Research Assessment: a flawed exercise

Stirling’s work: variable and vainglorious

Undermining the profession

The demise of architecture schools in the latest Research Assessment Exercise (RAE) will have caught the attention of every architect working in one of the UK’s research-led universities (arq 5/4, p.291). The debate about architectural theory, its definition and application into practice is complex, diverse and sometimes contentious. Within universities where research success is at the heart of their culture, architectural ‘research’ does not necessarily follow conventional protocols or manifest itself in the refereed journals ubiquitous in other disciplines. But should it be any less valued because its output does not conventionally fall into one of those standardized categories?

The RAE rubric states that the creative, unconventional deliverables of the architectural community will, of course, be considered, together with more conventional output. Lamentably, however, the results of the RAE suggest otherwise. Within the framework of the Exercise, not a single architecture school was credited for work of an international standard.* This is an intriguing outcome given that this year’s award of the Royal Gold Medal for Architecture honours Archigram – whose chief protagonist was included in one of the RAE entries.

Perhaps we should look rather more closely at the membership of the RAE panel and its method of selection. Before this latest Exercise, there were several cries of alarm when it became clear that the panel was dominated by certain sectors of the construction industry, with little or no representation from other key areas. Despite this concern, nothing was done to rebalance the group. This Exercise is not an arcane procedure confined to a small group of universities working on the margins of academia – it is a government mechanism for the distribution of very substantial sums of money to university departments. These sums are a vital part of their resourcing and have an impact not only on their research activity but also on their teaching and, ultimately, on the profession.

Whatever our own departmental judgements are – and however indignant some us may feel – we have to face the fact that the RAE sends out clear messages that reverberate within government, the funding agencies and the world of prospective students. This is an issue that the RIBA needs to address seriously – both educationally and politically – if the schools are not to be left limping behind their professional colleagues.

It is difficult to measure exactly what impact this blow will have on the architecture schools and the profession. However, it may serve to reinforce the prejudices expressed in yet another recently published document, Rethinking Construction Innovation and Research: a Review of Government Research and Development Policies and Practices by Sir John Fairclough. This publication, which barely mentions design, let alone architecture, offers the following unsubstantiated and uncredited observation:

‘Architectural education within British universities is now generally very weak – it is too arty farty/design theory led. Architects are their own worst enemies but should be leading innovation on the ground with help from the universities.’

Views such as this, together with the RAE results, serve to reinforce dangerous prejudices that will further undermine, not just architectural education, but the profession itself.

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* No architecture school was awarded the highest rating – a 5*. In order to achieve this, entries had to be assessed as achieving ‘international excellence in a majority of sub-areas of activity and ... national excellence in all other areas’. Three schools (Bath, Cardiff and Sheffield) were awarded a 5 – for which international excellence was judged to have been achieved in a minority of sub areas of activity. Editor

Spens on Stirling – too loyal

Until about 1974, James Stirling’s work subverted and redefined the Modernist canon. Michael Spens is deeply sympathetic to Stirling and brilliantly analyzes some of the authentic masterpieces from that time, particularly Olivetti Haslemere and the St Andrews residential accommodation (arq 5/4, pp.333–353). Accurately, he identifies the unbuilt St Andrews Arts Centre (1974) as the point where things began to change. After that, influenced by Werner Kreis, Léon Krier and others (and of course Colin Rowe), Stirling began to explore an exciting amalgam of the abstract and the figurative, marrying his previously intransigent Modernism to a representational Neo-Classical idiom.

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This was a dangerous course to take, and as his projects became larger and his clientele more international, exciting tensions accumulated which reached a climax with the Neue Staatsgalerie in Stuttgart. But then, as most agree, there was a disappointing loss of creativity. There followed a bad period in the mid-1980s when frankly sloppy work like Paternoster or Bracken House caused deep murmurings even in the office itself. I find Spens too loyal as he follows Stirling’s every move like the itinerary of a genius whose every building is, ipso facto, a masterpiece. This blinds him to the infelicities of the unadventurous, reiterative Museum of Scotland project [1], which he insists is a work of brilliance – even going so far as to excoriate as provincial and misguided the competition jury that rejected it, and condemning the winning project as ‘rhetorical’ when he has before him in the Stirling entry, alas, an example of rhetoric at its most vainglorious. Stirling had an authoritative personality that required total devotion, but he did not always deserve it. Critics must now distance themselves a little, discriminate between highs and lows, and give greater weight to the influence of collaborators. Spens does recognize the role played in some projects by Ulricke Wilke and Walter Nägeli, but not by Kreis, Ulrich Schaad and others, and especially Krier, a major force (for good and ill) whom Spens studiously ignores.

Spens’ proposition that Stirling ultimately redeemed himself with the Braun factory in Melsungen, Germany, is a thesis based on questionable assumptions. Stirling was indeed beginning to redeem himself, and Kenneth Frampton and others have identified some interesting indications of this. His Canary Wharf residential river-front scheme, for example, can be seen as a brilliant new definition which is far more consistent with his previous development and has nothing to do with Melsungen.

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More thoughts on St Mary’s Island
It is good to see innovations in housing design being applied to the private sector; the ultimate test of any new idea is that someone should want to invest in it. All too often in the past any experimentation in housing design was mainly confined to the public sector. Lack of ‘market testing’ was one of the main reasons why brave experiments sometimes went horribly wrong. All through those years of experimentation, between say 1955 and 1975, with the exception of Eric Lyons’ Span housing, architects found fertile ground in public sector – local authority – commissions. It is only now, with loads of government encouragement, that major developers are beginning to sponsor new ideas in design, in higher density, ‘joined up’ housing.

And this must be the right time to do it. The narrow frontage English Terrace House has not developed much in form, but a lot in style, since the end of the eighteenth century. Terrace houses became much bigger in the nineteenth century and this made them infinitely flexible for metamorphosing into all manner of subdivisions, original additions and adaptations. But what is still left to be ‘gentrified’ of that vast reservoir of second-hand space is often in urban areas in which many parents would not wish to bring up their children.

Buschow Henley’s winning design for St Mary’s Island (arq 5/3, pp229–247); is not a rural nor even a suburban model for family housing, but an attempt to create an urban neighbourhood with a real sense of place, the objective of many post-war new towns.

In his review of this scheme (arq 5/4, pp301–303), Bill Ungless singles out for scrutiny two of the five house types that are proposed, leaving aside the apartment blocks which are not illustrated in enough detail for comment. Of these five, one is a perfectly straightforward pair of semi-detached houses with a
wide frontage suggestive of low-density suburban housing. The other four contribute towards what the designers claim to be an overall density of 15 dwellings per acre. This is in itself a modest target when you remember that many streets of Victorian terrace houses achieved twice that density, each house having a small private garden.

Between them these four new house types have no private outside space at ground level, relying instead on roof terraces of which some houses have two, and some none at all [2]. Granted that shared gardens sometimes have more to offer households with children than minuscule individual plots, even so many of the houses in this layout appear not to have access to a shared garden. Looking at the internal plans, Bill Ungless already commented in his review on the ‘nugatory’ (meaning worthless) amounts of storage space. Although it is hard to tell from very small-scale drawings, there does not seem to be much living space either. Several of the three bedroom houses have awkward, triple functional kitchen, dining, living spaces [3], hardly conducive to multi-generational living, with two small private terraces situated on a different floor altogether. One back-to-back terraced house type is built bridging over an entirely covered service road, surely an expensive form, especially when combined with roof terraces on two levels as a substitute for private open space at ground level [4].

This winning competition entry demonstrates that developers and architects are moving into brave new territory. It is therefore all the more important to ensure that what the design professions create will move towards classic solutions for twentieth-century family living, solutions offering an enviable quality of life at higher densities. This will encourage new generations of housebuyers and developers to be less profligate in the use of land.

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Education: the quantity of quality

Well, I wasn’t putting down the incredible success of architectural education at attracting students [arq 5/2, p198]. Not at all. What amused me about Duany’s rightist discriminations [arq 5/2, pp105–106] is their humour and empirical accuracy. A rare ingredient in so much architectural criticism and discussion. Does the left make jokes that make the right laugh? That seems a rather last-century issue.
I know that Helen Mallinson (arq 5/3, pp293–394) is deeply committed to promoting responsible and delightful criteria for architectural education. And I share that commitment. So who does she consider is describing the admirable range of issues at the end of her letter as ‘intrinsically boring’? Is it the ‘management sodden culture’ that flattens all endeavour into a tediously predictable series of ‘outcomes’?

Finally, there is a sharp debate to discuss what happens when avant-garde explorations become widely popular. Is there a change of values? Who is mapping these with respect and discrimination? This issue seems much more acutely debated in the arts world than the architectural. As van Eyck said at the RIBA Gold Medal address, the issue is not quality versus quantity but those aspects which are responsible and delightful criteria for architectural education. And I share that commitment. So who does she consider is describing the admirable range of issues at the end of her letter as ‘intrinsically boring’? Is it the ‘management sodden culture’ that flattens all endeavour into a tediously predictable series of ‘outcomes’?

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Knight and Stiny: a valuable review...

Knight and Stiny’s paper ‘Classical and non-classical computation’ (arq 5/4, pp355–372) is a most valuable review of recent work in shape computation but also raises a number of concepts of value in architectural education. One of the problems faced by a ‘learner designer’ is the development of an effective ‘design process’. The ways in which a designer represents form in order to deal with it during design are not necessarily apparent in the final design, or in the resulting building: it is in design development that these representations and operations become explicit and the processes of composition become transparent. Since architectural computing makes explicit the structuring and ordering logic inherent in formal models and makes transparent the operations upon objects which result in designs, the computer provides a unique environment in which to explore the principles of design.

Libeskind (in Countersign – London: Academy Editions Architectural Monograph no 16, 1991) elaborates on how drawings have assumed the identity of signs. They may be considered to have an existence of their own. Indeed they may be seen as the major output of architectural design. Question: What do Architects do? Answer: Produce drawings – buildings are produced by builders. Once the idea of a drawing as an instruction for building is dispensed with, drawings may be seen as a coherent formal system in themselves. There is a historical tradition in architecture whereby drawings (as well as other forms of communication) signify more than can be embodied in stabilized frameworks of objectifiable data. If we can go beyond the material carrier (sign) into the internal reality of a drawing, the reduction of representation to a formal system – seeming at first void and useless – begins to appear as an extension of reality which is quite natural. The system ceases to be perceived as a prop whose coherence is supported by empty symbols, and reveals a structure whose manifestation is only mediated by symbolism.

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... mute on areas of design ...

Terry Knight and George Stiny’s paper on classical and non-classical computation (arq 5/4, pp355–372) reminds us that shape grammars have been around for 25 years. Both Knight and Stiny are to be congratulated on developing and sustaining the research paradigm to the quarter century mark. Computing about shapes has certainly been influential among those who think that theories of design and theories of computation have something to offer each other, or may in fact be the same thing.

The article discusses shape grammar theory in the context of other techniques, as an example of non-classical representation and classical process. I take non-classical representation to refer to ambiguous representations: lines on a drawing that can be interpreted as part of an abstract geometrical outline at one moment, a change in floor level the next. Classical process is about the application of clear rules. Non-classical process seems to pertain to stochastic technique, the use of very simple computations carried out over a vast number of iterations using controlled randomness to both ‘learn’ from examples and to generate new solutions. The scrutiny of a stochastic process provides nothing in terms of explanation, whereas a classical process, as in the iteration through a well-defined grammar, opens the outcome to scrutiny. The distinction here mirrors that between connectionist (neural networks) and symbolic artificial intelligence (AI) techniques.

In their discussion the authors are careful not to say that shape grammars and design are the same thing, though aligning the technique with Schon’s concepts of ‘back talk and reflective interaction with the stuff of design’ suggests such an ambitious claim. Presumably full-on design, as practised, has the character of being ambiguous and stochastic, non-classical in every sense. By the authors’ admission, the example given in the 4th quadrant (non-classical representation and process) of ‘shape annealing’ denies the procedural and explanatory power of the shape grammar formalism. There is no guaranteeing that the design is well formed, that it conforms to a grammar. I take it then that in so far as we wish to regard design as a computational exercise, shape grammars fail to address the 4th quadrant. The shape grammar formalism is not really a candidate for explaining ‘creative behaviour’.

Within the theoretical frame the authors set up in this article, it is worth asking how shape grammars account for the inventiveness of the students responsible for the designs in figures 17 to 19[5–7]. What are the rules by which the designers translate and fudge the shape rules to produce highly plausible architectural models and drawings? If the designs are indeed architecture then what are the rules by which the designers took account of context, appropriateness of form to site, translated the wishes of the teachers into diagrams and models, i.e. resolved the micro-politics of the studio? The obvious answer from the paper is that such considerations reside with the opaque mysteries of non-classical process. It is a pity that shape grammars are so mute on the areas of design that designers find most interesting.

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... a useful road map ...

It is a great pleasure to see in print this paper by Knight and Stiny (arq 5/4, pp 355–372), who have been collaborating for many years, Stiny predominantly as a theoretician, and Knight as a design teacher. Despite their close association, they have rarely published together, and it was something of a landmark when they gave a joint keynote speech, received with great warmth, to the conference in Greenwich in January 2000. The field in which they engage has grown rapidly, and few can be better placed to review its achievements, and establish a basic taxonomy to classify existing work, and map areas for further research.

A reader new to Knight and Stiny’s approach to computation will find much that is novel. We live in a world that surrounds us with computers, and our understanding of their somewhat limited role in design is conditioned by what they currently achieve. Knight and Stiny’s conception is much broader than that, and offers much more to design, as it is by no means essential that computation is performed by computers. They include the human processes of thinking or acting or doing in a systematic manner – an approach that can offer obvious benefits in design, particularly to those learning about design. The broad view of computation allows us to re-appraise the role of our desktop machines, in much the same way that the broad view of shape grammar enables us to see how prosaic are the manipulations of shape and line provided by CAD software.

As good taxonomists, Knight and Stiny do not place value on the categories they are defining. It is left to the reader to decide the relevance and usefulness of the work described. For each reader this will be different, but here I would like to select those that I value in the context of learning how to design. However, I would first like to dwell on a concept that is central to any notion of algorithmic or computational thinking about design: that of the role of rules.

To most in our society, a rule is something set by someone – ‘them’ – which must either be obeyed or wilfully ignored. Rules and regulations represent restrictions of some sort on our activities, alien to the freedom needed for creativity. It is perhaps also permissible to suggest that architects are somewhat apprehensive about technology. There is still some fear about computers in design, which can only be exacerbated by embedding rules in the machine.

We may be a little surprised, given this background, at the assertion that rules and computation can assist creativity rather than stifle it. Yet it is precisely this notion that is central to the taxonomy that Knight and Stiny define in this paper. It is also central to their individual contributions to the field of computation in architecture. In their case, the rules aid creativity because they are written not by an anonymous inhibitor of freedom, but by the designer herself. The process of rule creation becomes one of using a different, possibly more formal, language to codify the design during a particular phase of its development. The writing of the rules becomes one of the transformations the design undergoes, and the clarity of thought this demands can aid creativity. This concept of ‘freedom through rules’ requires a view of rules that is as fresh as the view of shapes required to understand shape grammar. If you look in a new way you can see more than you ever thought possible.

Clearly, in the taxonomy of computation, the procedure of rule-writing varies. The particular representation of the rules, whether non-classical or classical, influences the ease with which the rule can be written by a designer –...
The classical non-classical divide of process is less balanced, however. A classical process, explicit in every step, offers much to the designer wishing to consider every move she makes through its formalization. The non-classical process describes only the final outcome, with the journey to reach the final goal unconsidered. With non-classical processes there is no possibility of learning about your design thinking as you write the rules. The quotation from Marvin Minsky (p357), about the use of neural nets to increase insight into human cognitive function, can be applied equally well to the use of genetic algorithms in architectural design: there are those for whom the automatic creation of endless variations of form is appealing. But is it design?

Interestingly, the early application of shape grammars shows some confusion between rules written by the designer and rules written by others. Initially shape grammars were applied as a means of first characterizing and then proposing novel designs ‘in the manner’ of a particular architect. The authors of a shape grammar undoubtedly went through a learning process, but little attention was paid to its significance. It was further denied through the promotion of the grammar for use by others in ‘design’. What had been a process of discovery for the original authors then became a process of restriction for the users. Knight’s work with students both at UCLA and more recently at MIT does much to redress the balance in the use of shape grammar in this regard.

I would argue that three of the four divisions in Knight and Stiny’s taxonomy offer interesting possibilities and fresh ideas for design and the role of computation. Perhaps more importantly they offer a great deal to the ‘learner designer’ who struggles to develop her own design process without yet fully understanding what such a process involves. The fourth division, that of non-classical representation, non-classical process is necessarily part of the taxonomy though I would consider it to have less relevance for meaningful design. There are many I know who would—and have—argued in favour of automation in design even when the generative part is not explicitly defined by the designer. Yet I remain convinced that design is about having control over the things that you design: at best the genetic algorithm can throw forward suggestive ideas. But to take these shapes as the final form, or to attempt to apply some necessarily simplistic function to permit the software to come up with an ‘ideal’ solution moves the definition of design away from that loved by architects, where nothing is predetermined, and towards that of engineers, whose dependence on numbers more readily permits predefinition of criteria and optimized solutions. But there is a difference here in both the definition and process of design.

This paper, and the conference at which it was first presented, occurred at a cusp of the curve relating computation to architectural design. Once the realm of dedicated specialists, this field is now experiencing a boom in popularity. The standing-room-only crowd at the RIBA Futures conference on Digital Tectonics in Bath at the beginning of March this year bore witness to this interest. The taxonomy laid out in this paper will provide a useful roadmap for the understanding of this exciting field and its role in architecture and design. Megan Yakeley

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... part of which deserves a closer look

It is refreshing to see yet another take on shape grammars and their representations from Knight and Stiny [arq 5/4, pp353–372], in particular, the distinction made between process and representation, thus facilitating further categorization of a variety of generative design paradigms. The term ‘shape grammar’ as used here refers to very specific representations of shape and computational processes and is often misused. A brief web search turns up many references to shape grammars. Some are unrelated to the work described here; others reference the shape grammarians but describe paradigms which are either not grammars or utilize different representations of shape.

The classical concept of a grammar as a rewriting system capible of generation or explanation is fairly easy to comprehend, but the non-classical representations of shape described here (descriptions that facilitate the emergence of embedded subshapes through computation) are difficult to understand and often misrepresented. The difficulty in developing computer implementations using these non-classical representations leads many to abandon them for classical ones more amenable to implementation with the computer technology currently available.

Non-classical representations can be considered holistic: a shape can be subdivided in an infinite number of ways. Classical representations correspond to a reductionist view of the world, i.e. a ‘kit of parts’ or atomic approach to design, in which the number of possible combinations of parts may be large but enumerable (see my 1997 paper, ‘Logic Based Design Modelling With Shape Algebras’, Automation in Construction 6:4, 311–322). As requirements change, a reductionist approach may require the complete replacement of a vocabulary of parts to allow future desirable, but unanticipated forms and structures. Non-classical representations, while admittedly unable to take into account every possibility, do provide more scope in their potential for emergence, and thus deserve a closer look.

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