

Sebastian Macmillan

**THE HEAD, THE HEART AND THE HAND:
ARCHITECTURE AND ITS PLACE IN THE ACADEMY**

*University of Cambridge, 1-5 Scroope Terrace,
Cambridge CB2 1PX, United Kingdom sgm24@cam.ac.uk*

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Abstract. Architecture is a mainstream subject in the academy. While the development of spatial imagination and aesthetic judgment are among its core components, a wide range of knowledge, skills and sensitivities are delivered as part of the design curriculum. This paper discusses the potential benefits, but also the risks, associated with the growing emphasis on academically-focused research in schools of architecture.

Key words: education, research, design, knowledge.

1. Introduction

Architecture has successfully established itself as an academic discipline in universities right across the world, from the most prestigious [1] to those with more modest reputations. Demand is high and growing; in the United Kingdom, for example, the University of Reading launched a new Department of Architecture in 2016 and the University of Loughborough is to offer its first undergraduate degree in Architecture from 2017. Heriot-Watt University has launched its first Architecture course, initially at its Dubai campus. A private venture, the London School of Architecture, is being formed [2].

Meanwhile, however, universities themselves are changing with a growing emphasis on research; all UK university departments have their research assessed on a cycle of five or six years. Architectural departments are no exception with their staff increasingly expected to become research active. These changes are part of a historic trend in which architectural education moved from being purely office-based to a mix of office-based and academy based, in which leading practitioners taught in the academy. It was more formally institutionalised in the years before the First World War, and after 1958 became virtually an all-graduate profession although most teachers had a background in practice. In the last thirty years the rising expectation in universities for staff to be research active has made practitioners less and less likely gain full-time employment for they lack the necessary research credentials. Instead schools of architecture have recruited those mostly or wholly devoted to research activity, and whose research activities relate not to new design-focused knowledge but to traditional academic publication. At worst, this leaves or will leave schools of architecture with a shortage of studio leaders to teach the drawing and design skills that traditionally have engaged not only the head, but the hand and the heart. This is a direct consequence of architecture being expected to align its educational process to a system of university-wide research assessment whose roots lie not on the creative arts but in the sciences.

2. Architecture in the academy – pupillage and part-time study, 1750 to 1900

Architectural education in the academy can be traced back to at least the seventeenth century. According to Neil Bingham [3], the Academie Royale d'Architecture was founded in 1671 to standardise French architectural education, and the Ecole des Arts in 1743. The Ecole was open six days a week, with the mornings given over to discussions with the professors and afternoon lectures on fortification, mathematics, geometry, perspective, water supply and draining, and regular visits to notable buildings. In Britain conversely, architectural education was seen as a supplement to apprenticeship; students at the Royal Academy Schools worked in the day in offices as articulated pupils typically of prestigious architects. Much of the emphasis was on drawing from antique fragments or plaster casts, and on the production of

measured drawings of classical buildings such as St Paul's Covent Garden or parts of Somerset House. Lectures from the professors were in the evenings, and access to the library, which was open only from 10 a.m. to 4 p.m., was limited. Criticisms acknowledged at the time were that the Schools were only a supplement to apprenticeship. There were neither organised discussions nor requirements for written work. By 1836, A. W. N. Pugin was highly critical of the activities of the architecture section of the Royal Academy Schools, commenting of successful candidates who were sent abroad to study classical architecture: "... three or four years of the most precious period of his life is spent in going over, for the thousandth time, the same set of measurements on the same set of cornices and columns" [Pugin, cited in 3].

Richardson [4] describing the system of pupillage in the office of Sir John Soane, notes that in offices too it was the custom for pupils to begin their pupillage by learning the orders and drawing classical fragments and ornaments, often returning to these tasks months or years later. Also:

"The Soane office did not, it must be stressed, offer the pupils an opportunity to produce their own designs, for that they had to enter the Royal Academy Schools and work, as Soane had done himself, in the early mornings, late at night and on Sundays" [4, page 20].

3. Institutionalised architectural education in the Red Brick universities, 1900 to 1958

The architectural historian, Andrew Saint notes that: "Schools of architecture started in Britain later than in continental Europe and the USA. Before 1900 budding architects learnt their trade as articulated pupils or assistants in offices, supplementing their knowledge in the Victorian cities with evening or day-release classes. The Edwardian years saw a stampede to create a proper system of architectural schools" [5, page 1].

But it was not only a coincidence of timing but also one of character. According to Powers "The character of most of the institutions now existing in architectural education was formed during the period 1900 to 1914" [6]. Powers suggests that in the nineteenth century, architectural training was chaotic and underfunded, and that it was only with the establishment of the red-brick universities at the end of the nineteenth century that architecture became accommodated in the formal academic establishment. In London, University College and King's College offered part-time courses dating back to the mid-nineteenth century, but these were only an adjunct to pupillage. The Architectural Association offered evening classes. However, by 1900 there was only one full-time university course, at Liverpool University, which had been started in 1894 and was considerably expanded by C. H. Reilly following his appointment as Roscoe Professor of Architecture in 1904. "Reilly had a genius for promoting his ideas and his school, using the architectural journals to publish school drawings and reports with unprecedented frequency" [6, page 36]. Reilly encouraged measured drawings and studies in composition and, becoming editor of the *Builder's Journal* from 1912, he promoted 'Monumental Classic'.

Other British universities in cities like Birmingham, Edinburgh, Glasgow, and Leeds, established new full-time courses, generally built on the foundation of existing evening classes. Cambridge offered its first course in Architecture in 1912 [5], and in London University College and King's College Schools amalgamated to form the Bartlett School in 1913 [6]. Generally, "The training was based on the Beaux Arts tradition: large-scale, classical in style and intended for the public sphere" [7, page 43] attributes which according to Walker gave women specifically the confidence and experience to design grand public buildings.

4. Third phase: the Modern Movement and an all-graduate profession, 1958 to 1986

If the Beaux Arts tradition underpinned architectural education before the First World War and partly after it, the emergence of the International Modern Style in the 1920s and 30s also had a considerable impact. For example C. H. Reilly, who had initially promoted Monumental Classic at Liverpool, later turned towards modernism, espoused the work of Le Corbusier and encouraged visits by Mendelsohn, Chermayeff and Gropius in 1934 [8]. Teaching of the Classical Orders was generally abandoned in the mid-1930s, although the Bartlett held on to the Beaux Arts tradition through to the 1950s. Elsewhere, modernism was widely promoted by staff and students from the leading schools by individuals who went on to become promoters of change after the Second World War: influential figures like William Holford, Richard Llewellyn Davies and Leslie Martin [8].

The 1958 Oxford Conference [9] is widely regarded as a turning point in architectural education in Britain for it was there that the historic decision was taken to turn architecture into an all-graduate profession, thereby limiting a long-standing route to qualification that had involved pupillage, night-school and RIBA examination. In fact, as a compromise between a purely college-based system and traditional pupillage, two years of practical training in offices was required alongside a five year college course. Leslie Martin's write up of the event made a case for the move of architectural education into universities both to raise standards but also because the widely different types of knowledge required in architectural education and its teaching at the highest standard would be found only there [9, page 280]. In a separate report prepared for the conference on 'Deeper knowledge, better design' [10] Richard Llewelyn Davies identified the need for *research architects*, those who would remain architects first and foremost, but specialize in the sort of research that would support the profession. The interpretation of Lubbock and Crinson is that the historic conference also changed the education policy of the Institute: "... from a liberal even-handed balance between Beaux-Arts and modernist tendencies to a firm commitment to modernism" [8, page 49; see also 11, page 137 ff. for an extended discussion].

What was implied by modernism? It was a catch-all term with a wide variety of interpretations. Contrasted with the formula of the Beaux Arts tradition it meant an end to lettering, the orders, measured drawing, perspective and sciagraphy as well as to a reliance on Greek and Roman precedents, forms and rules. More broadly it meant a move beyond the gentlemanly figure of the private architect concerned with a market niche focusing on private houses for the well-off, churches, major public and commercial buildings, and the better class of offices and factories, instead towards greater engagement with mass housing, schools, hospitals, railways industry buildings, ordinary offices and a concern for modern town planning. In this, it took into account not only the difficult conditions after the First World War and the economic challenges following the 1929 slump, but also the potential of an architecture intended after the Second World War to support a political vision of the emerging welfare state with its concern for the enlightened application of technology to promote social well-being. Finally as Lubbock and Crinson further explain, central to modernism was a belief that the modern world was in a process of continuous flux, and the hallmark of the system was 'education for change'; as a consequence there was no fixed architectural curriculum [8].

Leslie Martin himself had been appointed Professor of Architecture at Cambridge in 1956 where among many other achievements [see 12] he established the Centre for Land Use and Built Form Studies (later renamed in his honour The Martin Centre for Architectural and Urban Studies) the first architectural research unit. Much of the early work of the Centre was concerned with mathematical modelling of alternative configurations of three dimensional built form to assess geometrical possibilities and their implications for site coverage, height and density. In joining Cambridge, of course, Martin found himself in a strongly research-led university, where recent developments and discoveries in his sister departments included the jet engine and the double helix structure of DNA.

5. Fourth phase: Architecture and the research-led university, 1986 to the present

Three decades after Leslie Martin helped to launch a research ethos in architecture, the significance of research for all UK universities and specifically in relation to the government funding they received, rose dramatically. In 1986, the first exercise to assess research was conducted by the University Grants Committee, as a means of allocating so called 'quality-related' funding. A subsequent exercise was conducted in 1989 under the term 'research selectivity exercise' by the Universities Funding Council. Then in 1992, the binary divide between UK universities and polytechnics was abolished, and regional funding councils were established such as the HEFCE, the Higher Education Funding Council for England. Over time, the former polytechnics, many of which contained schools of architecture with excellent reputations for their technical teaching of the subject, acquired university status. At the same time there was a recognition that the assessment of research needed to become more transparent, explicit and rigorous than it had been in past assessments. By 1996 the former polytechnics were competing for 'quality-related' funding with universities. Subsequent research assessment exercises took place in the UK in 2001, 2008 and 2014, this last termed the 'Research Excellence Framework'.

While many schools of architecture had begun their own research programmes, the roots of the discipline in teaching the practical skills of designing buildings and with strong links to the needs of practice, went very deep. For example, in the *Architects Journal*, prior to the 1996 RAE, Dave King wrote an article headed 'Research is at odds with Architects' Education' [13]. Following the 2001 research assessment exercise, there was not only considerable unhappiness at the result where several leading architecture schools were rated lower than they had expected, but an antithetical attitude towards the very notion of research and the production of new knowledge and new theory. One disgruntled academic wrote: "I think the teaching of architecture is just about the most important thing we can do, and that this whole research thing is rubbish" [14]. These and other comments revealed not just the lack of an established research tradition in schools of architecture with their strong emphasis on studio teaching and design work, but indifference and suspicion towards it. In a previous article, I argued that in the university system, and particularly within research-led universities, such attitudes made schools of architecture particularly vulnerable and that they risked becoming their own worst enemy [15].

The solution at the Cambridge Department of Architecture has been a radical one and has transformed both research and teaching. Following a major review of the Department's research activities during the 2000s, the last decade has seen major staff changes including the recruitment of several new, young research-active lecturers to tenured full-time positions. At the same time a more formalised system of Design Fellows has been introduced. They are offered fractional appointments of between 20 % and 35 % between October and June, and are expected to devise studio projects and organise external visiting studio critics, arrange site visits, and offer tutorials and supervisions. Those appointed are expected to be practising as architects or undertaking similar studio tutoring elsewhere [16]. Although unstated, it is clear that those recruited as Design Fellows lack the research track record that would make them eligible for a post as a University Teaching Officer, while their appointment releases the full time staff to spend more of their time undertaking research, writing and publishing in their own specialised academic field.



Architecture design studio, University of Cambridge: an emphasis on creativity and model-making

Clearly there are implications of being a practical discipline in a research-led university. As this example shows, at Cambridge there are now in effect two sets of staff – practitioners attending part-time leading the studio teaching with its emphasis on design, drawing and model-making (see Figure) and with formal lectures and written examinations led by the full time academic staff. At best for students, they are exposed to both sets of instructors – practitioners and research-active academics. However, it can also lead to an unwelcome separation between academic learning represented by written examinations and a written dissertation on the one hand, and studio project work on the other in which the relevance of academic work may be unclear to students since there is no obvious cross-over. At worst, separating research activity from the studio design work negates a fundamental principle espoused by Leslie Martin when he wrote about research: “Without it, teaching can have no direction and thought no cutting edge” [9].

Costs are also significant. Architecture is renowned for being an expensive discipline to teach given the prevalence of the studio project system compared with ‘chalk and talk’ and two sets of staff clearly increases teaching costs; only if research funds can be raised externally is this arrangement likely to be financially viable. Eventually it was revealed that the threat of closure faced by the Cambridge Department following the 2001 research assessment exercise had financial shortages at its root [17]. So the financial viability of adopting this dual staff arrangement generally in schools of architecture is highly questionable.

6. Implications of a research-led ethos in academia

There are other implications too for the teaching of architecture implied by the rise of the research culture across universities. Architectural education is a very broad discipline which, teaches not only the head, but also the heart and the hand. In terms of the head, it engages its students in developing a wide range of intellectual skills, ranging from mathematics and physics to knowledge of art history. Architectural education develops skills in geometry, measurement, computing, building physics, architectural history and conveys a wide variety of practical and theoretical knowledge about a range of issues from comfort conditions to global climate change. In terms of the heart, architectural education inculcates in its graduates a love of the built environment and respect for the built achievements of our forefathers, of the role of art, architecture and culture to underpin the identity of a place or a nation, and the passion needed to devise, explain, justify and defend the student’s own design proposals. In terms of the hand, more traditionally, architecture promotes the practical arts, the world of ‘making and doing’ and develops skills such as drawing, sketching, modelling, thinking and representing in three dimensions and even the fourth dimension, time, working with diverse materials and developing awareness of their properties and how to shape them and connect them.

Architectural education blends the arts, the humanities and the sciences, and promotes both numeracy and literacy. It demands of its graduates the ability to analyse a problem into its constituent parts and to reassemble them to a self-consistent whole. It promotes divergent thinking in the search for alternative potential design solutions, and convergent thinking to identify and isolate good solutions. It helps students to develop both creative and evaluative skills: creative imagination to envisage alternative possible futures, and judgment to determine the strengths and weaknesses of different approaches. It is concerned with both the natural world, natural materials and forms, but also with the sciences of the artificial. There is in addition an ethical dimension: what is the role of the designer in relation to the society that he or she serves; for example, is it to design for people, understanding and meeting their needs, or is to use skill and imagination to propose possibilities they could never have anticipated; as the expression has it, ‘exceeding their expectations’?

7. Concluding remarks

Designing a building is a practical craft skill but it is also an endeavour that raises numerous issues about art and culture, practicality and efficiency, the individual and society, environmental impact and the future of the human species. What is important about all of these issues, is not just that they are made the

subject of lectures with the student demonstrating understanding in an examination, valuable though this is, but that they are embedded into the thought process of young architects when designing to become habits of mind. This connection was a strength of architectural education between 1750 and 1900, that theory learned in the academy was implemented in the office. The institutionalisation of architectural education in the period 1900 to 1914 began a process of disconnecting education and practice, while the historic decision in 1958 to make architectural an all graduate profession extended that disconnection, although with the positive potential of new design-relevant knowledge being produced within universities, and the benefits for training of high level connections across academic faculties. However, Llewelyn Davies' notion of *research architects* has been lost. Instead the expectation for lecturers to be research-active and to publish academic research has forced places like Cambridge to provide two different and separate sets of staff: visiting practitioners on part-time short-term contracts who lead, devise and examine the studio project design work, and academic lecturers with limited experience of architectural practice, who focus on their own specialised academic research field and have minimal involvement in studio design projects.

Architectural education may be regarded as rather broad and shallow, but the range of issues to which it introduces and exposes its students is extensive, and the abilities they acquire wide-ranging and potentially valuable far beyond architecture itself. At best architectural education engages not only the head, but the heart and the hand. What remains a challenge, however, is how to preserve its significance and ensure its strengths are not lost in the quest for architecture schools to be the academic equivalent of other disciplines in research-led universities. A debate is needed, surely, about the relationship between architectural research and studio design project work. Is the solution at Cambridge one that should be repeated elsewhere, given that it separates out practical design work from academic learning, the two delivered by different sets of staff? And if the research staff become too engaged in their own academic research unrelated to the needs of practice, and do not engage in teaching in studio, even if students learn about their work, will it ensure that latest university research ideas and innovations are embodied in their design proposals? Or, conversely, might it lead a new generation of student architects to come to believe that academic research is irrelevant to design work? If this is the case, it would be a perverse outcome of the general attempt in higher education in the UK to embed a research ethos into university education.

It is also both ironic and unfortunate that the criteria used in the Research Excellence Framework, despite their aim to support innovation and research in universities, do not credit the sort of learning and outputs that take place in the creative arts, or the production of the sorts of knowledge needed in design, which is:

“... equivalent to but distinct from other forms of knowledge that underpin the sciences and the humanities..... These distinctive qualities include its open-endedness, its concern for action and what ought to be rather than what is, its value-laden nature, and its integrative rather than fragmentary possibilities” [18].

Architectural education is not without its faults, but it does have a well-established mode of operation that has developed from more than two centuries of dedication and experience. Project-based learning, peer-to-peer learning, experiential learning, and the emphasis not only on the head, but also the heart and the hand, have the potential to provide a very well-rounded individual with knowledge, enthusiasm, skill, expertise and cultural awareness. The application of a science-based model of research in academia risks placing much of this in jeopardy, and destroying the very qualities it is intended to support.

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Себастьян Макміллан

ГОЛОВА, СЕРЦЕ ТА РУКА: АРХІТЕКТУРА ТА ЇЇ МІСЦЕ В АКАДЕМІЧНІЙ ОСВІТІ

Анотація. *Архітектура є одним з основних напрямів академічної освіти. Розвиток просторової уяви та естетичного бачення є ключовим елементом цієї освіти, а навчальні програми передбачають також передачу багатьох інших знань, умінь та навичок. Висвітлено потенційні вигоди, а також загрози, що пов'язані із роллю академічно-сфокусованих досліджень в архітектурних школах, яка постійно зростає.*

Ключові слова: *освіта, дослідження, проектування, знання.*