned, how do they actually finance their activities? Or asked in another way: Who paid for the development of the design proposals and the new technologies and materials integrated in these designs?

Altogether I could identify two different ways how the members of the culture of Prototype Buildings financed their research. Firstly, they sometimes managed to acquire money from

public institutions, such as city governments or art museums. This was possible because, from time to time, these institutions provided grants for the development of design ideas or small-scale buildings, which address issues related sustainability or new technologies. Secondly, universities and academic funding bodies provided money. Yet, not in the way this happened in the UK. Since this second way of science related funding is of particular importance to my research on the relations of science policy making and design research, I decided to more closely investigate why it was actually possible that architects could acquire money dedicated to research in the sciences.

As already mentioned above, unlike at architecture schools as the UK 1, where faculty was hired to conduct design research and where funding streams for design research existed, in the USA there were neither grants nor positions dedicated to providing resources for the research that went into the conceptualisation and realisation of building designs. In my interviews, architects at the US 1 described the situation like this:

> "(…) since it is difficult for architects to apply for NSF [National Science Foundation] funding, or NIH [National Institute of Health] funding, and even a lot of foundations don't have a lot of funding for architectural design research maybe. And on the flip side there is funding for writing about the history and theory of architecture, but the design… very few people are funding just design experiments." [237]

However, the absence of resources dedicated to design research did not mean that architects couldn't acquire academic funding. Confronted with this situation, they told me that they needed to establish relations to other areas:

> "For architects, you have to kind of find, because architects don't necessarily fit into a particular [funding] category, we are not the sciences, we are not really the social sciences, so I mean we have to kind of figure out where might this kind of apply, what kind of area."[238]

[237] Interview, 19.04.2017, min. 29.
[238] Interview, 03.03.2017, min. 22.

The architects belonging to the culture of Prototype Buildings turned to the sciences, because, compared to most of the other options to, as one of my interviewees articulated it: "(…) the funding generally comes easier through the sciences".[239]

Why could architects acquire science funding? My answer is that this became possible because the policy initiatives that created the market university altered the relations between university and industry. As scholars examining recent policymaking in the USA point out, these initiatives have increasingly blurred the boundaries between professional fields, the industry and the sciences since the 1980s.[240] This was achieved by measures such as: loosening patent regulations and legal boundaries between university and industry, in order to increase the amount of private research funding at universities; reducing fulltime employment of researchers at universities in favour of part-time contracts; creating incentives for researchers to found start-ups; inventing grants dedicated to product development.

In a professionally oriented discipline such as architecture, whose members are used to collaborating with industry, finding one's position in the market and working with and for clients, securing this kind of research funding was not too far away from what they did anyway. This was even more true for the members of the culture of Prototype Buildings. From a historic perspective they can be considered as belonging to a relatively young group of research-oriented architecture firms, which started to emerge in the 1990s in the USA. According the historian of architecture Stan Allen, these firms entered the world of high-tech business and collaborated with clients on the development of new technologies and materials for building purposes. [241] Doing so, they, according to Allen, "(…) blur the boundaries between academic knowledge production and professional expertise".

In the early 2000s also a discourse emerged, which imagined architecture as discipline very much compatible with both, the sciences and the world of business. Although the scope of this discourse and the intensity with which questions of research were debated within it cannot be compared to the UK, I want to give an impression of this discourse, since I understand it to be related to the way how research was practiced and organised by the members of Prototype

[239] Interview, 02.02.2017, min. 37.
[240] For example: Mirowski, P. (2011): *ScienceMart. Privatizing American Science.* Cambridge, MA: Harvard University Press; Popp Berman, E. (2012): *Creating the Market University. How Academic Science became an Economic Engine.* Princeton: University Press.
[241] Allen, S. (2012): The Future That Is Now. In Ockman, J. [ed.]: Architecture School. Three Centuries of Educating Architects in North America. Cambridge, MA: MIT Press, p. 222.

Buildings. In her manifesto on design research, Helen Furjàn, professor of architecture at the University of Pennsylvania, describes design research as following "(…) a methodology that combines scientific rigor with innovation, intuition, and opportunism."[242] The model according to which this research works is the laboratory, which Furjàn makes clear, writing:

> "Practice—whether in the office or in the school—is now a laboratory: group-oriented, open-source, networked, and hybrid. Laboratories are process oriented and operational; the experimental process is in part the production of disorder—the noise of accumulated data, records of events, and traces of inscription—and in part the process of sorting, evaluation, and pattern finding within that disorder."[243]

Even the orientation towards the future and the development of architectural prototypes is already visible in this discourse. I realised this when I had a look at the writing of Sean Lally, one of Furjàn's colleagues at Rice University, who understands design research as:

> "(…) an approach that does not see research as a product in and of itself; rather, the investigation is only as important as where it leads to next. The work is less about being fully executable 'complete' projects and more about a strategy of design that seeks a 'proof of concept' – a verification of a strategy that shows a potential for its future project endeavours."[244]

Doing Interesting Design in Difficult Times

Describing the overlaps between the culture of Prototype Buildings, the design research discourse outlined above and science funding in the way I just did represents the members of this culture as rather closely related to dynamics and practices introduced by the marketization of US universities. For sure, this is not wrong. Yet, at the same time, it is not right either. At least, it is not a complete representation of the impression I gained from spending time with the architects at the US 1. Although I could identify many overlaps between the culture of Prototype Buildings and the policies leading to the marketization of US universities, it would be wrong

[242] Furjàn, H. (2007): Design/Research. Notes on a Manifesto. In Journal of Architectural Education, 61/1, p. 64.
[243] Ibid., p. 64.
[244] Lally, S. (2009): Potential Futures. In *Architectural Design*, 79/3, p. 89.

to understand the members of the culture I describe in this chapter as nothing more than capitalist opportunist. In that sense, in a similar way as it would have been wrong to come to the conclusion that the culture of Analytical Speculation or Social Context Exploration is nothing more than an effect of science policymaking, it would be wrong to assume that the architects belonging to the culture of Prototype Buildings was just the product of market opportunities. This also means that the ruptures between the US 1 and the profession can be attributed to logics and trajectories that go beyond science policymaking and the world of business.[245]

To show which, first of all I would like to describe the difficult situation that the members of the culture of Prototype Buildings had to face. Talking to architects about obstacles related to their work, they kept telling me about the challenging situation they were in. As architects they aimed at developing, creating and realising novel and interesting designs and not buildings that were already known within the realms of architecture. Yet, it was very difficult to find clients who would be willing to finance the build-up of this kind of design projects. As one of my interview partners told me:

> "It's interesting times we live in, and I wouldn't be surprised if the field of architecture dies in 50 years. I mean, I think already the signs are pretty much on the table. Even more than in Europe or in Asia. But in here it is pretty clear. I mean 90 something percent of all the buildings are not designed by architects. There you go. We are completely marginalized exotic birds. Right. As I told you, in my own practice, it's very difficult to have a practice as a young architect who wants to do interesting design. Most people give up."[246]

Before analysing this quote, it needs to be mentioned that fear of extinction and complaints about marginalisation are not something new to architects. The sociologist Robert Gutman identified these concerns already in the 1980s.[247] Contrasting architects' worries with the increasing amount of building commissions and public attention they received back then

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[245] Barry, A.; Born, G. and Weszkalnys, G. (2008): Logics of Interdisciplinarity, In *Economy and Society*, 2, pp. 20-49; Born, G. & Barry, A. (2010): ART-SCIECNE. From Public Understanding to Public Experiment. In *Journal of Cultural Economy*, 3/1, pp. 103-119.
[246] Interview, 19.02.2017, min. 54.
[247] Guttmann, R. (2010 [1985]): Educating Architects. Pedagogy and the Pendulum. In Cuff, D. & Wriedt, J. [eds.]: *Architecture from the Outside In. Selected essays by Robert Gutaman.* New York: Princeton Architecture Press, p. 260f.

however, Gutmann treated the articulation of such concerns rather as an attempt to increase the salaries and influence of architects than as a representation of an actual threat.

Being aware of the danger of misinterpretation, I still think that a quote like the one above points to challenges that architects at the US 1 experienced. I do so because architects were in a different economic situation in the 1980s and when I conducted my ethnography.[248] The background against which the above concern was articulated was one of a building industry ridden with crises and of a profession that was considered to be in decline. According to data of the Federal Reserve Bank, the economic crises of 2008 caused one of the most severe recession of the history of the US based building industry leading to the loss of approximately 1.5 million jobs.[249] From the private construction sector's peak in 2006, when the total monthly valuation of all construction put in place was estimated by the United Census Bureau to have reached 961 billion US Dollars, it fell over 50% to 466 billion US Dollars in 2011.[250] To make things worse, architecture was considered to be a profession with a rather dark future. When Forbes business magazine published its list of the 10 best and worst master's degrees to study in the future in 2016, architecture was listed amongst the worst 10 options.[251] The reasons for this bad ranking ranged from low payment, a high amount of work pressure to a market that almost does not grow.

Confronted with this difficult situation, architects told me that they had basically two options. Either they could join one of the architectural firms that did more conventional projects, in which economic efficiency is one of the most important driving forces, or they needed to transform their own office in order to become more conventional. To the architects belonging to the culture of Prototype Buildings, both of these options were not very attractive. Doing this kind of work was treated as something undesirable. One of my interviewees once said about architects who work for bigger economically successful offices, that they "(…) sell out in terms of their design ambition, because they wanna make money and do bigger more corporate

[248] For an impression of the more beneficial economic situation of the 1980s and 1990s see: Ursprung, P. (2017): *Der Wert der Oberfläche. Essays zu Architektur, Kunst und Ökonomie.* Zürich: gta Verlag, ETH Zürich, pp. 96-115.
[249] For FED data, see: https://fred.stlouisfed.org/series/CES2023610001 (29.01.2021)
[250] For USA Census data on the construction industry see: https://www.census.gov/construction/c30/prpdf.html (29.01.2021)
[251] Dill, K. (2016): The Best And Worst Master's Degrees For Jobs In 2016. In Forbes Online, online available at: https://www.forbes.com/sites/kathryndill/2016/08/12/the-best-and-worst-masters-degrees-for-jobs-in-2016/?sh=515c4ae57435 (04.02.2021)

projects."[252] Contrary to understanding themselves as architects fulfilling wishes of corporate clients and superiors oriented towards maximizing profit, I experienced the members belonging to the culture of Prototype Buildings as driven by various motives that were in conflict with this kind of corporate work. In my interviews, I could identify different logics that were embedded in their arguments about why they do what they did. They ranged from the classic architectural strive for artistic freedom,[253] including the wish of being inventive and to come up with new designs on one's own, to more current motives, such as the desire to create ecologically sustainable architecture and an interest in re-thinking and further developing architecture in the light of new technological developments. For these reasons, they decided to go for a third option: to run a small office and to teach at architecture school.

Writing this I don't want to evoke the impression that the members of the culture of Prototype Buildings did not work for clients at all or that they never designed buildings that got built. They did that too. However, running a small office meant that they did not have to do that full time. Since they needed less resources to keep the office going and had an extra income due to their teaching activities, they could also work on projects that did not generate much economic turnover. So altogether, having a part time employment at university and running an office with no or just a few employees allowed the architects to do work they understood to be worth pursuing. Even though this meant doing work which was rather unlikely to be built permanently within post-crisis circumstances, it was the preferred way of working for these architects. Asking one of my interviewees about why he decided to work in this way, I received the answer:

> "(…) we have seen too many times, and I think this goes for me and the people on my team, that it can get just too focused on the next job and turning in profit, and on taking one thing that you have done successfully and doing them again, because it is easy, because you already have the templates and the formulas. Then ultimately you are not doing a job you like, to be blunt about it."[254]

[252] Interview, 19.02.2017, min. 54.
[253] For historical and sociological reflections of the role of art in architecture, see: Crinson, M. & Lubbock, J. (1994): *Architecture: art or profession? Three Hundred Years of Architectural Education in Britain.* Manchester: University Press; Cuff, D. (1993 [1991]): *Architecture: The Story of Practice.* Cambridge, MA: MIT Press, p. 28-35; Sarfatti Larson, M. (1995 [1993]): *Behind the Postmodern Façade. Architectural Change in the Late Twentieth-Century America.* Berkley: University of California Press, pp. 3-20.
[254] Interview, 19.04.2017, min. 34.

There is also a historic trajectory that I understand to be connected to the idea that independent architectural development, design based investigations and science and technology research belong together: the digital design studios that got introduced at the US 1 in the 1990s.[255] Reacting to the lack of architectural design software in the 1990s, students as well as professors in educational studios of the US 1 belonged to the first ones, who adapted software, for example form the film industry, for architectural purposes. As in all other studios, also in the digital studios the students were required to make individual architectural design proposals. However, unlike their colleagues, who still did most of the design work by means of hand drawing and physical model building, in these studios students were just allowed to use computers for design purposes. Often the students even taught themselves how to write digital code, in order to further develop the software and its design features. By running this kind of design studio, the US 1 became one of the pioneers in digital design. This kind of studio also opened up new pathways for collaborations on the intersection of architecture, science and technology. According to architecture historian Antoine Picon, especially new possibilities for making digital visualisations provided ground for interactions between architecture, the computer sciences and other fields interested in digital representation.[256] Talking to the members of the culture of Prototype Buildings about what inspired their research, I got the impression that their ideas of new technology related architectural development had a lot to do with the digital past of the US 1. Some of architects explicitly mentioned a close connection between the work they did as professors and the experiences they had as students in these digital studios. The image of technology-related design development as research especially seemed to be rooted in this time. To give an impression, here is one quote of an architect who was a student at the US 1 back then, identifying his first digital design activities as design research:

> "We had to work with a computer that was the prerequisite, right. So we couldn't just play with it (…) no, we had to stick to it. And it was also quite frustrating because, I think for the first half of the semester, we had no idea how to visualize what we are doing (…). And then there were like wired little animations, you know, and the animations, because we couldn't learn from the internet, we would just talk to each other and test things. So it was real research, it was real, real research."[257]

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[255] For a short history of the digital studios in the USA, see: Allen, S. (2012): The Future That Is Now. In Ockman, J. [ed.]: Architecture School. Three Centuries of Educating Architects in North America. Cambridge, MA: MIT Press, pp. 212-217.
[256] Picon, A. (2008): Architecture, Science, Technology and the Virtual Realm. In Picon, A. & Ponte, A. [eds.]: *Architecture and the Sciences. Exchanging Metaphors*. New York: Princeton Architectural Press, pp. 292-313.
[257] Interview, 19.02.2017, min. 7.

Collecting this kind of data, I started to understand that the ruptures created by the culture of Prototype Buildings were not just effects of policymaking. They actually had as much to do with science politics as with the economic crisis of 2008, architects desires for independent work and an interest in new technologies and issues of sustainability.

Research that does not look like Architecture

Before I conclude this chapter, I would like to analyse one concern that was articulated by students who were educated by members of the culture of Prototype Buildings. As in the previous chapters this analysis of concerns should give me a more detailed impression of the problems that design research produces for faculty and students by creating ruptures between architecture schools and the profession.

The reason why I focus on students is because I could not identify design-research-based concerns among the more senior members of the culture of Prototype Buildings. Unlike the architects belonging the culture of Analytical Speculation for example, who worried about building relations between design and text, the people belonging to the culture of Prototype Buildings did not associate any concerns with their research activities. At least the architects that I met did not mention any of these difficulties. Why these concerns were absent, I honestly don't know. Maybe I asked the wrong questions, maybe architects had no reasons for problematising design research. What I can say is that I did not find out anything of interest about design research related concerns talking to the professors at the US 1. One hypothesis that I have is that architects did not problematise design research and in the same way as they did in the UK because research in architecture was a less problematised issue in the USA altogether. While in the UK there was a public debate about the problematic relation of science steering instruments such as research evaluations and architecture, in the US 1 these kinds of instruments did not exist. Hence, no debate was triggered, and design research was an issue that architects did not associate problems with, at least not publicly, or when someone like me wanted to talk about problems. That said, I don't want to imply that developments in the culture of Prototype Buildings could not and should not be critically reflected. As I will show in the conclusion of this chapter, there are various reasons for critical reflection. For now, however, the only thing I want to outline is that unlike their colleagues in the UK, the senior architects

belonging to the culture of Prototype Buildings did not associate concerns with their research activities.

The students who learned to conduct research in studios taught by professors belonging to the culture of Prototype Buildings, on the other hand, had something they were concerned about. They worried about not having produced enough architecture at the end of term. In order to give an impression what this concern had to do with design research, I will have now another look at a student design project, which I already shortly introduced above when describing the studio cluster focusing on the environment.

In this project, two students in their third and final MA year worked as a team on a building which was dedicated to research on as well as education and production of alternative energy. As already mentioned, this project can be understood as reacting to increasing environmental pollution as well as growing unemployment numbers amongst unskilled labourers. In order to act against both, they designed a factory located in a navy yard, which contained, as they called it, "systems" of energy production and environmental cleaning. These systems were: a waste-to-energy incineration system; a station to clean black water; a system to produce algae biodiesel; and system that produces so called yellow grease from used cooking oil, which can be used to feed live stock or to produce soap, rubber and products alike. The reason they had to choose these kinds of systems were their dependence on each other. For example, did the algae biodiesel need the water of the black water cleaning station, which needed the energy from the energy incineration system. Using these mutual dependencies, the students had created a factory that could produce some of the most important resources needed for its working on its own. According to the students, these systems had never been related to each other in the way proposed by them. They intended to use this factory for research and production purposes as well as to educate unskilled labourers how to use these systems, which would open up new job opportunities for them.

When I asked the students about the research that went into the design of a project like this, they told me that:

> "So I think research for this project was pretty, was like very twofold. Like there was sort of research related to this energy systems, and how these processes could work

> together, sort of more at the beginnings part of the semester (…) And then the other things that you could call research would be the generative design."[258]

Regarding research on the energy systems, both students told me that they had to get a "basic understanding" of how each of the chosen systems worked. To do so, they gathered technical descriptions as well as diagrams and drawings of these systems from companies making this equipment or from waste energy sellers. These drawings were used by the students to get a spatial understanding of the energy systems. They broke these energy systems down into their constituent parts, found out the size of each part and made digital three-dimensional models of them. After they did that, the students began thinking about options to position the different systems in space so that they could be related to each other, in terms of their inputs and outputs.

After they produced drawings visualising the energy systems and their relations to each other, the students could start with the generative design. When I asked them what generative design is, they told me that this is a digital design approach they used to allocate production, research and education spaces across their building. Since they were not just interested in designing a space in which four different energy systems are located but a building in which production, research and education takes place as well, they needed to define the spaces for these activities. Because they aimed at creating a factory that generates synergies between research, education and production by mixing spaces dedicated to the different activities, they wanted to come up with a design proposal in which spaces for the different activities were evenly distributed throughout the building. In order to arrive at this even mix, they used generative design to calculate different options of spatial distribution. Before the students could use generative algorithms to calculate the spatial set-up of their factory, however they needed to do several things. Firstly they had estimate the space each energy system needs within the factory. Secondly they had to define gaols, regarding how much of the remaining space should be dedicated to which activities (research, training, education) and energy system and how the different spaces should be related to each other. Once the students fed this information to their design tool, the generative design algorithms, as one of the students explained,: "(…) will do like a random selection of say 300 of those options, and then (…) it will take the best of those options based on the goals we set and pit them against each other, and then come up with new solutions. So, over time, over say like 50 generations of redoing this, it basically finds better

[258] Interview, 11.05.2017, min. 9.

and better solutions."[259] The only thing that the novice architects had to do at the end was to decide for defining the was to decide which regarding the distribution of production, research and education space they preferred.

For the students being involved in this kind of design research had two sides. On the one hand, they were happy to be able to participate in a design studio that allowed them to do this kind of design. In our interview, they described themselves as people who want to get to know the latest developments in the field of architecture, and being able to work with generative design meant to them that they were at the forefront of architectural development. On the other hand, they associated a concern with these kind of design activities. This concern had to do with the presentation of their work to invited architects at the final review, which happened in every advanced studio at the end of term.

When I talked with both of them about what they had to prepare for this final critique, they told me that it was not enough to just present their research. Since the generative design tool mostly generated rather abstract representations and graphs representing calculations of spatial distribution ratios, they still needed to actually design the factory as a space with things such as stairways, doors, windows and they needed to think about issues such as the factory's aesthetic appearance. This was important because the architects who got invited by their professor to critique the students' work were mostly professionals expecting to see building designs. Yet, as the students spent most of their time with research related to their energy systems and generative design, they did not have much building design to show. In our interview, the students articulated this concern by saying:

> Student 1: " (…) because you are not just drawing geometry, you can work on it for three weeks and not have anything to show from there, which is sort of a big deal in architecture school, when people want to see typical, conventional, yeah…".
>
> Student 2: "…architecture. Which can definitely be a bit of a problem, especially for our final review. I think a lot of the critics really wanted to just see the architecture that came from it. Whereas our studio was much more focused in sort of the research and

[259] Ibid., min. 10.

the argument of the idea and the methodology for creating the design than the actual design itself."

Student 1: "Yeah, there is definitely a very big, I think, struggle in terms of that the studio has such a different approach than a typical architecture studio, which I think is great, we learned a lot. But then at the same time the people who are coming in critiquing your project are so unfamiliar with it, that they don't… in the seven minutes you present, they don't understand that you did it all."

Student 2: "They just wanna see the architecture."

Student 1: "And then they are seeing the things they are used to seeing developed over 15 weeks were done in the last week." [260]

Ending this analysis of design research as the US 1 now with the concerns that two architecture students experienced when conducting design research, I wanted to the problems that were part of the culture of Prototype Buildings. Interested in the extent to which the rise of design research transforms professional architecture schools, this insight was very interesting to me. It shows that the culture of Prototype Buildings created ruptures, which partially separated design research education from professional education at architecture school. For the students this meant to be in a position in which their work was not recognized as architecture by invited critics and that they had to worry about finding ways to present their research as such.

The Culture of Prototype Buildings and the Academisation of Architecture

This chapter provided a third example of the multiculturality of design research in architecture. Describing the practice, knowledge, social organisation and education defining the culture of Prototype Buildings, I gave an impression of a design research culture that was more closely related to the profession of architecture than the design research cultures I described in the UK. As shown in this chapter, the architects belonging to the culture of Prototype Buildings reproduced the model of the professional architecture school by being architects working in

[260] Ibid., min. 12.

offices, developing building designs and working as part time design professors at the US 1. The same was true for the students taught by members of this culture. As their fellow novice architects in many of the other professional schools, they spent their time in studio mainly with the development individual building projects. The reason why I decided to call this culture the culture of Prototype Buildings is because of the preliminary status that building designs and buildings have had within this culture. Architects belonging to this culture often worked on buildings they understood to be first early or first versions of building design developments to come. Research encompassed the work needed to develop and invent these novel buildings, which often included collaborations with the sciences and high-tech companies.

One further particularity of this culture was the spatially distributed nature of research. Because some of the members of the culture of Prototype Buildings consider their work to be taking place in a laboratory, it took me a while to grasp this dimension of design research. Guided by STS literature identifying laboratories as the most important space of knowledge production in the natural sciences, I found myself looking for these spaces not recognizing that the laboratories of the design researchers were more of an metaphorical than of a physical nature.[261] As my interviews with the members of the culture of Prototype Buildings showed, laboratories in this culture were narrative constructions symbolically binding together research activities taking place in the studios of architects as well as offices of start-up companies and laboratories of scientists. For me, this insight about the metaphorical nature of laboratories shows how important it is go beyond the concept of the laboratory as physical entity when analysing design research and to be able to account for distributed spatial character of research.

Asking myself to what extent a culture that was as closely related to professional architectural work and education as the culture of Prototype Buildings can be considered as belonging to the academisation of architecture schools I have been analysing in the UK, I came to the conclusion that it can be, just to a lower degree. This is because, although the culture of Prototype Buildings was in many ways closely related to the profession, I still could identify relations between a US based market-oriented science policymaking and two ruptures that the culture of Prototype Development created between the profession and the US 1. These ruptures were a closeness of

[261] E.g.: Latour, B. and Woolgar, S. (1979): *Laboratory Life: The Social Construction of Scientific Facts*. Beverly Hills: Sage; Knorr Cetina, K. (1999): *Epistemic Cultures. How the Sciences make Knowledge.* Cambridge, MA: Harvard University Press, esp. ch. 2; Farias, I. & Wilkie, A. (2018): Studio studies: Notes for a research programme. In Farias, I. & Wilkie, A. [eds.]: *Studio Studies. Operations, topologies and displacements.* Abingdon: Routledge, p. 2.

this culture to the realm of science and technology in terms of funding and collaboration and projects that produced designs of buildings that never got built permanently.

A comparison between USA and UK based findings revealed also differences in the ways science policymaking and the cultures of design research were related to each other. This is because the comparison can tell us something about why the culture of Prototype Buildings was actually more closely related to professional practice and education than the two cultures of design research I described in the UK. The factor explaining these different degrees of academisation in the UK and USA are the different ways how the marketization of universities was politically achieved in both countries and the different consequences this had for architecture schools. In the UK something took place that I identified with Müller and De Rijcke as direct impacts of academic performance indicators on academic life.[262] As I show in both of the chapters above, one important reason why design research became a big topic at architecture schools was the establishment of science evaluations distributing public research money according to the research performance of universities and their departments. In the UK this led to the introduction of structures supporting university based design research. In the USA, these evaluations did not exist. Hence, there was no need to react to bad evaluations by increasing research activities of architecture schools and architects in the USA were less under pressure to deliver measurable research outputs. The institutional conditions contributing to the academization of architecture in this country consisted out of a building industry in decline and a science governance blurring the boundaries of academia, industry and business. Established within this kind of institutional environment, design research remained more closely connected to the profession.

What kind of implications do these differences have now when critically engaging with design research? My first critical remark has to do with how the members of the culture of Prototype Buildings continued problematic tendencies of a market driven academia. As I have already mentioned above with reference to Popp Berman, due to science policies introduced in the 1980s a logic of the market has gained strength which "(…) views science as useful tool for affecting the world. Its success is ultimately measured by whether its results have value in the marketplace (…)."[263] This logic is seen as problematic, since it jeopardizes mission of the

[262] Müller, R. & de Rijcke, S. (2017): Thinking with indicators. Exploring the epistemic impacts of academic performance indicators in the life sciences. In *Research Evaluation*, 26/3, pp. 157–168.
[263] Popp Berman, E. (2012): Creating the Market University. How Academic Science became an Economic Engine. Princeton: University Press, p. 9.

search for truth in which practical results are not of highest priority. As I have shown above, the architects of the culture of Prototype Buildings participated in this development by establishing connections to start-up companies and pursuing research in the field of product oriented high-tech research. Of course, it would be silly to apply the same criteria of critique that one would apply to the sciences to a professional field such as architecture. Since working for clients, running offices and collaborating with companies belongs to the daily business of architects it would be pointless to criticizing them for doing exactly that. However, I think that the involvement in business oriented high-tech collaborations also had problematic consequences for architecture. In this thesis, I understand professional architecture as a highly complex endeavour in which architects have to deal with various different kinds of knowledge, ranging from knowledge about the history of building sites to knowledge about legal regulations, client requirements as well as knowledge about the new buildings style, aesthetics, materiality and about a buildings relation to its urban environment.[264] Compared to that, the design projects that the members of the culture of Prototype Buildings worked on rather reduced versions of building designs, which put considerable attention on the technical aspects of buildings while often not considering aesthetic, typological, historic or social aspects to the same degree. Hence, I think it is fair to say that the close relation between market-oriented research funding and architecture, as I just described it in the culture of Prototype Buildings, produced buildings with high technical but reduced architectural complexity.

My second point of critique is related to the concerns that the architecture students articulated, when talking about how the guest invited to review their project did not recognize their work as architecture, because of the time they had spent on generative design calculations. From the perspective of professional education this not recognizability of the students' work as architecture by architects is problematic. It shows that, similar to the faculty belonging to the culture of Prototype Buildings, also the students worked on a rather reduced version of architecture. To make my position on this matter clear: by articulating this kind of critique I don't suggest that novel digital approaches to architecture should not have a place in architecture education. I don't want to criticise the culture of Prototype Buildings for being interested in technology and the sciences. What I want to say is this: if the application of novel digital tools reaches such a degree that design is not recognized as architecture anymore by professional architects themselves, then design-research-based architecture education lost

[264] In this regard I draw especially on: Yaneva, A. (2009): *The Making of a Building: A Pragmatist Approach to Architecture*. Oxford: Peter Lang.

important ties connecting it to the profession. Similar to the culture of Social Context Exploration, where students struggled to come up with designs that met the quality standards of an MA course, also here we can assert that the rise of design research undermines their role as educator of future professionals.

While considering all these problematic aspects, I would like to end this chapter as I ended the previous two: by balancing the critique through showing what this culture allowed architects to do that could not have been done otherwise. This is important, because representing a culture like the one of Prototypical Buildings as an effect of science policymaking and as leading to nothing but problematic transformations of architecture schools does not do justice to the complexities of design research and the ambivalences that were part of this kind of research. Therefore, let's not forget that this culture allowed architects to still work on novel kinds of architectural design projects, which made it possible for them to address issues they deemed important, such as sustainability and ecological design. To do this kind of work would had being difficult, if not impossible, in any other professional setting dependent on the crisis ridden US building industry. Beyond that, it is important to keep in mind that technological inventions have played an important role for architecture ever since and that a trajectory was continued in the culture of Prototype Buildings, which was very important for architecture's development in the digital age.[265] Hence, a culture that engages with new design possibilities and science and technology related research, is one which still keeps developing the profession. In that sense, as I did with the cultures previously described, I consider the culture of Prototype Buildings as one which had as much to do with problematic ruptures and effects of market-oriented science policymaking as it had to do with new possibilities for architectural design development.

[265] For a history of technology – architecture relations, see: Saint, A. (2007): *Architect and Engineer: A Study in Sibling Rivalry*. New Haven: Yale University Press.

Conclusion

To conclude this thesis, I would like to present one last observation that became important for my perspective on design research. I made this observation at the fourth architecture school I visited, which I will call US 2. There, I was present as an observer during the days of the final reviews, in which the MA students of the US 2 presented the design projects they had worked on throughout the last semester to faculty as well as guest critics. After a long day full of presentations, everyone gathered in the main lecture hall of the architecture school for final words and to congratulate the students on the design projects they developed during the previous months. After the faculty highlighted the scope and depth of the students' work, the director of the MA program mentioned the research that students conducted while working on their design project. Apart from acknowledging the time, energy and thought they invested into the development of their design proposals, she also mentioned the research efforts that were intertwined with the production of design. Since I had already spent three quarters of a year at architecture schools in which design research was daily business, I expected nothing else than appreciative applause from the faculty for the students' research achievements. Yet, this applause did not come. Instead, the head of the US 2 spoke up. After agreeing with the director of the MA program that the students did outstanding work, there was one question she had: was it really necessary to call the work architects do research? Wasn't there any other word for architectural work?

Although this question got never answered on that day, and the gathering in the school's lecture hall went on in festive spirit after it was raised, this question stayed in my mind. While I witnessed this event, at first I took the question about research as another observation that I understood to be typical for the US 2. More than at any other school I visited, the faculty of this architecture school was critical about the term 'research'. Very much like the head of the school, several of my interview partners thought of design-based research as an activity that architects don't do. During my time at the US 2, I treated these responses as a most unwelcome obstacle to my work. Since I wanted to learn more about design research, I interpreted their hesitation to use the word research as a sign showing me that it was a mistake to come to this place.

Confronted with a faculty that does not consider their work research, I thought, it would have been better have I gone somewhere else to explore what it means to conduct design research.

For sure, this was one reason why a public note doubting the usefulness of the term research for architects stayed in my mind. It was one more instance proofing that I had chosen the wrong school. However, now looking back at my fieldtrips, I think there was also another reason why this note stayed in my head. Actually, thanks to events like the one described above and to architects questioning the usefulness of the notion of design research, I started to ask myself why architects would actually be hesitant to label their work as research. Did they have a good reason to refuse considering architecture as a design-based research discipline? Or, asked in another way: does considering architecture as research discipline change architecture schools? Does it make a difference?

Drawing on my examination of design research, I can say, yes it does. Understanding architecture schools as institutions for professional education, the argument that my thesis wanted to convey is that the introduction of design research at architecture schools created ruptures between these schools and the profession. This is because, in order to conduct and organise design research, architects left the realms of professional work and education by drawing on ideas, practices, outputs and funding streams of the sciences. I gave various examples how this inclusion of the sciences took place, ranging from architects who organised their research according to principles of scientific research communities, to students increasingly drawing on practices from the social sciences, and research projects, in which actors from science and technology related fields played an important role.

Furthermore, my thesis shows that the ruptures between the profession and architecture schools had problematic consequences for the architecture schools' relation to the profession. What I mean are instances when design research created ruptures that were so deep that the connection between the architecture schools I analysed and the profession of architecture was almost completely lost. Drawing on the work of scholars such as Dana Cuff, Spiro Kostof or Magali Sarfatti Larson, I understand architecture as profession holding special knowledge and skills about the invention, representation, discussion and reconfiguration of building designs that no other profession, discipline or industry has.[266] Since architecture schools are the most important

[266] Cuff, D. (1993 [1991]): *Architecture: The Story of Practice.* Cambridge, MA: MIT Press; Kostof, S. (2000 [1977]). [ed.]: *The Architect. Chapters in the History of the Profession.* Berkley: University of California Press;

places for professional socialisation, disconnections between these schools and professional practice, knowledge and personal can be harmful for the reproduction of this profession. Design research created these kinds of problematic ruptures. This happened when research communities emerged that had no practical, epistemological or social connection anymore to the profession. This happened also when the introduction of design research in professional educational programs lead to a strong increase of research methods from the social- or technical sciences and a decrease of building design activities in the students' studios. To architects and students alike these ruptures were a matter of concern. For professional members of the architectural faculty the institutionalisation of design research often meant becoming involved in activities they never wanted to do, such as writing texts about their design activities in terms of the empirical sciences. These architects also found it increasingly difficult to maintain their position at architecture schools, in which publications, scientific categories and research practices from other disciplines became more important. The students, on the other hand, worried that being part of a design research studio would not give them enough time for developing building designs, which live up to professional standards.

Did the architects at the US 2 have a reason to be sceptical about understanding architecture as a field of design research? Asking the question again now, my response is yes, they did. The establishment of design research could not just bring along confusions and concerns but also contribute the loss of important connections between an architecture school and the profession, when thinking about the future reproduction of this profession.

However, this is not the only answer that my research can provide. While highlighting all these problems is of paramount importance, doing so should not cover up the more productive side of design research. In this regard, my thesis shows that the ruptures design research created between architecture schools and the profession also opened up spaces for practice, education and interaction that architects understood to be highly desirable. To better understand why design research induced ruptures were also something architects welcomed, we first of all need to acknowledge that being part of the profession of architecture can be frustrating. As various architects told me, to be a professional architect often meant to do work that was repetitive, profit oriented and limited in scope when thinking about the endless possibilities for expression and invention design offers. Hence, losing some of the connections that tie architecture schools

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Sarfatti Larson, M. (1995 [1993]): *Behind the Postmodern Façade. Architectural Change in the Late Twentieth-Century America.* Berkley: University of California Press.

to the profession opened up a variety of possibilities for architects. The introduction of design research allowed architects to engage closely with socio-political questions, matters of sustainability and new technologies as well as with literature form the humanities, design focused reflection and scholars from other disciplines. Due to the introduction of structures supporting the conduct of design research architects could also develop design proposals without needing to think about clients wishes or building laws and -regulations. This gave them the opportunity to utilize practices of spatial design to explore almost any kind of topic they were interested in and, by doing so, to open up new realms for architectural engagement.

Considering these more productive effects, my answer to the question of whether considering architecture as a research discipline changes architecture schools is the same: yes, it does. Against the background of the opportunities design research opened up for architects however, my response has become a more differentiated one. Instead of understanding design research as something that every professional architecture school should keep its distance to, I think of it as an ambivalent phenomenon. One that introduces ruptures between architecture schools and the profession that do both, produce challenges and problems for maintaining architecture schools' relation to the profession and open up realms for the engagement with- and the development of architecture, which could not exist in within strictly confined profession settings.

But there is still something else that I want to add to my reflections about the question if architects at the US 2 had good reason for refusing to consider architecture as a design-based research discipline. All of the changes that I described above did not just emerge because one day architects decided to describe architecture as a research discipline based on design. Actually, design research has a strong political dimension, which goes beyond the realms of individual architects and architecture departments. In this regard, my thesis has shown that the discourse, institutional structure and partly also the form that design research took was closely connected policies that introduced the market university. Having described the threats and challenges this kind of politics caused for architecture schools, I think that we cannot understand the ambivalent character of design research without understanding its relations to research evaluations, university-industry partnerships or competitive mechanisms of science funding. For the future development of design research this means that it is a phenomenon that is very likely to stay ambivalent and whose problematic aspects will remain. At least as long as science politics stay the same.

Cultures – Politics – Ruptures

Apart from these contributions to questions asked within the world of architecture, my research adds new knowledge to debates around the academisation of architecture. In this regard my thesis is in line with the claim that design research is associated with a growing desire to reflect on design process by Ammon and Froschauer and also with Monika Kurath's observation that research in architecture is often associated with practices of established research disciplines.[267] Going beyond these observations, however, my thesis provides a finer grained picture of what the academisation of architecture means in terms of culture and politics. One of the most important findings of this thesis is that design research is a heterogenous phenomenon consisting of different research cultures. In each of these cultures approaches from the sciences and architectural ways of working got mixed and related to each other in different ways. Asking then about the consequences of the rise of design research, I showed that each of these cultures created different ruptures between architecture schools and the profession. In order to highlight this multiculturality of design research, I described three cultures: the culture of Analytical Speculation – a university-based community of architects and PhD students, who produced mainly design based knowledge about matters of form and style and about the possibilities this knowledge opens up for architectural design development. The culture of Social Context Exploration – an education focused culture, in which students conducted social scientific research about the socio-political contexts of building design sites, under the supervision of scholars with backgrounds in the social sciences. The culture of Prototype Buildings – a culture that was closely related to professional architectural practice and education. In this culture architects collaborated with actors in science and technology related fields to introduce novel building prototypes. Comparing these cultures thorough this thesis, I outlined how they differed from each other in regard to their practice, knowledge, social organisation and education. Furthermore, I gave impressions of the different concerns and problems that were part of these cultures as well as the various logics that motivated the members of these cultures to establish and conduct design research and the trajectories of these logics.

[267] Ammon, S. & Froschauer, E. M. (2013): Zur Einleitung: Wissenschaft Entwerfen. Perspektiven einer Reflexiven Entwurfsforschung. In ibid. [eds.]: *Wissenschaft Entwerfen: vom forschenden Entwerfen zur Entwurfsforschung der Architektur*. Munich: Wilhelm Fink, pp. 15-48; Kurath, M. (2015): Architecture as Science. Boundary Work and the Demarcation of Design Knowledge from Research. In *Science & Technology Studies*, 28/3, pp. 81-100.

Combining this cultural perspective with an analysis of the political dimension of design research, I gave various impressions how the different cultures of design research were related to acts of science policymaking contributing to the marketization of universities. One of the most interesting insights I gained by comparing the UK and USA is about the different degrees to which the design research induced ruptures disconnected architecture schools and the profession in the different countries. While the cultures of Analytical Speculation and Social Context Exploration in the UK had cut of many ties to the profession, the culture I described in the USA still maintained a closer connection to professional architectural work and education. My policy-based explanation for these differences has to do with the different ways how market oriented science was introduced in both countries. In the UK, the introduction of nation-wide science evaluations triggered a big debate about design research in architecture and contributed to the establishment of university-based research structures. In the USA however, these federally controlled evaluations did not exist, and the government achieved the marketisation of its universities by other means, such as reducing science funding and encouraging science and industry collaborations. This, in turn, never created a situation like in the UK, where architecture had to establish itself as a university-based research discipline. Consequently design research in the USA remained closely related to the profession.

While adding these policy explanations to my analysis of the different cultures, I want to make clear that I am not claiming that these design research cultures are typical of any national-cultural character of design research. In that sense, it would be wrong to assume that the culture of Analytical Speculation and the Social Context Exploration are British and the culture of Prototype Buildings is research culture typical of the USA. Actually, various architectural influences from the USA were part of the trajectories of the UK based design research cultures, such as the social sciences inspired architectural studio `Learning from Las Vegas' by Vernturi, Scott Brown and Izenour.[268] Also design research as conducted in the USA existed in the UK. Although I did not engage with this in detail, during my time in the UK, I met architects who conducted research in similar ways as the people belonging to the culture of Prototype Buildings did in USA. Institutionally this was possible because, similar to the USA, also in the UK funding for this kind of research existed. The same was true for technology-oriented architects and start-ups. Both of them were present on either side of the Atlantic. Hence, it is

[268] Venturi, R.; Scott Borwn, D. & Izenour, S. (1977 [1972]): *Learning From Las Vegas. Cambridge,* MA: MIT Press.

not surprising that similar to their colleagues in the USA, also architects in the UK conducted research in close proximity to new technologies, the natural sciences and start-ups existed in both countries. However, the same was not true for the cultures of Analytical Speculation and Social Context Exploration I described in the UK. At least in the USA, I did encounter cultures that created as many ruptures between their architecture schools and the profession as the ones I discovered in the UK. As already mentioned above, I think these cultures did not exist in the USA due to the absence of centralised science steering instruments, such as the research evaluation. Since these evaluations triggered a big debate about design research in architecture and contributed to the establishment of university-based research structures in the UK, the institutional ground was laid for research cultures that had more to do with the university than with the profession. Adapting the work of Elizabeth Popp Berman now to analyse different science policy settings, we can say then that different science policy conditions contribute to the emergence of different cultures of design research and to the amount and degree of the ruptures they generate. [269]

On a conceptual level, with my focus on the trinity of cultures – politics – ruptures, I tried to introduce a new perspective to STS research on art and architecture. Inspired by the laboratory studies, STS scholar analysing the work of artists and architects were fascinated by the details of studio-based work.[270] Although I can understand this fascination, and this STS literature built an important point of departure for my own investigation, this thesis gave three reasons why it is important to leave the studio when dealing with a phenomenon such as design research. Firstly, design research is a multi-sited phenomenon often taking place outside of the studio. Hence, a focus on the particularities of studio or laboratory activities misses many of the research practices that are important to architects. Second, without taking into account the decisions of policymakers and science administrators, without going back in time to trace trajectories and without taking into account questions of professionalism, it is impossible to describe and explain the concerns and problems design research created at architecture schools as well as the possibilities it generated for architects. Worse than that, it is not possible to describe current forms of change at universities and their consequences for professional fields, such as architecture. Thirdly, by engaging with questions of politics and change, STS gains a

[269] Popp Berman, E. (2012): Creating the Market University. How Academic Science became an Economic Engine. Princeton: University Press.
[270] For example: Farias, I. & Wilkie, A. [eds.] (2016): *Studio Studies. Operations, topologies and displacements*. Abingdon: Routledge; Yaneva, A. (2009): *The Making of a Building: A Pragmatist Approach to Architecture*. Oxford: Peter Lang.

critical perspective on issues related to art and architecture. This is something that, as Guggenheim tellingly pointed out, got lost when STS scholars left the laboratories of the sciences and went into the ateliers and studios of artists and designers.[271]

Writing about the necessity to leave the studio does not mean that I think that STS examinations of research in art, design or architecture should neglect studios and ateliers altogether. Since we have gained a fundamentally new understanding of what science and research is by studying the details of how it is done, it would be a step back to give up STS sensitivity for local practices and cultural differences. This is also why I tried to describe different cultures of design research and to be precise about the problems and new opportunities that design research created for the architects and students in each of these different cultures. When writing that STS should leave the studio, what I want to say is that we should develop perspectives that allow us to analyse relations between particularities of research cultures, politics and matters of change. This is especially important when we want to address rather young developments related to research in art and architecture, such as design research, where it is not clear how this will change art and architecture schools.

The metaphor that helped me to leave the studios is the one of ruptures. By describing and following the disconnections design research created between architecture schools and the profession, I learned a lot about different research cultures and the political dimension of design research. Apart from directing my research activities, the notion of ruptures also played a conceptual role in my thesis. It served as the centre around which I could position the different approaches and concepts I used to study design research induced transformations. In my case, these approaches were related to STS, Sociology, Cultural Anthropology, History and Policy Studies.

Three Pieces of Advice

"In terms of establishing design research at the department of architecture, how would you advise me… what should I do?"

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[271] Guggenheim, M. (2020) How to use ANT in inventive ways so that its critique will not run out of steam? In: Blok, A., Farias, I. & Roberts C. [eds.]: *The Routledge Companion to Actor-Network Theory.* Abingdon: Routledge, pp. 64-72.

As I mentioned in the epilogue to this text, I was asked this question during the job interview for my PhD position, and it has laid the ground for many of the reflections, investigations and writing about design research that became part of this thesis. The person who asked this question, my thesis supervisor, was, back then, the designated dean of the department of architecture at ETH Zurich. In this capacity he was responsible for making strategic decisions about the establishment of research at this department. While my first response to his question for advice during the job interview was a hesitant one, in which I argued more for the necessity for more research than I gave an actual answer, as this thesis now comes to an end, I would like to answer the question again.

Beyond highlighting the importance of being aware of the transformations going along with the establishment of design research, I have one general and three more specific pieces of advice. The general advice is to take the concerns of architects and architecture students seriously. They are the ones experiencing the design-research-induced changes the most, and one can learn a lot from them about mistakes to avoid when establishing design research programs. This is also the reason why all three of my specific pieces of advice have to do with the concerns that architects and students articulated. In particular, these pieces of advice address three different relationships that were problematised over and over again when architects talked to me about the concerns that they associated with design research.

Design – Text

As I have shown in the first chapter of my thesis, architects belonging to the culture of Analytical Speculation were concerned about the question of how to communicate their design knowledge in papers and books. In my interviews, they expressed this concern by talking about the incompatibility of tacit design knowledge and explicit knowledge that can be written down. Dismissing the explanation of a general incompatibility of design and text, I claimed that the concerns had more to do with the little beforehand training in writing that architects had and the fact that they needed to order their writing along the categories of the empirical sciences. What can be learned from this concern is that, if writing and publishing research outcomes should play a role in design research, then it needs to be done in a way that also allows architects with little writing experience to participate in text production. This will just work if architecture departments offer training in writing and publishing. Furthermore, this concern shows that is important to introduce publication formats and languages that are close to architectural design

practice. In particular, this would mean to think about research in new terms rather than making architecture fit to already existing categories and ideas of research developed in the sciences.

Design – Research Practices from other Disciplines

Architecture is often understood as an interdisciplinary field capable of building relations between disciplines as far apart from each other as engineering and the social sciences. Of course, there is nothing wrong with that and interdisciplinary collaborations have a long history in architecture. However, I think within the realm of design research this interdisciplinary conception of architecture can become problematic. This happens when research practices from other disciplines get included in the curricula and research agendas at architecture schools to such a high degree that there is not much left of architecture anymore. In my case studies this happened when the professional architectural faculty got replaced by scholars with backgrounds in established research disciplines or when students worried about not having enough time to do design, due to their involvement in the conduct of technical or social science research. Against this background, my suggestion is to be cautious when balancing design practices with research practices from other fields. This includes making sure that matters of spatial complexity and architectural design quality do not fade into the background due to the introduction of design research.

Design – Politics

My third and final pieces of advice addresses design research and politics. Throughout this thesis I have given various examples of the problematic connections between science and policies that contributed to the marketization of universities and the rise of design research. The reason why I think it is important to have this problematic relation in mind is because all the pieces of advice about how to establish relations between architectural design, writing and research practices of other disciplines will be difficult if not impossible to implement if the politics do not change. This is what I have learned from the architects who told me about their concerns and the various problematic relations between design research and politics. So, if research evaluations will keep giving high ratings to design research that is communicated along categories of the empirical sciences, and if it is more likely for architecture schools to receive funding when hiring scholars with backgrounds in disciplines such as the social- and technical sciences, then it will be difficult to establish a kind of design research that avoids these problems. In that sense, I suggest considering both culture and politics when thinking about the establishment of design research. Therefore, it is as important to discuss ideas of what

design research can and should be within architecture schools as it is to make sure that these ideas find their way into the offices of funding institutions and science ministries, and not the other way round.

Of course, all of these suggestions just make sense when considering architecture schools as part of the profession of architecture. In case we start to think about architecture schools solely as research units, then each and every suggestion I just made can be put aside. However, if this is not the case, and if we think of architecture schools as part of a professional education that is worth preserving at universities, then acknowledging architects' concerns can help establish a version of design research that is more sensitive to spatial complexities, architectural qualities and building design knowledge. I am certain that this version of design research would create ruptures that produce more opportunities for the development of the profession of architecture than they inhibit.

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Appendix

Abbreviations

3D	three-dimensional
AIA	American Institute for Architects
ARENA	Architectural Research European Network Association
BA/BA Program	Bachelor of Architecture Program
CNC Machine	Computer Numerical Control Machine
ETH	Eidgenössische Technische Hochschule
MA/MA Program	Master of Architecture Program
NGO	Non-Governmental Organisation
NIH	National Institute of Health, USA
NSF	National Science Foundation, USA
REF	Research Excellence Framework
RIBA	Royal Institute for British Architecture
STS	Science and Technology Studies
UK	United Kingdom
UN	United Nations
US/USA	United States of America

List of Interviews

Interview	Position Interviewee	Architecture School
Interview, 30.01.2016	Lecturer	UK 1
Interview, 03.02.2016	Senior Lecturer	UK 1
Interview, 09.02.2016	Director of Research	UK 1
Interview, 16.02.2016	Director PhD by Design Program	UK 1
Interview, 26.02.2016	Professor of Architecture	UK 1
Interview, 11.03.2016	PhD Student A	UK 1
Interview, 16.03.2016	Vice-Dean of research	UK 1
Interview, 17.03.2016	PhD Student B	UK 1
Interview, 21.03.2016	PhD Student C	UK 1
Interview 19.05.2016	Reader A	UK 2
Interview, 17.05.2016	Head of Architecture Department	UK 2
Interview, 27.05.2016	Director, MA of Architecture Program	UK 2
Interview, 01.06.2016	Reader B	UK 2
Interview, 03.06.2016	Former Head	UK 2
Interview, 08.06.2016	MA Student	UK 2
Interview, 02.02.2017	Associate Professor B	US 1
Interview, 03.02.2017	Adjunct Associate Professor	US 1
Interview, 19.02.2017	Former Student and Architect	US 1
Interview, 03.03.2017	Associate Professor A	US 1
Interview, 19.04.2017	Associate Professor B	US 1
Interview, 11.05.2017	MA Students	US 1

Curriculum Vitae

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Education

2015 – 2021	**PhD.sc.ETH Zurich** at the Department of Architecture *ETH Zurich*
2011 – 2014	**Master of Arts** (M.A.) in „Science – Technology – Society“ (with distinction) *University of Vienna*
2006 – 2010	**Bachelor of Arts** (B.A.) in Sociology *University of Vienna*

Professional Experience

10/2019 – today	**Independent Work** Consultant and Concept Developer in the fields of architecture and urbanism
10/2019 – 03/2021	**International Research Centre for Cultural Studies, University of Art and Design Linz** Junior Fellow
09/2015 – 09/2019	**ETH Zurich** Scientific Assistant, Department of Architecture and Chair for Science Studies (Department of Humanities, Social and Political Sciences)
07/2008 – 07/2015	**Ars Electronica Linz GmbH** Junior -Researcher, -Manager, -Curator

Selected Publications:

2021	Hans-Jörg Rheinberger. Experimentalsysteme und epistemische Dinge in der Künstlerischen Forschung. In: Grütter, F.; Güttler, N.; Stadler, M.; Wulz, M. (Hg.): Deregulation/Restauration. Facetten einer politischen Wissensgeschichte des Neoliberalismus. Berlin: Matthes & Seitz, pp. 250-261.

2020	Implizites Wissen und die Politik des Design Research in der Architektur. In: IFKnow, 2/2020, pp. 6 – 7.
	Forschung in der Architekturausbildung. Sozialwissenschaftliche Methoden in der Entwurfslehre an zwei Architekturschulen in Großbritannien und der Schweiz. In: Ebert, C.; Froschauer, E. V.; Salge, C. (Hg.): Vom Baumeister zum Master. Formen der Architekturlehre vom 19. bis ins 21. Jahrhundert. Berlin: Universitätsverlag der TU Berlin, pp. 70 – 87 (Gemeinsam mit Hipp, Anna).
2018	From heterogeneity to hybridity?: Working and living in arts-based research. In: Sormani, P.; Carbone, G.; Priska, G. (Ed.): Practicing Art/Science. Experiments in an Emerging Field. Oxon and New York: Routledge, pp. 125 – 141.
2016	Eine neue Praxis der Architektur. Flankierende Gedanken zu Design Research. In: Manege für Architektur, 1, p. 65

Teaching Experience:

10/2020 – 02/2021	Seminar «Artistic Encounters: STS and Research in Art and Architecture», Master Science-Technology-Society, Department of Science and Technology Studies, University of Vienna
02 – 05/2019	Seminar on social scientific and historic approaches to contemporary architecture, Studio Christian Kerez, ETH Zurich
10/2012 - 02/2013	Tutor, Master Science-Technology-Society, Department of Science and Technology Studies, University of Vienna

Organisation:

12/2017	Co-Organiser, Workshop "Against Method? Architectural Design in Academia", ETH Zürich
07/2017	Co-Organiser EPFL – ETH Summer School „Exploring Edges. An International Colloquium Between the Digital Humanities, Architecture, Artistic Research and Critical Technical Practice", École polytechnique fédérale de Lausanne

Scholarships:

01/2014	Scholarship of Excellence University of Vienna
01/2013	Scholarship of Excellence University of Vienna