

## **07: Design (-ing) research: architectural experimentation as innovation – a modern genealogy of architectural innovation**

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*(Images unavailable)*

We thought it would be interesting as a last session today to step back slightly from the specific examples that some of our speakers today have offered and to reflect a little more generally on the question of how it is that we find ourselves talking increasingly about this relationship between research and design today in architecture. In the Design Research Lab, which Patrik Schumacher and I had the opportunity to set up nine years ago at the Architectural Association, we argued for putting the very words "design" and "research" in the name of the programme that we were creating. We appended to that the word "lab" as we wanted to emphasise a kind of experimental approach to whatever it meant to try and solve that kind of problem. The subtitle on today's programme as "a recent history of the relationship between design and research" for me really constitutes the last decade's thinking, a strange series of things that have occurred since the mid-Nineties that have rippled through architectural culture, including its practices and discourses, for some time.

For us one of the key terms for how we might define the difference between a project-based practice and a research one is the idea of communication itself and the transmission of knowledge, which has somehow become prioritised in the last few years, not just within our own work with the kind of examples you have seen today, but in a larger sense within architectural culture as we know it. The reasons for that kind of privileging of communication or networking is pretty straightforward - it has to do with a fairly rapid and accelerated development of those tools within the space of the architect's studio, whether it be a school or an office, and it plays a kind of backdrop to the comments I will be making today about how we might approach this question of design and research.

I have divided the topic up to take it on in bits. First of all the idea of research as a form of sustained reflection or activity that looks at the question of the systems that we use as designers, which I think has been reflected on in various ways in the presentations today. After that, I will make a few comments on the way in which information itself becomes the basis for a different kind of research activity. I would like to follow that up with a third tangent which is the way in which research could be seen as an inherently performative operation within our studios or offices. I want to sketch a background for that and so for each one of those kinds of activities I have picked out deliberately non-architectural examples that let us look at the way in which we are thinking of research within the discipline of architecture alongside competing, and at times very different, models of research that help provide a backdrop for how we talk about the term. I picked an evil and large corporate example; Microsoft - makers of the operating system I will be using today, if not the programme - a company that has invested in research and development within an industry that has transformed the way we think about, not just these systems, but corporate life itself. I thought I would play off that the way in which research has emerged within recent contemporary art practices, and for that I picked a radical New York artist named Hans Hacker whose research base in the 1970s energised contemporary art culture and discourse. As a third example, somewhere between corporate and artistic merit, is

something that I could just call a kind of crazy example of architecture; a group of ex-hippies that I first encountered as a teenager in San Francisco that founded a group called the Survival Research Labs in the 1970s. They have spent the last 25 years basically blowing up stuff as a way to try and understand better what it is they are trying to do, so a kind of larger network of examples. The point of this presentation will be to introduce a larger discussion with everybody after this and with all of you in the audience.

To emphasise this idea of a research based practice, I have pulled out – or rather my search engine has pulled out from a database of about 15,000 images and modelling files that we keep on the laptops that we carry around – a series of images that try and work through the implications of what it means to approach a problem from a research-based initiative. For me that is not an example of shifting architecture towards a more rational, empirical or studied kind of operation, but in fact almost the opposite - as any scientist would say, a much more chaotic kind of research environment, out of which the “knowledge of science” emerges in the everyday activity of laboratories. I have drawn this lecture out of an interface which is a working catalogue of several thousand images and documents which is, in part, the basis for how we address what I think is the underlying current of today’s topic - the question of how one learns architecture today in a world of increasingly fast forms of communication, connection and practice.

With that as an introduction, the question of this relationship between rigorous, sustained bodies of knowledge goes back a very long time before this decade of computer interfaces and materials. The kind of example that many of you will know, taken from the 1920s, is Hans Myers’ famous competition entry for the Modeschule project. Myers, in parity of the kind of constraints that he faced in Germany at the time for that project, submitted his entry as a kind of automated machine that was the outcome of all the planning criteria that he said was increasingly constraining the former creativity or invention within architecture.

I would like to impose that kind of image against what I believe to be a far more chaotic understanding of research today in institutions and disciplines like this one. This is the Google Earth view of the Redman campus of Microsoft, as of yesterday afternoon – I am sure it has evolved since then, it grows constantly. In fact there is a beautiful diagram one of my teams did once of the increasing floor area of Microsoft accelerating at a rate that mirrors the decreasing size of the computer chips. The point I want to make about that organisation, and which Bill Gates has in fact written about in his books, is a form of activity that is driven by collaboration between different kinds of specialist expertise. In fact, there is a photograph of the kind of millionaires that he has created within this company, people whose strange offices are a combination of the dorm rooms they had often only just left before going to work in his company. They also challenge everyday modern assumptions about distinctions between living and working, which you will all know through stories like Microserves and the kind of novels that have been written around it.

What we became interested in, in the Design Research Lab a decade ago, was the idea of reformulating how it is one teaches and learns within a collaborative studio setting. For that reason – and Patrik and I were very fortunate in that we were offered a chance not just to direct the programme but to effectively create a new kind of graduate design programme at the AA – we reconfigured the assumptions of teaching so that they would deliberately privilege forms of peer-to-peer communication and

learning and, in fact, deliberately require that our people, both teachers and students, always work within collaborative teams of some kind.

One of the interesting transitions that we observed from our first year in the fall of 1997 when the occupation of space was pretty familiar in terms of offices – bright lights, lots of room, individual people – a few years later converts itself into an overheated cave, typically a little dark so that you can see the laptops which were then taking over from the desktop systems on tables that we then cut down in size to get our team-mates closer together with one another. The first point I would like to make in terms of a shift towards research, is to pay attention to the questions or the demands that it places on us in terms of our organisation of activities, which is certainly one of the things that we have all witnessed occurring within studios of all kinds everywhere. In fact I snapped an image last autumn in our studio and for me, as a teacher, one of the compelling things about it was that there was not a teacher in sight. There is a kind of clustering behaviour where people immediately gather around to try and understand something that has come out of this kind of experimentation and the gradual form of expertise that emerges out of it.

The point I would like to make with our graduate students today is that which has a long and disciplined history within the architectural office itself. I had a chance to work for Nathaniel Owings as a teenager a very long time ago and one of his really innovative insights was his attention to detail in the design of an office rather than buildings that came out of it. Owings and the partnership Skidmore, Owings & Merrill, was responsible for the design of the organisation itself and, as he said, his job was to create an organisation that would last longer than the buildings of his competitors. From a design point of view the guy has been remarkably successful two or three decades later.

Rem Koolhaas put up a photograph on the screen at the AA in 1978 to launch the research of *Delirious New York* which sits in the video for about 20 minutes before Rem bothers getting to Manhattan. It is interesting because it is a photograph of the peculiar organisational circumstances of one of the projects that he is looking at in New York at the time. There was a strange committee of anonymous/successful professionals in Manhattan that came together for the Rockefeller Centre. As Rem says at the beginning of his introduction, his initial fascination with the profession of architecture lies not in its ideas or its personalities that are driving what we call architecture, but in the organisation of the office itself. For him, this becomes uniquely possible for achieving what he ends up calling a metropolitan form of architecture.

My last example of that kind of organisational bias and picking through the question of research is a picture I snapped in a hurry a couple of weeks ago in Tokyo; a remarkable room at the top of a 52-storey building, a company named Inks Inc. The company is ten years old and it is the leading user of stereo-lithography equipment in the world today. They are a company that is effectively driving the evolution of stereo-lithography equipment because they work for the robotic tooling of the industrial forms which all of our mobile phones are made in now. Inks Inc has something like 80 per cent of all mobile phone production in the world, including Ericsson, Motorola and all the leading manufacturers. One of the ways they were able to achieve that kind of expertise was through restructuring the design processes that lead from a company handing over the design of a product to its eventual manufacture and production. They are very proud of the fact that there was a five year period in which they were able to reduce the time from a company handing over

a new mobile phone to it being in my hand as a user from 45 days, which it was in the mid-1990s, to 45 hours which it is today. It takes place in a remarkable 52-storey, vertically integrated building which has – and it is a very painful image – 300 CAD operators at the top of a high rise. The windows at the edge look out over an incredible skyline that they never see in Tokyo. The designers, the CAD operators, are at the top, at the bottom of this building are the robotic tooling machines that were being driven by these files through a series of servers in the building that could allow these kinds of things to be produced within two days of the company receiving the orders.

If that first kind of framework was trying to emphasise these questions that have to do with the organisation of our activities, for me the second obvious category would be thinking about research in terms of the systems we all now use as designers. I became very interested in the way in which everyday throwaway stuff that was cluttering our lives starts to suggest in itself a different kind of paradigm for what we call the designer. For me the designer is not just a member that somehow operates as a connected or network individual to his or her team-mates, but is simply the organic node within a network that includes an increasing and growing number of silicone-based participants: all of the applications, the hardware and the add-on scripting tools that all the design projects now flow through.

I snapped this picture, the top floor of our studio, in 2001 and I think it is a fantastic comparison to Stanley Kubrick's version of 2001 made 25 years ago, where he imagined these kinds of activities would somehow be given over to some extra form of specialisation like an astronaut or something, but in fact becomes the very model of the kind of activities we now think of as architects. For this kind of an example, I would like to turn to the other disciplines and for me particularly a 30-year history of ambient music which has tried to work through this relationship between an individual composer, creator, inventor and his or her activities within a growing and swollen space of all of these other kinds of extensions. For me the great record of that is a diagram that Brian Eno puts on the back cover of a fantastic 1975 album called *Discreet Music*. This is one of his early and pioneering ambient albums made here in London in 1975 after he recovered from an injury in which he famously says he set up all of these tape-looping machines and stereo feedback systems, went in the other room, made a cup of tea and came back and the album had been produced. One of the things Eno argued for at the time was the way in which this kind of a distributed activity, part human, part machine, but willingly complex in its interaction and its unpredictable results nonetheless, becomes a new kind of landscape for him to think creatively about the world we live in.

A famous, controversial example taken from the art world a couple of years earlier in Manhattan is Hans Hacker's invitation to present at the Guggenheim Museum. Upon his presentation of the material the show was immediately cancelled and he was rejected from the New York art community. Hacker takes his activity as an artist, not the production of cultural icons and symbols, but in fact the mapping of relationships that are concealed within the institutions of art itself. In his famous Repulski real estate piece he is networking the relationship of property ownership and board members at the museum that have commissioned him to make paintings for the city. Immediately the curator and the board of directors think this is the absolute wrong thing for an artist to do and so cancel the show. His career and the history of the discipline are thus ensured forever. In a way he foregrounds something that I think all of us within architectural practices and discourses already know which is the idea that research at some level is a kind of observation. In fact it can be an incredibly creative

act to try and imagine or project relationships otherwise hidden within the everyday activities of disciplines, clients or other aspects of our professional lives.

Nearly 20 years later the famous programming map from 1991 and the Yokohama competition that the Office for Metropolitan Architecture presents to its clients is published within architecture. Here the office argues for a time-based activation of different programmes and activities on an existing parking lot as a much better solution to the project than the installation of a new kind of building, but it becomes one of the real icons in terms of architectural publication over the last 15 years.

That kind of an information-graphic approach to research, leads to the contemporary discourse of the diagram that some of our presentations today have alluded to, and the idea that our understanding of space and how to organise it and project it in a new form, can be derived from a critical assessment of the already existing performance of space as it is observed. One of hundreds of diagrams that our teams have looked at, of existing buildings in London happened to map out the time occupation of the different galleries in Tate Bankside, revealing in one interesting moment that the average user of the upper floors of Tate Bankside spent more time looking at the labels explaining what the work is in the gallery than looking at the objects themselves, which for them gave them a basis for projecting a kind of project where that becomes an extension of the artwork in those spaces.

All of those kinds of examples are, let us say, foregrounding, a shift away from the everyday production of the architect as a representation of either the world they want or that they think they see. The term that has come up several times today is a kind of awareness of the fundamental property of simulation or inter-activity that becomes a part of an increasingly complex networking of information and/or knowledge as it emerges in projects.

My last of the three examples is the argument for research as a kind of formative activity that is not pre-planned, preordained and then simply carried through, but a form of learning that takes place essentially, necessarily, through the action of the activity itself. Mark Pauline has directed the Survival Research Labs for the last 20 years in the Bay area. He is, as you all know I am sure, most famous for nearly blowing his hand off in one of these and, like any good researcher, having a surgeon graft his big toe onto his hand to give him an opposable thumb so that he could carry on his work as a machinist and building these strange exploding robots and military equipment. I do not have time to show you the great videos today of these guys blowing stuff up, which they do in spectacular fashion.

The point of that and the way in which it relates very well to the activities of a generation of people shifting the terms of architectural learning today, is that however we call our command and expertise of these kinds of tools, it is coming out of a real live experience with the tools themselves. They are tools that are rapidly evolving alongside the work we do, and one of the interesting phenomena I have observed over and over again with these kinds of tools is the innate will to project not only a kind of project coming out of these sorts of interfaces and machinic systems, but the kinds of instructions and ways of using them that are in parallel being asserted as a part of this kind of activity. It is a very interesting shift in the kind of outcome we have been observing within students and schools in lots of places where the expertise of the use of these kinds of systems becomes part and parcel of the projects that are an outcome of them; the sort of serial iterative projects that Charles was referring to earlier.

In this case the project on the right is a serial array of rotatable two-dimensional planes that make up a ceiling system in Heathrow. It has a kind of graphic space on the right in an application like this – this is a version from a couple of years ago so it is going to be about 4.5. In that version on the left the mal-editor, which for the first time is taking on high order programming capabilities, not unlike, although not yet fully comparable to C ++, for the first time gave us a generation of designers whose final thesis project was submitted as a piece of typing. That script on the left was the final submission for one of several programmes which were interacting and then projecting that project that emerges on the right side of the page. The graphic interface is obviously just one of several ways to try and control the flow of information through them.

This form of expertise for us seems to have less to do with individual programmes or applications from my side as a designer than with the ability of what we would call a designer to control and understand how information passes through those different demands. One of the images I like to use at the beginning of the year to argue for a collaborative or team-based approach to these things is a simple presentation of the fact that these are systems designed, and that can only be used by, intelligent teams of various kinds. One person cannot possibly, nor would want to try and take on an application which, in its very nature as an artificial system, has been developed for different forms of highly focused expertise. This is the annual reading list of one release of two or three fairly ordinary programmes you will all know today within studios. Another example then of how that manual sensibility on the right, down to the design of the actual control and dialogue boxes that are part of the extensions that our teams add on to the every day applications, becomes an extension of the projects that come out of them.

Just two final points about the research-based approach to questions of design: it is a little like fiction which tries to signal the moment when the tide starts to turn in some strange way from an architecture that we thought was ordered around projects and personalities and largely proprietary approaches to space, to an increasingly distributed and multiplicitous one. That little story for me, if I were to pick a date – and it is a convenient one because it is exactly ten years ago for us now – is November 1995 when two or three very interesting things occurred nearly simultaneously within architectural culture and a larger culture of communication. It is something that I started to realise a few years ago when I started getting applications like this in the DRL - people burning SML, or Excel or cutting it up as a kind of document, which I thought was a very strange thing and in this case in fact led to immediate rejection in the application process because we just thought there were issues that had to be worked on elsewhere.

I think the kind of generational instinct to try and think through a particular moment is an interesting one. In fact when Rem comes to launch a book on architecture to worldwide acclaim, funded by 16 organisations globally and then published simultaneously in countries around the world, one of the great things he does is not show what is in the book, he just shows the book. An hour-long talk holding, caressing, stroking the book, suggests to me that it was an ultimate statement about the book as a written monograph. He is holding it up as a kind of trophy – and he called it a piece of sustained research over a 20-year period which is interesting in the context of filtering out so many projects despite its 1,440 pages. At the exact same moment in a larger culture in which that kind of a median within architecture is given its ultimate kind of statement, we have someone like Tim Berners-Lee sitting in the basement of his laboratory in Switzerland, working in the evenings on his own,

writing a protocol that is originally developed in 1993 and 1994 and launches in 1995 as the worldwide web. The idea of a new and completely, if not competitive, threatening mode of communication and networking becomes a fascinating event, literally alongside the printed word within architectural discourse as we know it.

The proliferation of that network, which of course starts with that system, takes off rampantly and becomes the context for us in the DRL to develop this distributed approach to teaching and learning. I like to brag that when we started the studio our first generation machines were running Windows 95 and literally running applications that could not link a network together; only ten years ago. One of the remarkable things is simply how quickly that kind of a force builds energy within the studios we know as architects.

More recently there has been the emergence of entirely new sciences of networking in the work of Barabossi, Duncan Lotts or any of the scientists that are working on fields of network science that literally did not exist a decade ago. The mathematics for these sciences is built upon an observation of the everyday world that analyses these kinds of phenomena, like the formation of paths within a square around the terms of entirely new sciences. We are not going to have time to go into it today but it is something that certainly, again, has a long history even within modern architecture as we know it.

Just to conclude, what that then sets up is the idea of going back and looking at a discipline we thought we knew very well, in effect from a different vantage, from forms of practice or experimentation that have long privileged a research-based form of learning or knowledge. The famous examples being like Galilei's suspended nets which are then inverted to find the form of some of his projects, the soap film studies of Friarotto and others, which are then used to generate the formal solutions to his cable net and other structures. The Eames Practice in Los Angeles in the mid-20<sup>th</sup> century which is founded around their entire lives as designers. As Charles Eames says at one time, it is based upon this strange little machine that is sat in the bedroom, what they called the Kazam machine, which had the ability through this bicycle pump to compress and to band fibreglass, and later plywood, to form the furniture that would then fund their research and their development as architects. Today there are the obvious examples we could look at which shift strangely between what would be material forms of research in practice and information itself - bits, ones and zeros as being a new kind of material. The extension for that is often these kinds of experiments which are the kinds of spaces that are literally projected at new kinds of media and spaces.

In my conclusion I just wanted to show you a couple of examples of how those of us in either offices or schools face a completely different territory of learning today. These are the links that I am sure all of you have been sent from your different users to the sites that they use to develop and perfect the kinds of experiments they are doing. There are now, literally, thousands of these things constantly running on the network. It is fairly common for us in the studio for our people to send, as they develop, different kinds of tools that are either scripts or applications which are attached to the design tools they are using, to upload these to these public sites, which then lead to these lively and strange discussion forums which keep iterating and updating the development of these things beyond even the terms of the ones that Charles was mentioning earlier, which are within the studio itself.

After the Design Research Lab annual presentation of our work at the AA in autumn 2003 we discovered later that evening that the entire introduction and organisation of the year had already been uploaded to a peer-to-peer side that was then letting this stuff out of the studio, completely beyond our hands. What we are really talking about, I think, is a shift from a research-based initiative within which we understand our practices, whether they are in the office or in the studio or elsewhere. For me that sort of shift, as many people have alluded to today, is a shift towards a knowledge-based economy of some kind. I think one of the great pleasures in today's presentations for me is to see (Saskia Sassoon has written this about globalisation today) that its forces are not always the same everywhere, paradoxically there are little pockets where advanced forms of development do occur faster or on different terms than other places. In addition to the incredible and pioneering work within the different studios and offices that we have seen, is the fact that all of those have occurred geographically within about 20 minutes from this room today. That says something interesting about, not just the strange, advanced or otherwise, economy that we inhabit here in London aside from urbanism, but certainly about the kind of advanced economies of architectural production that each of those offices has demonstrated.