Architectural Research and Disciplinarity

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Abstract: This paper suggests that architectural research is best understood as a complex and diverse subject area which while adopting a number of disciplinary procedures also maintains a specificity of its own in terms of architectural design. First the paper provides an overview of the current research environment and explores how within the subject of architecture, architectural research adopts a number of disciplinary approaches, resulting in the division of architectural research into, for example, arts and humanities research on the one hand, and building science research on the other. The paper suggests that this is compartmentalization of architectural research works against the multi-disciplinary nature of the subject. Architectural design research, or the practice-led component of architectural research, is then examined in more detail and compared to other forms of practice-led research in art and design. Similarities are noted in terms of the creative content of architectural design's generative processes. However the paper also argues that specific research methods and processes are driven by the practice-led area of activity concerned with the design of buildings situated at the core of the subject. The paper ends by considering how practice-led research in architecture, by relating both to the profession of architecture and to academic research can be critical of disciplinary boundaries and so produce new forms of inter-disciplinary knowledge.

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There are at present considerable concerns with how architectural research will be assessed in the Research Assessment Exercise (RAE) of 2008. In RAE 2001, most architectural research was submitted to one of three Units of Assessment: 33 *Built Environment*, 60 *History of Art, Architecture and Design*, and 64 *Art and Design*.[1] There were subtle but important differences in output definition and assessment criteria between UoA 33 and UoA 64 with respect to practice-led research. Most importantly in UoA 33 practice-led outputs were accepted by the panel but only as publications whereas UoA 64 assessed practice-led research outputs accompanied by a 300-word statement that clarified the contributions of that particular research to the development of original knowledge in the field. The diversity of methods and complexity of output types, combined with the composition of UoA 33, led to results that many feel did not properly reflect the relative strength of architectural design, particularly practice-led research. This methodology essentially disenfranchised a significant part of the community from the RAE process to the detriment not only of the community, but to the credibility of the process itself.

I consider intellectual debate concerning the relationship between the RAE and architectural research to be important, this paper does not therefore aim to promote the interests of one particular group of researchers in architecture, but rather to promote a critical and conceptual discussion of the various methods and outputs of architectural research.[2] If the paper does have an objective, it is to propose that in order to fully acknowledge the wide range of methods adopted and outputs produced within architectural research, we need to engage with discussions around disciplinarity.[3]

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[1] See www.hero.ac.uk/rae/

[2] I would like to thank the two referees for their close readings of this paper in its draft form and their insightful and productive comments.

[3] It is worth noting that this paper discusses architectural research with specific reference to the current UK condition and that this perspective needs expanding to take into account the international context.

University Research is funded predominantly through two sources: through Quality Related (QR) funding and through the seven Research Councils. QR allocations are calculated on the results of the peer review based RAE. This funding derives from the Department for Education and Skills (DfES) and is distributed to Higher Education Institutions (HEIs) as part of their block grant. In 2004-5 QR funding will be £1,625 million across the UK. The amount of research funding distributed by the Research Councils is of the same order – their combined budget in 2003-4 was £1,892 million. This is almost 30 times larger than the amount of research funding distributed through the Arts and Humanities Research Board (AHRB), which is annually estimated at 'almost £70 million'.[4] In 2005 the AHRB is due to become a research council and the following footnote in a recent government paper on research funding for science and innovation provides a useful indication of the place of arts and humanities research occupies in governmental strategic thinking:

> To become eight [Research Councils] on completion of final legislative processes following Royal Assent of the Higher Education Act, when the Arts and Humanities Research Board receives Research Council status. In this context "science" should be read in its broadest sense to encompass all aspects of engineering, technology, design, social sciences and the arts and humanities.[5]

It is beyond the scope of this paper to explore in detail how research operates within the science paradigm, but we can make some provisional observations concerning the kinds of research output produced by scientists, the ways in those outputs are assessed and the social processes for conducting research. Science research tends to be carried out through funded bids to research councils for teams of researchers to pursue projects headed up by established and senior research professors. Named principal investigators take charge of the intellectual

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[4] See HM Treasury, DTI, DfES, 'Science and Innovation: Investment Framework 2004-14', (July 2004), p. 42. See www.hm-treasury.gov.uk and www.ahrb.ac.uk/about/

[5] See HM Treasury, DTI, DfES, 'Science and Innovation: Investment Framework 2004-14', (July 2004), p. 42, footnote 3. See www.hm-treasury.gov.uk.

leadership and the management of projects, with research fellows, assistants and technicians carrying out the research. Research findings are usually delivered as peer-reviewed papers at conferences and published as conference proceedings, or as refereed papers published in journals ranked internationally. It is common for papers to be multiple authored, with the most senior figure listed last, the principal investigator first, and others involved in the project listed alphabetically in between. Research excellence is judged on the reputation of the named researchers, the ranking of the journal, combined with the publication's impact factor measured through citation indices. The government claim that citation is: 'the generally accepted measure of research excellence'.[6]

In the arts and humanities the situation is rather different. Research has traditionally been conducted by individuals operating independently producing solo authored books and works in their research time. This consists in the main of the 20% allocated to research through QR in most permanent lecturing contracts, as well as academic holidays periods and the occasional sabbatical or period of funded research leave or fellowship. While researchers in the arts and humanities do publish material in refereed journals, monographs tend to be more effective in achieving reach and influence for scholars. There is no single published ranking system agreed internationally, rather different academic groups regard certain journals and publishers to have more status than others. (It is here that the disciplinary differences that lie buried within the term 'arts and humanities' start to surface, concerning, for example, different paradigms of knowledge and research methodologies in social science and visuals arts practice.) Almost all national and international rankings of universities, such as the recent 'World University Rankings' published by *The Times Higher Education Supplement*, take citation as a key index of status. Yet the fact that citation is not taken as a measure of excellence in the same way in science and arts and humanities research remains relatively un-discussed, as does the global distribution of publishers and citation companies. Since the number of journals listed in the arts and humanities citation index is 1130 compared to 5900 science journals, it is clear that a

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[6] See HM Treasury, DTI, DfES, 'Science and Innovation: Investment Framework 2004-14', (July 2004), p. 20. See www.hm-treasury.gov.uk.

university whose main research is in the arts and humanities will be at a disadvantage.[7] At the time of writing, debate on this issue has finally begun, stimulated by the AHRB's recommendation that the arts and humanities generates a journals reference list.[8]

So what does this mean for architecture? Architecture schools in the UK, as a recent project conducted by researchers at Edinburgh College of Art has indicated, are orientated towards one of three different approaches to research – built environment, humanities/social sciences or visual arts research.[9] This tri-partite definition takes its point of departure from the location of architecture schools within university faculties in the UK, and also matches the three UoA: 33 *Built Environment*, 60 *History of Art, Architecture and Design*, and 64 *Art and Design* that architectural research was submitted to for the RAE 2001. However, it is also possible to broaden the definition to four rather than three disciplinary approaches to research: building science, social science, humanities, and art and design. It is also worth noting that these areas of research are not equal partners. They receive very different amounts of financial support, from building science with the most to social science, and then with considerably less funding, humanities and finally art and design. It is also the case that submissions to RAE 2001 were not equally distributed across the UoAs:

> Across the UK, 17 schools submitted under Unit of Assessment 33 (Built
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> Environment), 8 schools under Unit of Assessment 60 (History of Art, Architecture and

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[7] 'World University Rankings', *The Times Higher Education Supplement*, (5 November 2004). It is also worth noting that in subsequent rankings of universities by research area, arts and humanities was the only area whose ranking was generated without the use of citation impact data. See *The Times Higher Education Supplement*, (4 February 2005), pp. 12-3. For citation indices see www.isinet.com/products/citation/ahci/. See also the very different list and ranking produced by the Network for Theory, History and Criticism of Architecture (NETHCA) users.swing.be/nethca/index2.htm.

[8] Phil Baty, 'Journals "top ten" sparks a rebellion', *The Times Higher Education Supplement*, (28 January 2005), p. 1.

[9] Paul Jenkins, Leslie Forsyth and Harry Smith, 'Balancing three dimensions in architectural research: depth, breadth and length. An institutional analysis of   research in architecture   in the UK higher education sector', (October 2004), Edinburgh College of Art School of Architecture.

Design), and 8 schools under Unit of Assessment 64 (Art and Design). In addition 4 schools submitted in association with Unit of Assessment 34 (Town and Country Planning). Of these, 3 schools submitted under two Units of Assessment (usually 60 and 64, but also 33 and 34), and 2 schools under three Units of Assessment (33, 34 and 60).[10]

Since architectural research can operate using different methodologies, the various research outputs have been equated with those produced within the areas of building science, social science, humanities, and art and design research. Crudely put, technical and materials based research is usually taken to operate following the science model, whereas scholarly research into architectural history and theory is understood to adopt either social science methodology on the one hand or humanities on the other, and architectural design research has to date been related to other practice-led research, for example in art and design. This model of separating various kinds of architectural research into different areas and their related disciplinary procedures seems reasonably straightforward, so why might it be problematic?

A government paper published earlier this year on the future of research funding for science and innovation in the UK emphasises the important of creating a multi-disciplinary environment for research and aims to 'enhance a culture of multidisciplinary research in the UK and provide the underpinning infrastructure and funding mechanisms to support it'.[11] It is also worth noting that the Engineering and Physical Sciences Research Council (EPSRC) and the AHRB have for the first time collaborated on an arts-science initiative to fund a number of multi-disciplinary research networks investigating issues pertinent to 'Designing for the 21st

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[10] Paul Jenkins, Leslie Forsyth and Harry Smith, 'Balancing three dimensions in architectural research: depth, breadth and length. An institutional analysis of research in architecture in the UK higher education sector', (October 2004), Edinburgh College of Art School of Architecture, p. 8.

[11] HM Treasury, DTI, DfES, 'Science and Innovation: Investment Framework 2004-14', (July 2004), p. 28. See www.hm-treasury.gov.uk.

Century'.[12] And finally, in the report summarising their investigations into public funding for architecture and built environment research, the Commission for Architecture and the Built Environment (CABE) state that the existing division of research into 'hard' and 'soft' areas, science based projects and investigations with a focus on creative design and user experience, has not been of benefit to the built environment.[13] If national research and strategic initiatives indicate the need for multi-disciplinary research does it make sense to continue to separate out the various strands of architectural research? Is it not the case that architecture, a research subject that is already multi-disciplinary, would benefit intellectually and economically from this emerging cultural shift by identifying itself as a multi-disciplinary subject?

This is a contentious issue and one that in discussions concerning architectural research is continually connected to debates around architecture's uniqueness as a discipline. Adopting positions of vested interest around RAE politics, many argue against architecture's uniqueness since they believe this marginalises architecture within the academy and strengthens the perception that architecture holds a fragile compatibility with other models of academic research. If we choose instead to argue that architecture is unique on what grounds can we make such a statement?

If we define discipline as a system of rules of conduct or as a method of practice, then we could argue that architecture is not a discipline since it combines a number of methods of practice. However, it is also possible to define architecture as a recognized subject area or field of study containing a number of disciplinary approaches. Is architecture unique because of the particular combination of disciplinary approaches it comprises and/or is any one of these disciplinary approaches unique? As a subject, architecture encompasses several disciplines,

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[12] See www.ahrb.ac.uk/ahrb/website/apply/research/strategicinitiatives/designing_for_the_21st_century.asp

[13] CABE, 'The Real Budget for Research: An Analysis of Current Levels of Public Funding for Built Environment Research', (August 2004). See www.cabe.org.uk/publications/

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 inter-disciplinary research. 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. In architectural design, profession practice allows for research through the production of buildings while academic study provides possibilities for extending and critiquing the profession through conceptual designs. We could therefore argue that architecture is unique as a subject *and* as a discipline.

One of the key changes already in place for RAE 2008 has been the re-structuring of the UoAs as panels and sub-panels, and the transformation of UoA 33 into a sub-panel entitled *Architecture and Built Environment*. Given this change it seems likely that in RAE 2008 the pattern of submission of architectural research outputs across three different sub-panels will change, especially if the working methods and assessment criteria for *Architecture and the Built Environment* due published by the end of 2005 support multi- and inter-disciplinary work. It is particularly important then that the specific nature of practice-led research in this sector is taken into consideration during the development of sub-panel working methods, including the definition of output and assessment criteria, and that such methods are coordinated between these and other sub-panels, such as Civil Engineering. As I write (February 2005) although HEFCE is consulting various 'stakeholder groups in four disciplines (engineering, health, education, and art and design)' on appropriate assessment criteria for 'applied and practice-based research', architecture and built environment is not one of them.[14]

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[14] 'Units of assessment and recruitment of panel members', July 2004 , Ref RAE 03/2004, points 11-3. See www.rae.ac.uk/pubs/2004/03/ . It is worth noting here that 'to avoid a diversity of terminology' the AHRB have shifted from using the term practice-based, which they believe 'is not universally adopted', to practice-led, yet at the same the publications produced by HEFCE for RAE 2008 use the term practice-based research. See AHRB, 'The RAE and Research in the Creative & Performing Arts', (September, 2003). www.ahrb.ac.uk/strategy/policy/response/the_rae_research_in_the_creative_performing_arts.asp

In 1993, The Royal College of Art, London, published Christopher Frayling's paper 'Research in Art and Design', perhaps one of the most cited publications in the recent history of design research. In this paper Frayling put forward a tri-partite model of 'in', 'through', 'for', in order to clarify the complex set of relationships between design and research. In this model, research 'for' design tends to involve investigations conducted with a design application in mind, research 'into' design examines design for a historical and theoretical perspective, whereas research 'through' design takes design processes to constitute the research methodology itself. It is this last category that we would today classify as 'practice-led' research.

In the last decade, research 'for' and 'into' design has developed non-problematically, partly because the work can easily be positioned within existing disciplinary modes in science and the humanities. Research 'through' design has produced more debate and is currently being further developed in discussions around the relation between theory and practice. In 1999 the AHRB put forward a set of criteria for assessing the extent to which practice-led funding proposals could qualify as research. This required that a proposal be defined according to four elements – questions, methods, contexts, and modes of dissemination. This has been widely adopted across the research community as a 'definition' of practice-led research. Along with visual documentation, the written text describing the four elements is taken to be 'a record or route map of the research process', and is understood to articulate and reflect upon the position of the research in relation to a more scholarly apparatus. The AHRB have made it clear that in their opinion not all practice is research:[15]

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[15] AHRB, 'The RAE and Research in the Creative & Performing Arts', (September, 2003).www.ahrb.ac.uk/strategy/policy/response/the_rae_research_in_the_creative_performing_arts.asp

Not all creative activity and practice, even of the highest quality, constitutes research, and much research in the creative and performing arts involves no such activity at all.[16]

Not all those in practice-led research agree with the AHRB. Some are concerned that this set of definitions has been generated through a science or humanities based model and then applied to practice. Others hope that practice-led research can re-inform this model or better yet produce its own parallel model of research. There is also disagreement concerning whether practice-led research needs to be accompanied by texts, and whether such texts need refer to a scholarly research apparatus.[17] But despite stating that not all practice is research, and requiring practice-led research to be supported by a written document, the AHRB does not intend its definition of research to imply a linear model. They note 'a widespread recognition that the relationships between the four elements […] are not linear'.[18]

This acknowledgement is important since it is perhaps in this area – the sequencing of the four elements or research processes – that practice-led work and more traditional 'academic' text-based research differ. One example might be the relationship between posing research questions and finding answers. In much practice-led research, the process operates through generative or propositional modes, producing works that may then be reflected upon, along

[16] AHRB, 'The RAE and Research in the Creative & Performing Arts', (September, 2003).www.ahrb.ac.uk/strategy/policy/response/the_rae_research_in_the_creative_performing_arts.asp

[17] See for example, John Hunt, (University of Aukland) 'Design as research, Addressing the 'New Knowledge' Criterion', University of Melbourne, 2003, who suggests the design process produces six knowledge domains, including 'generative production'.http://www.arbld.unimelb.edu.au/events/conferences/aasa/maintenance/view_book.php See also Euan McArthur, 'Research in the creative and performing arts: A response to the AHRB Paper: The RAE and Research in the Creative and Performing Arts. Review of Research Assessment' (September 2003), *Journal of Visual Art Practice,* v. 3, n. 1, (March 2004), pp. 75-80. Where the AHRB paper states that creative works need the text based description of a scholarly apparatus, McArthur argues that this position needs to be stated more 'moderately in order to recognize the realities of the research dimension of the artwork'.

[18] AHRB, 'The RAE and Research in the Creative & Performing Arts', (September, 2003)http://www.ahrb.ac.uk/strategy/policy/response/the_rae_research_in_the_creative_performing_arts.asp

the lines of Donald Schön's 'reflection in action'.[19] If we take another example, this time context, while a researcher in the humanities would first explore the context for a research question in order to find out the current state of knowledge in the specific field, in some cases practitioners will investigate ideas through the production of a work first and later consider for whom and how the knowledge generated is original. The order inscribed into these four elements through humanities research can pose difficulties when using them to describe certain kinds of practice-led research; however until a more convincing model emerges out of practice-led research itself, this framework, used both contingently and critically, provides a helpful way of considering the research potential of practice-led work.

It is worth emphasising here the variations in research method between various different forms of practice-led research. Artists and designers, for example, might be interested in gaining different kinds of knowledge and do so through diverging forms of acquisition and dissemination. Traditionally, and I emphasize traditionally, design has tended to position its methodology in respond to a brief – where the outcome is the solution to a posed problem. But as a growing number of artists engage in territories usually associated with design and architecture, the distinctions become more complex, as well as producing objects that 'look like' designed artefacts, many artists adopt design-like working methods, such as responding to a need or to a brief. What appears to be have been produced by a designer under closer investigation reveals itself to have been made by an artist. What defines one object as design and the other art? Is it possible to have a definition of research that includes both? The definition of research for RAE 2008 as 'original investigation[s] undertaken in order to gain knowledge and understanding', is broad enough to encompass a number of disciplinary approaches, while also making specific reference to practice-led work, that 'the invention and

19 See Donald Schon, 'Educating the Reflective Practitioner', (1987). See educ.queensu.ca/~ar/schon87.htm

generation of ideas, images, performances, artifacts including design, where these lead to new or substantially improved insights' constitute research.[20]

The methods used by designers may be lateral, intuitive and creative, but the focus is often driven by 'application', which means that it is less usual for a designer to make a 'problematic' object or a design that questions the context of application. The markets, industries and professions to which design is related often make it difficult for products to have no function or to consider criticality or the construction of concepts as their most important purpose.[21] This is an important point: how does a work that questions get assessed as research in an applied context? A practice that questions the context and/or reflects on its own methods may produce new knowledge, but such knowledge is not necessarily of 'direct relevance to the needs of commerce and industry' as the RAE definition of research for 2008 demands, though it can 'lead to new or substantially improved insights'.[22]

Let us know now turn to architecture and briefly to Frayling's tri-partite division of art and design research into 'for', 'into' and 'through'. Research 'for' architecture could describe work driven by the perceived needs of the sector and cover the development of new materials and technologies. Research 'into' architecture might include the advancement of new scholarship through historical and theoretical interpretations. Research 'through' architecture takes the design process as the research methodology. The focus of such practice-led research in

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[20] This working definition of research is taken from 'Annex B: Definition of Research for the RAE', RAE 2008: Research Assessment Exercise: Guidance to Panels, 01/2005, (February 2005), p. 22.

[21] See Jane Rendell, *From Art to Architecture*, (book manuscript in preparation). See also Jane Rendell, 'Space, Place, Site: Critical Spatial Practice', in Cameron Cartiere and Shelly Willis (eds.), *RE/Placing Public Art*, (Minneapolis: University of Minnesota Press, forthcoming) and Jane Rendell, 'A Place Between, Art, Architecture and Criticism', in Pedro Brandao and Antoni Remesar, (eds.), *Design Urbano Inclusivo: uma experienca de projecto em Marvila, Fragmentos e Nexos,* (Lisboa: Centro Portugues de Design, 2004).

[22] This working definition of research is taken from 'Annex B: Definition of Research for the RAE', RAE 2008: Research Assessment Exercise: Guidance to Panels, 01/2005, (February 2005), p. 22.

architecture can be on product or process. Original investigations might lead to new knowledge evidenced through the application of inventive design concepts in buildings. Equally, the acquisition of knowledge might take place through writing, drawing and modelling and generate new kinds of understanding evidenced in those design processes themselves. Outputs, then, may take the form of buildings and parts of buildings, as well as exhibits, installations, artefacts and published designs representing built and un-built architectural projects.

The practice-led aspect of architectural design research is closely comparable to practice-led research in art and design; however, it is also worth noting several features specific to architecture. First, the scale and multi-disciplinary nature of some building designs suggests a level of complexity that can exceed the scope of other designed and artistic artefacts. Second, the collaborative nature of the architectural design process produces a situation where the same building may evidence different contributions to knowledge for each practitioner/researcher involved. Third, certain competitions and non-refereed architectural journals involve peer review processes regarded by professionals and academics alike as highly significant in assessing original design and ensuring the dissemination of influence and reach, despite their absence from ranked lists and citation indices.

We can compare the distinctions between different kinds of practice-led research in art, design and architecture with reference to the four elements of research – questions, contexts, methods and modes of dissemination – put forward by the AHRB. While the kinds of outputs produced in architectural design research vary from books to buildings, it is not only the output type, but also the relation of question to method to context that characterizes the specificity of knowledge gained through acquisition and dissemination. While designers may follow a science model and test concepts through material application, theorists might adopt a social science method in order to assess an architectural design's contribution to 'improving' the 'quality' of the built environment through quantitative analysis; conceptual design projects, especially those which are not designed to be built, follow art in producing knowledge

which questions rather than affirms. Such research outputs place emphasis on architectural design research methodologies that are both productive and critical.

I suggest that it is the reflexive nature of a practice that might help to define the work as research. Projects that put forward questions as the central tenet of the research, instead of, or as well as, solving or resolving problems, tend to produce objects that critically rethink the parameters of the problem itself. It is this mode of critical practice that lies perhaps closest to what we call critical theory. While, the term 'theory' is often understood to refer to modes of enquiry in science, either through induction, the inference of scientific laws or theories from observational evidence, or deduction, a process of reasoning from the general over-arching theory to the particular; critical theory however does not aim to prove a hypothesis nor to prescribe a particular methodology, instead it offers in a myriad of ways self-reflective modes of thought that seek to change the world.

> A critical theory, then, is a reflective theory which gives agents a kind of knowledge inherently productive of enlightenment and emancipation.[23]

The term is usually used to refer to the writings of those of the Frankfurt School, however, I extend the term to include the work of later theorists, post-structuralists, feminists and others, whose thinking is also self critical and desirous of social change. For me, this kind of theoretical work provides a chance to reflect upon what is there but also to imagine something different, to question and transform rather than describe and affirm.

In architectural design research, such work can take the form of installations, drawings and texts, as well as buildings, or even parts of buildings or aspects of the design process. Architectural representations may describe spaces with the intention that they will be realized in built-form, or they can propose architectural projects that are unrealizable, which explore

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[23] Raymond Geuss, *The Idea of Critical Theory: Habermas and the Frankfurt School,* (Cambridge, 1981), p. 2.

and critique the paradigms of knowledge held within the architectural profession and construction industry that underlie the production of the built environment itself. Such forms of conceptual architecture may adopt the normative language of the architectural drawing; for example producing visual images that suggest atmosphere and persuade clients and developers of an intended scheme or detailed documents that communicate quantities and design processes to those who will build the construction. However, there are also drawn projects that challenge the very notion of the architectural drawing, testing its forms and processes and suggesting new directions for architectural representation. This work is closest in many ways to modes of research in conceptual fine art, but with its specific reference to architectural design and the built environment it is significantly different. Recognition of the new insights such architectural design research produces may vary according to audiences and operate over differing time periods, for example, a conceptual design in the form of a drawing may influence researchers in theoretical, conceptual and critical architecture more quickly, and require a longer gestation period to impact upon the profession and the construction industry.

In both academic and arts-based contexts, the term inter-disciplinarity is often used interchangeably with multi-disciplinarity, but I understand the terms to mean quite different things. Multi-disciplinarity research tends to describe a way of working where a number of disciplines are present but maintain their own distinct identities and ways of doing things; whereas in inter-disciplinarity research individuals operate at the edge and in between disciplines and in so doing question the ways in which they usually work. In exploring questions of method or process that discussions of inter-disciplinarity and the relationship between theory and practice inevitably bring to the fore, Julia Kristeva has argued for the construction of 'a diagonal axis':

> Interdisciplinarity is always a site where expressions of resistance are latent. Many academics are locked within the specificity of their field: that is a fact . . . the first obstacle is often linked to individual competence, coupled with a tendency to jealously protect one's own domain. Specialists are often too protective of their

own prerogatives, do not actually work with other colleagues, and therefore do not teach their students to construct a diagonal axis in their methodology.[24]

Engaging with this diagonal axis demands that we call into question what we normally take for granted, that we question our methodologies, the ways we do things, and our terminologies, what we call what we do. The construction of 'a diagonal axis' is necessarily, then, a difficult business. When Kristeva talks of 'the anxiety of interdisciplinarity', she is referring to the problems we encounter when we question the disciplines we identify with. Homi Bhabha has described this moment of encounter between disciplines as an 'ambivalent movement between pedagogical and performative address'.[25] It is precisely for this reason that I am a passionate advocate for interdisciplinary research, because to truly engage in such work is often a difficult and transformational experience, combining critical engagement with the emergence of new forms of knowledge that are not yet classifiable.

We could describe the position of architectural design research between the profession and academia as characterised by anxiety and ambivalence. Typically the suggestion is that academic research should strengthen ties its with professional practice and act as an incubator for innovations in architectural design that will improve the quality of the built environment. However, this paper proposes an inter-disciplinary model that instead explores the boundaries of disciplinary knowledge to allow for the production of complex forms of research that are at once self-reflective and propositional. It is at the inter-sections between disciplines where the tenets of normative architectural design are being questioned through the creation of innovative research methodologies. Beyond Frayling's 'through' a number of other prepositions are in play relating design and research in new ways. Such prepositions possess a suggestive role in constructing relationships between concepts, disciplines and objects. As philosopher

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[24] Julia Kristeva, 'Institutional Interdisciplinarity in Theory and Practice: an interview', Alex Coles and Alexia Defert, eds, *The Anxiety of Interdisciplinarity*, *De-, Dis-, Ex-*, v.2, (London, 1997), pp. 3-21, pp. 5-6.

[25] Homi K. Bhabha, *The Location of Culture*, (London, 1994), p. 163.

Michel Serres has observed, for such small words, prepositions are extra-ordinary, they have the potential to change everything around them.[26]

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[26] Michel Serres, *Angels: A Modern Myth*, (Paris, 1995), pp. 140-7.