TRIAL AND ERROR

Kester Rattenbury

I have nothing to do with construction sites. I haven't worked on one for thirty years; and Pietro Valle, editor of this "on-site" issue, knows it. Obviously, there are construction sites and construction sites, but I'm deeply suspicious of the metaphorical ones. But the residual trained architect in me impels me to improvise with the material and conditions which I have available. To make something, anyway.

Which is really, what this article is about: our subconscious and under-rated core architectural skills of improvisation. And about a curious thing I noticed in my last two years as a very long-established teacher of architecture, in one of the UK's leading schools[1]. A peculiar, core anomaly between the way that we are supposed to design, practice, and teach, and the way that we actually do it.

This is, it seems to me, is essentially about risk. We, as architects (which I'm not) and teachers of architecture (which I am) are supposed to do everything we can to minimise it; to cut it out. To make our design, our drawings, our teaching, and, of course our building sites, as utterly predictable as possible.

And yet, perversely, as teachers (at least in schools like mine[2]) we deliberately structure risk in to our student design projects, at all levels and to an astonishing degree. We write in new, extreme, untested criteria every year, and we issue them to new and unknown students, to the extent to which we don't, *can't* know, what our teaching outcomes will be.

Which is far from being as reckless as it seems. Because though we don't usually express it as such, one

next page
Ruby Ray Penny, 2014
Image directed by I Ching. Photograph of self as child (1:1) and thrown paint.

of the key things we are doing, in our immersive education of new designers, is teaching people to improvise, productively and well, and in detailed, complex, developed form, given unpredicted variables. To work actively with situations which are inherently *not* predictable.

Like those on site, for instance, where so many complicated, inter-related things turn out to be not as predicted. Where the budget may change, or the site, or the brief. Where site conditions, structural or material defects, manufacturers, contractors, wars, strikes, economic crises, or new legislation kick the project way off course; requiring a rethink at all levels, from the setting-out to the ironmongery schedule.

Professional legislation of all kinds increasingly tries to nail down every circumstance of building and teaching. But real architectural conditions are *always* non-standard. They *always* have vast numbers of variables — practical, aesthetic, human, chronological, economic: you name it — shifting in relation to each other all the time.

And in the very bizarre fictional student project briefs we invent (and re-invent) every year, perhaps we are - more subconsciously than deliberately — teaching people to work, creatively and well, with this pretty well limitless range of unpredictable conditions. To make something good, something in some way coherent, intelligent, enjoyable, *better*, out of a seething concatination of unreliable circumstances. To do something which is, in fact, *always* a kind of prototype; *always* a kind of experiment; *inherently* risky. To design, that is.

Ruby Ray Penny,
2014
Alphabet using two hands, ink and blowing.

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My take on this anomaly came from two things. First was our teaching studio, DS 15,'s latest student project. It was my teaching partner Sean Griffiths[3] ' idea to use tactics of random compositional choices, generated by the ancient Chinese Book of Changes, the *I-Ching* — in the way the musician John Cage used it to compose his famous pieces — thus setting up a peculiarly left-field *architectural* project, driven 'entirely' by chance.[4]

My interpretation (Sean's would naturally diverge) came partly from my coincidental involvement, over the same period, with the innovative *RMIT/Adapt-r PhD by Practice programme*, where eminent architectural and design practitioners explore, describe, test and improve their own design, in practice, to the level of a PhD, building up an individual and collective contribution to our almost uncharted knowledge about how we really *do* design[5].

Design is a peculiar skill set: highly sophisticated, powerful, widely used, rarely explained or even understood. And design teaching is a really major part of this surprisingly uncharted territory[6]. Indeed, it is a core aspect: where we start developing, and how we pass on, our powerful, rarely defined sense of what architecture is, how we produce it and appraise it.

The last few decades of architectural research, have tended to be framed through *theory*, rather than describing what we actually *do*. So recent architectural writings have addressed the contrast between the "perfect" building ideal and the contingent realities of real architecture on site — in a more or less theoretical

way[7]. My interpretation came accidentally, from trying to describe what we were actually *doing*, as teachers — and noticing parallels in the *RMIT/ADAPT-r's* unusually honest, analytic — and *not* artificially perfect — investigation of their own *real* work in progress.
Our reticence about our risky abilities may be an inherent part of our tacit and unexpressed design abilities. But surely it's also because the legal, economic and insurance requirements of our various professional commitments *demand* reticence. As Tom Holbrook of 5th Studio recently said (in the last PRS discussion), we spend our time having to pretend to have absolute certainty about extremely uncertain things. "That discussion, about risk and doubt, is being constantly erased"[8].
I'd noticed that too. As our students' unexpected, "purely by chance" work developed, it became clear that they were using core, largely undescribed architectural skills. The ability to improvise, to work with what we've got. To deal with unforeseen, unforeseeable circumstances: exactly those skills which are essential on site. Bizarrely, the value of those practical, little described skills became clearest in what seemed like the most esoteric and unrealistic student briefs we've ever set.

Ricardas Blazukas, 2014
Design studio 15, ceramic sign.

Thus suggesting that we have, perhaps subconsciously, come to set such peculiar teaching projects *precisely* to deal with a critical aspect of professional practice - which our industries don't otherwise encourage us to discuss.

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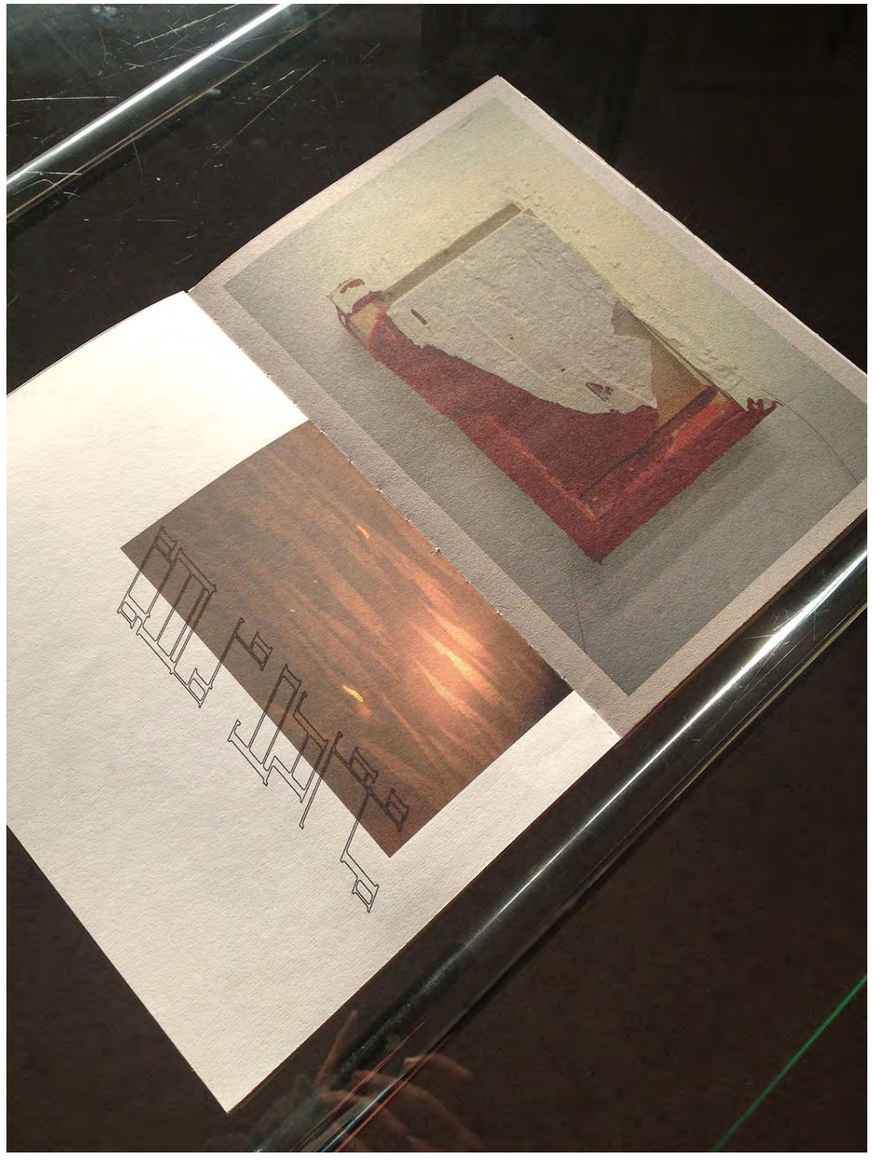
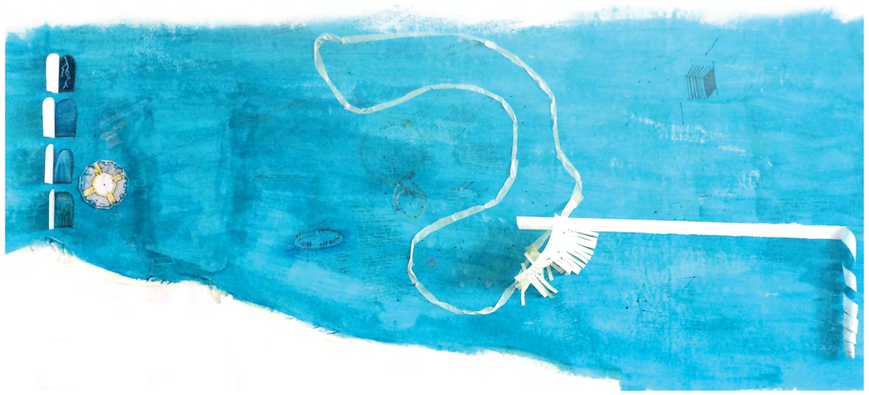
It's refreshing writing for a non-UK publication, because the weird things we take for granted really do



Michael Perkins, 2014
Extended portfolio, first semester.



Simona Cojocaru, 2015
Lost map of programme.

need explaining. Teaching studio is the core of the odd, sophisticated and largely unexplained design education of architecture schools like ours — fairly typical for London and other major urbanised, really diverse, English-speaking zones — where we put our main educational emphasis on the design *project,* an imaginary, unreal, often bizarre form of projective thinking[9].

These projects are developed, individually, by the student, from a loose, demanding, polemical brief set by the tutors; and they result in the "design" of something, called a project: usually, but not necessarily, an imaginary building; usually, but not necessarily, on a real site; typically with more or less stringent technical requirements; and varying from the fairly realistic to the most extreme forms of science fiction[10] or conceptual art.

This is *always* a kind of unpredictable experiment. The briefs often challenge aspects of current professional thinking, and more or less form part of the tutors' "research" experiments in design. We call the teaching studio a laboratory for the profession, and we mean it.

But setting experiments as the core part of your professional training sounds terribly risky. Unless of course, it is the *approach* to such an unpredictable world that you are teaching.

The characteristics of these projects are so complicated, familiar and varied that it's hard to know where to start (or stop) describing them. It's currently normal practice in schools like ours, to teach in Studios or Units which set entirely their own briefs. These are usually led by two tutors, (practicing architects; other designers; academics)[11], with inevitable debates and arguments between them. Interestingly, this conforms with research[12] where creative design is actively helped by the individual's ability to define their own position in relation to *two* other people's views. But so far as I know, teaching pairs is a formula which has evolved through trial and error.

As has almost everything else. Vertical studios - that is, different years of the same course, taught together, on the same brief, at different official levels - breaks all sorts of academic norms. But it works incredibly effectively, because this type of teaching is *not* through acquiring ability in a given syllabus or explicit skill set, but by doing unknown design experiments, and assessing and improving the results. So design — perhaps a strange vernacular variant of the scientific method — is fundamentally learned by doing (*curated* doing); watching others do it, and seeing yourself how to distinguish what works from what doesn't. Attending and participating in the feedback is how students — *and* staff — learn.[13]

There are all kinds of other evolving characteristics and tropes of the student projects, which are almost never explained or discussed.[14] Typically, our briefs in Westminster now last a whole academic year.[15] Briefs

of different groups vary widely, for instance in driving interests in programme, theory, site, representation, technology, strategy, aesthetics, social matters. Exercises, experiments or "research" at the early stage are set up to generative speculative making; often with emphasis on special forms of representation.[16] Feedback and further references come through tutorials and pin-up crits, and might include buildings, places, books, movies, art works, political movements, other types of representation or theory. Moreover, a highly visible (but usually tacit) group dynamic and *collective* direction of the students' work means tutors have to adjust or redirect the brief, issuing new criteria, tasks and exercises, making specific drawing/representation requirements, as the project goes along.

At some point, any successful student's individual work takes on its own internal coherence; its own credibility, as a proposal, as a fiction, as an exploration, as a body of work, with some kind of relationship to the built world. It becomes what we can, somehow, *agree* is a project. We are often asked how we manage to cross-mark such different studio work. But the answer is that it's fairly easy — assessing the value, complexity, development, coherence, clarity and resolution of any body of work is exactly the shared ability we are teaching. It's no wonder architects often end up married to each other; almost no-one else can understand what they're talking about.

Simona Cojocaru, 2015
Technical drawing, 'pet/monster'.

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I've been teaching with Sean, on and off (mainly on) for twenty-odd years; from before FAT's first publication through their spilt at the end of 2013 into three different practices, with Sean rebranding himself as an architect-artist. There are always repercussions (or projections) in a studio' work of what their teachers are doing in practice. That's a reason why practitioners — especially working designers — are highly valued teachers. And it's *reciprocal* nature, — its use for the *practitioner*, is why so many continue teaching — not a lucrative business in the UK.

Our path at Westminster has therefore taken some swerves. Early on, we did a lot of work on master-planning (for practical and polemical reasons). This

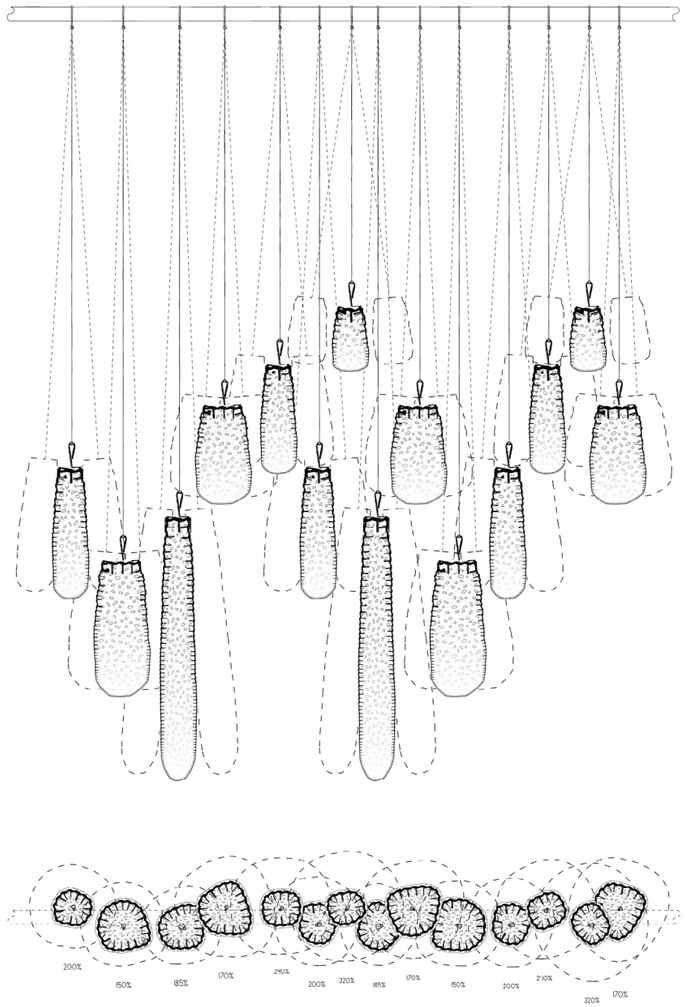
gradually extended into a non-digital exploration of Sean's interest in Platonic geometry. Naturally, this developed to explore Utopias. Our last project was a particularly challenging juxtaposition of this with my own conviction that environmental issues should be tackled, more laterally, and from a smaller scale outwards. The project worked from the smallest behaviour-changing components (derived from the past: canopy beds, bath-houses) outwards, to a radical retrofit of Rome's great ruins. It was so successful (Sean argued) it couldn't possibly be repeated.

Sean's new enthusiasm for Cage's use of the *I-Ching* as a tool for generating randomised, compositions was our biggest swerve yet. Cage did it by setting various criteria (note, duration, etc) and then tossing coins and consulting the book's hexagrams, to decide the notes, silences, periods and durations of the composition — most famously Music of Changes " A *mistake* is beside the point, for once something has happened, it authentically is" said Cage.[17] Mistakes in architecture are a much riskier area, of course.

We didn't really know what our students would do, because they hadn't done it yet. To a certain extent, you *never* know what you're expecting from a student project. There's a risk implicit in all design projects, which never fits comfortably in academic predictive learning criteria — any more than it would in our rules about the construction of real buildings. And yet that projective, complex ingenuity — the ability to work through any bizarre circumstance in detail, a kind of creative futurology, is just what we teach. An approach to creatively managing mistakes, flukes and other realities.

The *I-Ching* process was astonishing — producing, almost immediately, a kind of *Arte Povera* factory of work which students had (partly randomly) instructed themselves to do: get up in the middle of the night and do a drawing with their left hand for three and a half minutes; build everything in clay and fire it in random Pantone colours; draw on a laptop while riding a bicycle; dip a drawing in plaster, dribble wax; build from the leftovers. Or, of course, leave the paper blank.

It seemed like we might be removing ourselves — our choices and tastes — from the equation. Of course,



Liam Atkins,
2015
Technical drawing, sensory satellites.

we weren't. At all stages, we and the students intervened — discussing the questions, deciding how to use the *I-Ching*. Quickly, the students learned that if they thought something particularly bad, we would welcome it with glee. In retrospect, it was natural that a mass of *Arte Povera*, type work would arise from a process using such methods, freely available materials, tutors who had a taste for that kind of work anyway (however different to the year before). In retrospect, we were always curating their experiment — a hidden

Molly de Courcy Wheeler,
2015
Wax shingles.

core of design teaching — and showing them how to do it themselves.

Sean kept thinking we would get stopped by some academic process, crit, colleague or line manager. But it never happened, and as the process continued, I became intrigued by how *typical* this all was of our student projects. In fact, my main concern about the project was how to stop it becoming too intensely normative.

Because it seemed that this wilfuly randomised process was a kind of x-ray of *all* the student projects which were going on in our University; city; culture. The students had — *as usual* — done a series of bizarre experiments, set by the tutors. They had presented and discussed them, learned to recognise values in the work. They had to repeat, develop, test, combine them; working in different kinds of media, at different sizes or scales. They had to use their skills of recognition, criticism, post-rationalisation; discovering connections between originally random bits of work and using them to make further decisions and development[18] They had to develop, assemble, improve, refine, draw, model, re-draw, work out technical details and deliver strategic reports. To post-rationalise everything as though it *were* some kind of building project – even though of course it was not. We were teaching them how to improvise, assemble this nebulous, crucial entity, the design project, the qualitative, coherent, legible thing which made buildings architecture – out of whatever came to hand.

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Our first year was something of a white-knuckle-ride for the brave students, who signed up two deep. The

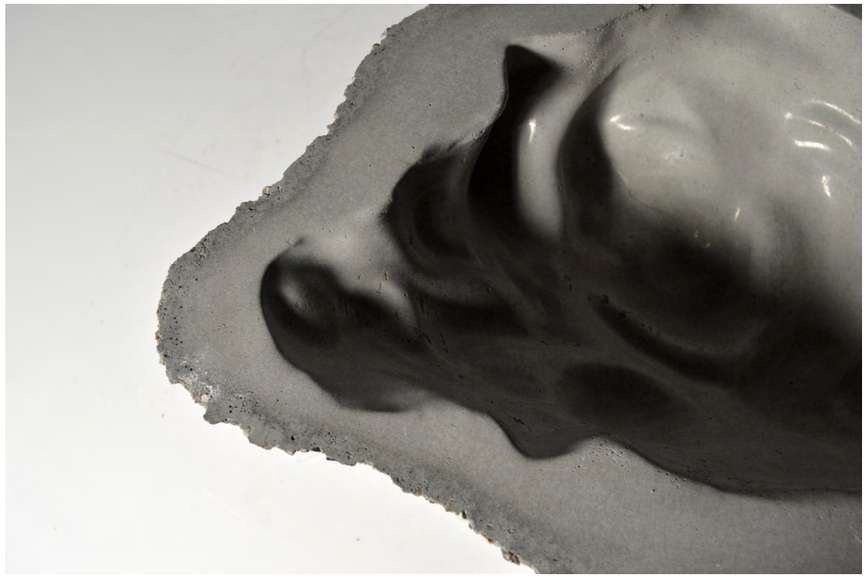
first pieces of work were great – giant doodles; strange notational systems, soundscapes, peculiar process inventions; wax, dipped paint, two-handed drawings, glazed clay, dribbled latex; drawings done by toy insects — often making stunningly convincing installations.

Sean loved the first bit of the process and would happily have stayed there all year; asserting (in his new role as architect-artist) the unarguable thing-in-itself-iness of the work. Which was fundamentally true. But I became increasingly gripped by the *problem* question of how you make all this experimentation turn into a building. Or better still, into some deeper interpretation of related possibilities: a *project*.

That's the real crunch: "turn it into" a building — that most classically difficult bit of any student project (unless they just shunt down the experiment-means-funny-shape line, which has its merits, but is wildly overused). This bit is next-to-impossible for the young students — and problematically easy for the teachers, who all too easily see former architectural models in unfamiliar territories.[19] It was made harder by our insistence on the real qualities of all the mad stuff: the masking paper columns, the wax screens, the dribbled paint. But addressing that problem meant *learning.*

First, there was the big mid-year struggle to put together intelligent portfolio when from a random collection of strange, glorious or problem objects or drawings and some photos and drawings of Marrakech (the "site" in our first year). To assemble images in such a way as to allow viewer and *student* to see new possibilities — to sort of *guess* what they might be used for.

There were some great portfolio successes — typically art-catalogue type juxtapositions, with suggestions of a design direction. There was one astounding in-



novation: a folio-maze which folded in endless directions, with randomised readings of overlays and cut-outs of found and made images, previewing an as yet unreal urban reality. And one honorable near-failure (everything stuffed in a suitcase). We'd asked for it, our colleagues said.

These odd folios, too seemed a magnification of what we do *normally*. They showed how critical post-rationalisation is, in assessing and developing a project. That we teach how to recognise, react to unexpected qualities of their own work, in relation to *real* found circumstances, and to develop from it: not through the ruthless projection of whatever idea they had it the first place, but by a highly varied assessment of whatever that had (perhaps accidentally) found and made.

So those bizarre extremes — the masking paper columns, the wax screens, the dribbled paint, made the student discussions of their own work better than I have ever known, in 25 years of teaching. The real crunch of the technical and strategic reports was perhaps more intense than ever, but it forced the students to ask what on earth it means to try to do technical or

Miranda Hammond
Concrete basin made using vacuum formed acrylic mould.

James John Clifford Rogers, 2015
First semester folio submission: painting on 40 bedsheets.

presentation drawings, as a student in a school of architecture, about an unreal project, when the project was generated partly by random circumstance, and would inevitably change on site (as building do).
It made them actively, individually question how on earth this related to 'real' construction. To discuss how such a building might be set out on site. To discuss the values of a wax wall, in a place where the temperature reached 40 deg in summer — (a mad proposal, sure, but a visiting movie Art Director and an environmental engineer both saw real possibilities in it). It made us readily discuss how long a building project might last; how the programme might be interfered with by strike or flood or earthquake, or arguments on site. Or how might be changed by being built under a different kind of contract, or in a different material. About far more real stuff than usual.
It meant we naturally started discussing the peculiar notion of a perfect set of drawings as the architectural ideal. It meant we naturally started talking about what really happens on site; how far the predicted, risk-averse projects would inevitably go off the rails and change the project. Because the problems we were facing were surprisingly like real life.

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I am touching wood now, because in some ways this second project, — a film school in the cave-city of Matera — is even riskier than last year's, closer to the mainframe of studio teaching. We shunted the *building* part earlier, to make sure they had longer on the technical aspects of the work — I'm not saying we've sorted it; I'm saying we try; we adjust.[20] The students haven't finished yet, (naturally some are doing better than others), and the technical and strategic reports, separately marked and taught — and often divisive — haven't been marked yet. Some students (as usual) have chickened out and worked out completely different, much easier structural problems. But some have really gone for the main issues and tried to work it out. And boy, do they look interesting.
And strangely close to architectural life.[21] Not as it is usually published, with the risk hidden away, but as it

is forensically explored at the PRS. Alice Casey of the wonderful TAKA architects in Dublin made a brilliant presentation on concrete

"Concrete, unlike many other construction practices, is a dark art. Technical literature tends to be dense and difficult to penetrate. More than any other building material, the quality of the final product is dependent on site specific or temporal factors. Unlike other building materials, the qualities to which an Architect pays attention – colour, texture, form, finish, detail – are almost impossible to establish prior to making. In a process in which off-site standardisation does not really exist, control of on-site making is the only mechanism to achieve a desired result."

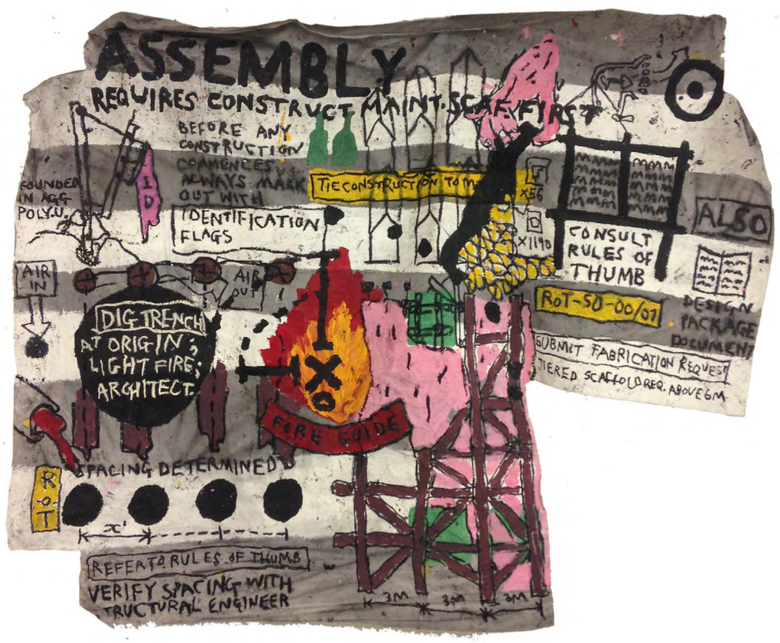
"By their nature each site is different — contractors have varying skills and knowledge, suppliers change, weather and temperature are unreliable, forms vary between projects. To add further pressure, the making of concrete is unwieldy, time-consuming and expensive. Concrete must be right first time."

"...in a process which is inherently out of our control, how to we exert control?"

"...Be wilfully naive."[22]

Casey's report was in some ways spookily close to the most extreme of all our *Monster Factory* projects; a second year, James John Clifford Rogers. His experiments in structural uses of insulation foam, provisionally reconceived as part-randomised *bad building system* where chance components were tested to destruction. A deliberately primitive project — producing experimental open caves heated only by ruthlessly managed open fires; he aimed consciously to test our strange teaching process to the limits (he claims he wants a mark of either 85 or 38 — very high pass, or fail). His first semester folio was delivered as a vast carpet-roll of about 40 bedsheets covered in paintings in the manner of late Philip Guston; his technical report ruthlessly coded the now 200 large paintings and troubling prototypes of which it was made.

Casey's exquisite, high-code hardline architectural drawings could hardly have looked more different; nor TAKA's tightly controlled architectural richness from Rogers' polemically gruesome work. But there were odd overlaps. Both used real "script" of discussions with contractors (in Taka's case a real firm, in Rogers'



James John Clifford Rogers, 2015
Assembly painting (bedsheets, 1/200), technical report.

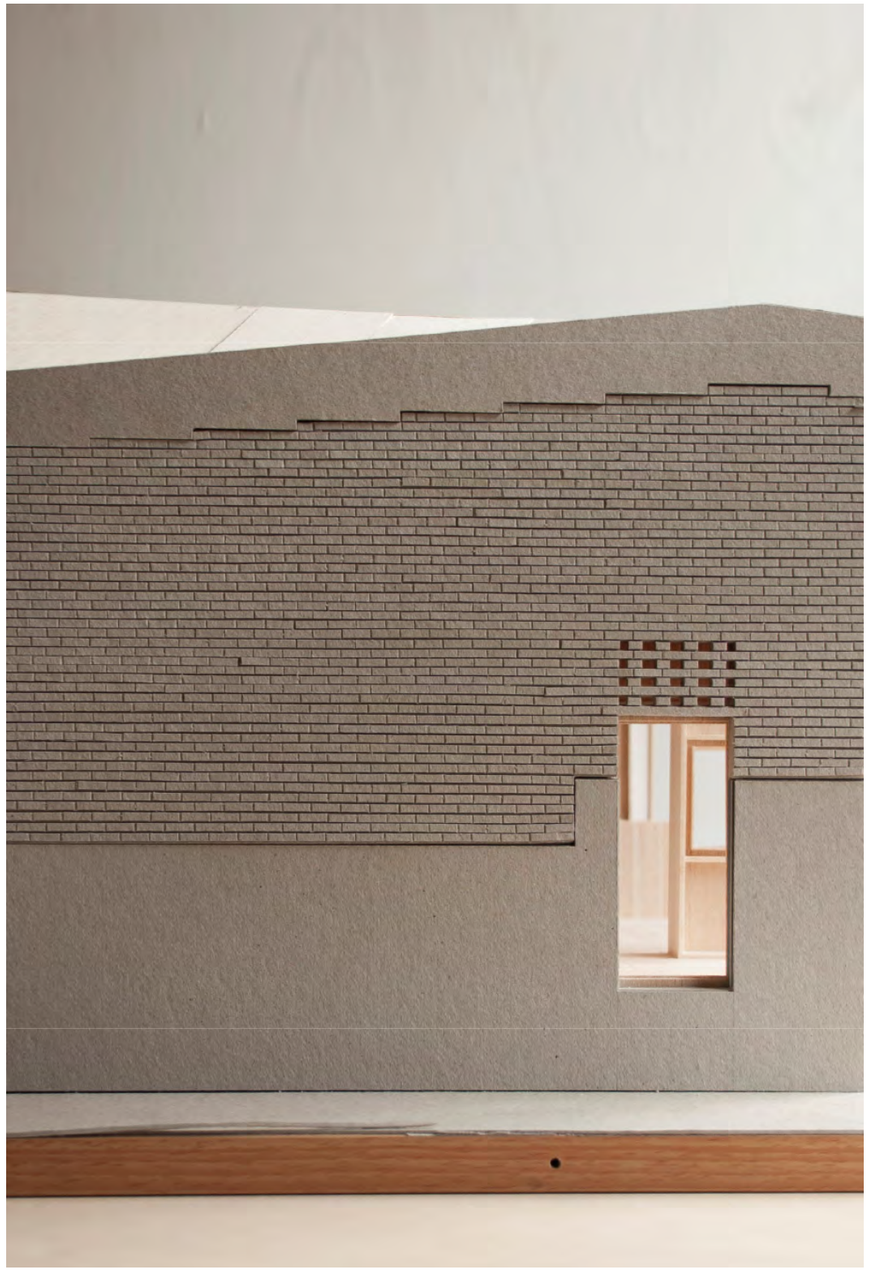
one of the workshop technicians mending a broken insulation foam joint with steel strip). Both described the struggle to achieve perversely engaging outcomes. Both were wilfuly inventing against the norm. Both documented technically based arguments, which are normally concealed. Both expose the real risks and experiments of architectural work.

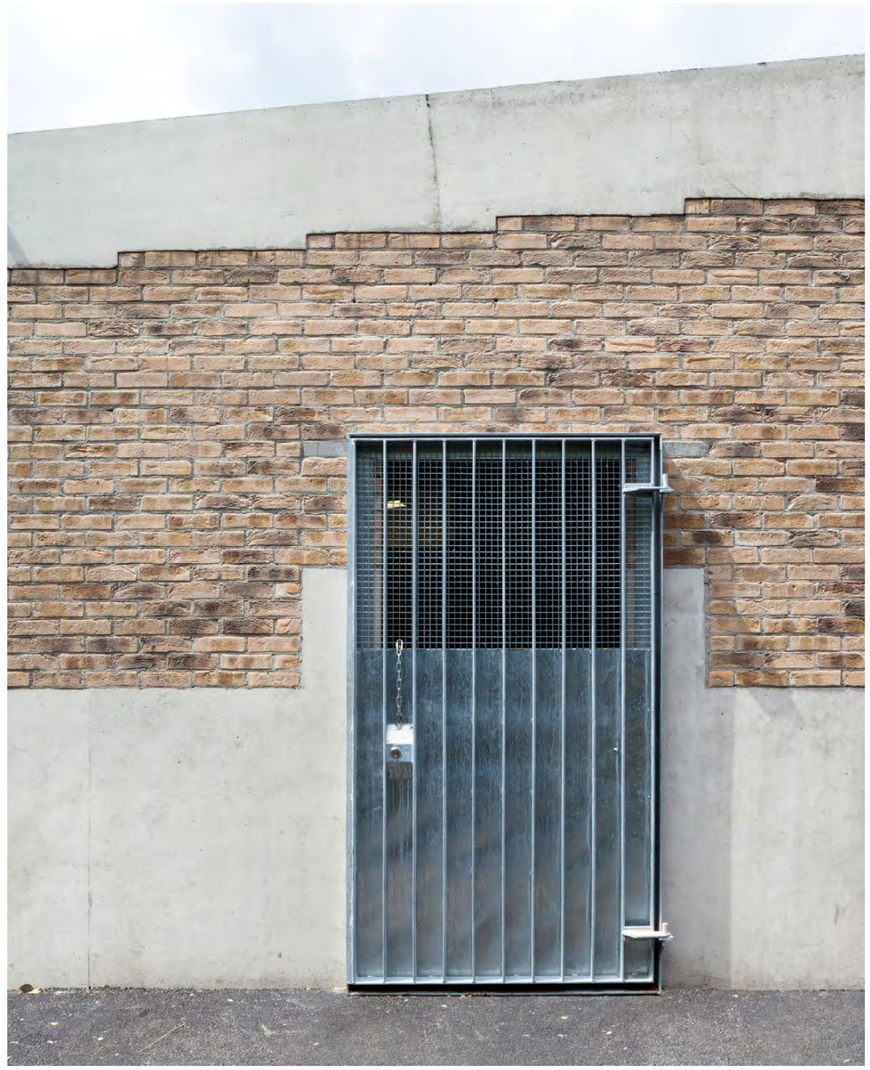
Of course, this argument is self-defining. If you look for similar patterns, you'll find them. Maybe that's what architectural thinking does. It makes you see relationships between very different things, and work projectively from them, to make something new.

So here's my own proposal (which turns out to be a sort of amateur neuroscience). That our wilfuly weird teaching, our deliberate defamiliarisation makes it clearer that we are teaching (almost subconsciously) almost subconscious skills. That our assessment and discussion, our drawings and crits of these curious projects teach some of what architects will actually have to do, in entirely unknown circumstances, to make a building have the coherence and quality, the spatial and material sense, the functional beauties that we call architecture. That this projective improvisation skill: observing, describing, making, assessing, rejecting, assembling, connecting, changing, testing, selecting, reworking, improving is one of our core skills.

To work projectively. To conceptualise something from unknown variables. To work through trial and error.

Alice Casey, TAKA Architects How to make beautiful concrete: where it went wrong (left) and right (right) (ADAPT-r presentation, PRS4, Ghent 2015. See ADAPT-r disclaimer).





Alice Casey, TAKA architects
How to make beautiful concrete: Succeeding at being wilfully naive. Merrion Cricket Club design model and final building. (ADAPT-r presentation, PRS4, Ghent 2015. See ADAPT-r disclaimer.

1.
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2.
I have come to characterise schools of architecture (within my local UK experience) as being either "Canon" or "Monster Factory " types. The Canon (Cambridge &c) emphasise a shared and continued tradition. The Monster Factory (Westminster, Bartlett, AA &c) emphasise experiment and innovation in each new project. But these are corollaries - opposite views of the same model. Both use references and innovate from them, though the type, range and nature of the references and the degree of hybridisation vary, and they share common tactics and methods. "Monster Factory" is a name adopted from David Greene, a founder of Archigram and former Professor and colleague at Westminster.

3.
Founder of FAT, Sean Griffiths Modern Architect, and Professor.

4.
The student blog is designstudiofifteen.wordpress.com.

5.
Developed by RMIT and extended through the European *ADAPT-r* partnership of European Universities. Accounts of this can be found by Richard Blythe and Leon van Schaik in, *Design Research in Architecture: An Overview*, Murray Fraser, Ashgate 2014; Leon van Schaik in *Mastering Architecture*, *Becoming a Creative Innovator*, AP 2005; *Practical Poetics in Architecture*, Wiley, 2015; *Spatial Intelligence: New Futures for Architecture*, Wiley 2008 and my own articles in *AR Academic* and *RIBA Journal*, both 2014 www.architectural-education.club/revealing_secrets_kester_rattenbury www.ribaj.com/culture/the-imagination-game. These last emphasise van Schaik's inaugural role and in no way fully describe the key role of other contributors, notably RMIT Dean, Richard Blythe who led the *ADAPT-r* bid, or the input of RMIT head in Europe, Marcelo Stamm. It is an endeavour of awesome complexity, and cannot possibly described in a single article, let alone a footnote.

6.
The recent emphasis on design research in UK universities is showing signs of shifting this, and many studios publish regularly. The usual formats are the visually led catalogue, an official course document type overview, or a tutor led polemic. Critical analysis may happen within these, but is rarely the driver. A recent collection, Neil Spiller and Nic Clear, *Educating Architects: How Tomorrows Practitioners Will Learn Today*, Thames and Hudson 2014, is a good sample of the range of writing about studio teaching.

7.
eg Jeremy Till, *Architecture Depends*, MIT Press, 2009, Yeoryia Mananopoulou, *Architectures of Chance*, Ashgate, 2013

8.
Discussing Alice Casey's PRS 4 presentation, *RMIT/Adapt-r Practice Research Symposium Ghent*, 2015.

9.
This differs from an essentially historical /reference based ethos of other European architectural schools.

10.
CJ Lim, *The Imaginarium of Urban Futures* — " an architect's greatest influence lies in the visualisation of an alternative reality", p 151, in Spiller and Clear, op cit, 2014.

11.
The horizontal year structure is now less fashionable, though there are powerful arguments that it is far more appropriate for places without London's extreme diversity of real practice types. I'm indebted to Andrew Clancy for his forthright exposition of this.

12.
Randall Collins, *The Law of Small Numbers.* See *Mastering Architecture*, op.cit.

13.
Effectively, the PhD by Practice extends the same learning model into practice, and to a higher academic level.

14.
Our department's own Learning Futures discussions were an exception to this.

15.
Countries offering far more and shorter projects (eg Iran, South Africa) have a very different expectation of project work.

16.
See Robin Evans' *Translations from Drawings into Buildings*, "AA Files", Summer 1986 on this fundamental paradox of architectural teaching.

17.
John Cage: *Composition: To Describe the Process of Composition Used in Music of Changes and Imaginary Landscape No 4*, first published as part of *Four Musicians at Work*, "Trans/formation", volume no. 3, 1952, p. 59

18.
Riet Eeckhout's PhD by Practice, *Process Drawing*, RMIT, 2014, describes this kind of work in some detail. *ADAPT-r* work is credited: The research leading to these results has received funding from the *People Programme (Marie Curie Actions)* of the European Union's Seventh Framework Programme FP7/2007-2013/ under REA grant agreement n° 317325.'

19.
Cedric Price famously (and unusually) challenged the architectural belief that the answer was always a building.

20.
We initially set a building design early in Semester 1; it didn't take - some teaching exercises don't. We retro-fitted a 'technical drawing' brief into the first semester experiments instead, which worked well.

21.
I am indebted to discussions with Sam Kebbell of KebbellDaish in Auckland, NZ, and *ADAPT-r* Fellow at Westminster. He both observed the 'on-site' relation of our bizarre student work, and separately observed that some most revelatory learning moments of his career were the mistakes, the things he would never even talk about to his children about.

22.
Alice Casey, *PRS 4, PhD by Practice (RMIT) presentation*, Ghent, April 2015. See note 18 for *ADAPT-r* disclaimer.