Inaugural Lecture

A Dialogue with the Future:
Design Thinking and the 21st Century Imagination

Peter Lloyd, Professor of Design
University of Brighton

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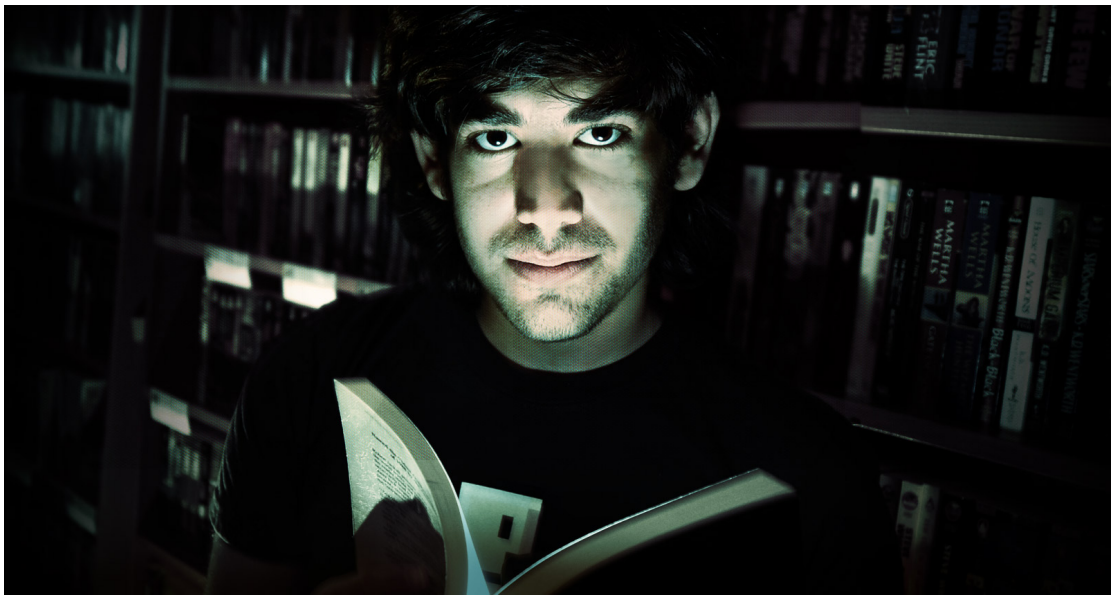
Design Will Save the World

This is a person called Aaron Swartz who was born in Boston in 1986. Some of you may have heard of him through a documentary that was made about him in 2014 titled *The Internet's Own Boy.*



If you haven't seen it then I can't recommend it highly enough – it's free to watch on YouTube. The title is well chosen because what Aaron did through his involvement with a number of influential projects was to show how the democratic and creative potential of the internet could be realised. At age 13 he'd produced a version of Wikipedia, before Wikipedia existed. He helped develop Reddit, one of the first social networking websites in 2005, he helped develop RSS technology that syndicates regularly published web content like podcasts. And he worked on the computational and legal framework for Creative Commons, a form of copyright that means that you or I can easily draw on and reference the creative work of others. What drove him was a desire to make important information open and freely available, so that collectively any one of us could build on the work of others. But that apparently straightforward aim got him into trouble.

Many of us who work in Universities and edit an academic journal, as I do, know that much of the research we do is published in the form of journal articles or 'papers'. To an outsider, academic publishing operates a strange model. We spend a great deal of *time* producing our articles – [explain], before we then submit them to be *judged* by our peers. If we are judged favourably, our paper is accepted, and we release our

copyright to the publisher. The publisher then sells our paper back to us, usually through our University library. So the extensive content we generate for publication is unpaid for by the publisher, the work of peer reviewing to ensure academic quality is unpaid by the publisher, we waive our rights to reproduce our own work, and then we are sent the bill in order to see what we have done!

It's a crazy system but the publishers make money from this process – a lot of money. The problem for Aaron Swartz was that, situating the very latest fundamental knowledge behind a paywall stops people outside of Universities, as well as those in developing countries, being able to access – and learn from, and use – that knowledge. He wanted to free knowledge so that *anyone*, not just academics, could build on the insights of others. In other words bring public access to the public domain. In 2011 Aaron was being tracked by the FBI. He'd already successfully used the power of social networking to challenge and halt the Stop Online Piracy Act going through US Congress, that many thought could have dire consequences for free speech. He'd also developed a system of automatically downloading large but inaccessible public document archives, like the articles of US legislation, bringing them into the public domain. That clearly marked him out as someone the government should keep an eye on.

In January 2011 he found himself in a cleaner's cupboard at MIT plugged into the computer network and automatically downloading thousands of academic journal articles for free distribution. He was arrested for state breaking-and-entering, which soon escalated to a number of federal indictments and charges carrying 35 years imprisonment. Despite both MIT and the Journal Publishers later dropping their case against him, he was in the process of being prosecuted when he took his own life, aged just 26.

So this is a story of a powerful intelligence lost, someone who had the ability to understand the structures and barriers that control information flows, someone who had the moral sense to realise that our progress is through sharing and creativity, and the computational and coding nous to be able to do something about it.

In the middle of the film I was drawn to one particular scene. You can see a still of that scene here. On the T-shirt that Aaron wears is a simple, perhaps idealistic phrase: "Design will Save the World".

What Aaron did shows many of the characteristics we normally think of as designing: understanding the formal and informal laws that govern our behaviours and trying, through making new structures and forms to change the world for the better. I've chosen this example because, if we think of what Aaron Swartz was doing *as* designing, then there is no identifiable design discipline. No product, no furniture, no building, no vehicle, no clothing, no machine, all the things we generally teach as design in our Universities. The kind of design Aaron Swartz was doing, the kind that addresses the *nature* of how we do things in our society, that is politically charged, legally challenging, that questions corporate interests, but is democratically configured – this kind of design represents, I think, the problems that the 21st Century imagination needs to be working on.

Origins

I've started at the end. Let's rewind to the beginning. This is a photograph of me taken in 1968 by my Dad, who is here today – it's always useful having a photographer in the family for occasions like your inaugural lecture.

In the photo I'm already displaying an unhealthy attachment to the material world, in this case to *advanced* German engineering – an Auto Union 1000S Coupe with a wrap around windscreen – back in the late sixties that was *Voorsprung durch technic*.

That interest in the designed world has stayed with me and after studying at Sussex University – which included my own brush with the criminal justice system and a night in a police cell probably just a couple of hundred metres from this very spot – I worked as an Engineering System Designer and became fascinated in what I, and others who call themselves designers, actually do; particularly in the type of qualities

and abilities they posses in solving design problems.

The Qualities and Abilities of Designers

To try and figure out those qualities and abilities we could start by just looking at the things in the world around us. We could try to figure out how these things might relate to a designer, or a design process, and attempt to piece together the intentions behind them – and it's particularly tempting to ask what was the designer thinking of when things are difficult to use [online shop example]. The world is filled with designed objects, tangible and intangible, so there is no shortage of things to choose from. Here's just one of them that I found at a street market not far from here the other day. It's a personal electric desk fan and I think it is a beautiful thing.

There is a simplicity in the overall form made more complex by the contrast in colouring and the aperture for the fan blades, which is echoed in both the quality mark to the left and the central point between the blades. There is a play of simple forms at work here – triangles, parallelograms, circles, rectangles. Turning around the object in your hands, and taking it apart, reveals how the external form is related to the internal form – regular rivet points mark where the batteries go, for example (one is visible on the front next to the on/off switch). Then there are the details. The semi-circular on-off switch, emerging from the box with a grooved edge to provide grip for the thumb, the point of human contact. The elegant radii of the green corners which contrast with the sharp white corners. The cowling effect surrounding the fan which suggests a

radiator grill. The way the white angle doesn't quite meet the green corner which leaves a better idea of the rectangle. For the life of me I haven't been able to find out who designed it but by taking it apart, and looking at it, I have some idea about how it might have been designed.

Actually you can even look at the world itself as a designed object. The philosopher David Hume, writing in the Enlightenment in the mid 1700's, produced a book called *The Dialogues of Natural Religion*. The book subtly knocks over what's called 'the argument from design', the idea that the world and everything in it is such a complicated and seemingly ordered thing, that only a designer – by implication a God – could have come up with it, which proves God's existence. You might have heard this argument on your doorstep at some point.

Hume, while not denying that a designer had designed the world – in the 18th century he wasn't in a position to directly question the existence of God – instead explores the qualities that such a designer might have – the world might just be a poor copy of a previous world, he argues, and the designer a novice, or as Hume puts it the world might be: "the first rude essay of an infant diety". The designer might not be a single designer at all, but a team of designers, and the designer might have long since passed away, no longer omniscient or omnipotent – the fact that that the design continues to exist, doesn't mean the designer does.

So the designer of this electric fan, if it was one designer, may no longer be with us, and in any case there are other things we don't know about the designer – we might be able to guess some of their influences and even have a guess at their gender, but things like their nationality, their level of education and experience, and indeed their practice means that intentions generally remain unknown.

If we start from the world of things, the qualities and abilities of designers begin to take on a slightly mysterious and reverential air. There is a tendency to assign the term 'genius' to designers responsible for very successful designs, while discounting other key factors that may have contributed, like a good client or an intelligent manufacturer, for example. And most design work is, by definition, normal, so perhaps we should be looking to that if we are interested in the behavior of designers.

Another way of looking at these qualities and abilities is to look at designers in action,

by studying the process of design. Over about 25 years I've looked at quite a lot of design processes in many different disciplines – what is striking is that so much time is devoted to things that don't exist. All the conversations, sketches, models, schematics, diagrams, and visualisations are aimed at nailing down a fluid, not-yet-existing entity – what we term 'the design'.

A colleague of mine called Peter Medway, who sadly passed away recently, used the term 'virtual' to describe what it is that designers work on – virtual buildings, virtual desk lamps, virtual pepper grinders, virtual websites. He didn't mean it in the 'virtual reality' sense, but to mean 'almost', 'not quite', or as my Chambers dictionary rather nicely puts it: "Not such in fact but capable of being considered as such for some purpose." Talking about things that don't exist might be taken as a sign of madness or delusion – but it turns out there are many ways that we can think and talk about the possible future and that is what my research has been focused on over the years.

It strikes me that designers conduct very specific types of dialogue, and that understanding how these types of dialogue function are critical to understanding both what designing *is* as an activity, and perhaps points the way to what designing *could* be in the future.

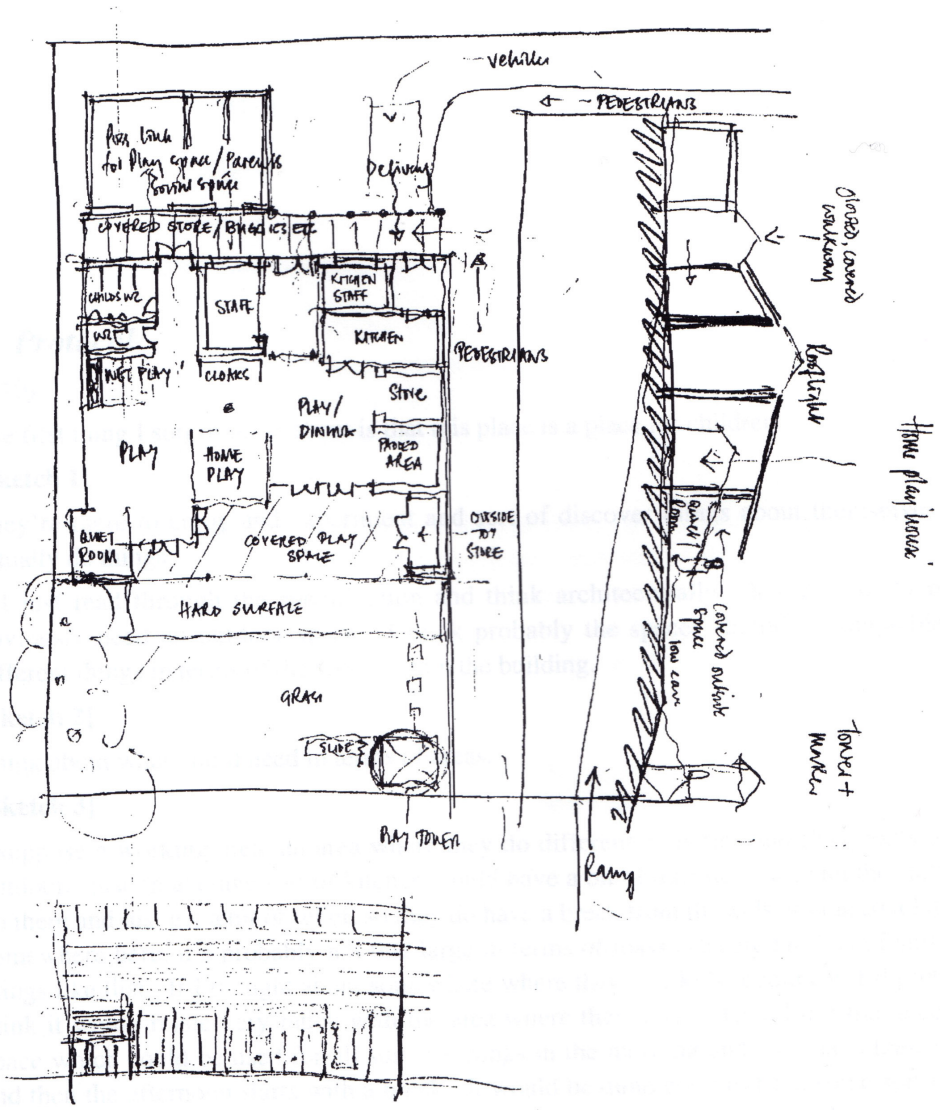
Dialogue with Self

I started my research career in the department of Psychology at Sheffield University trying to model design thinking using a fiendish Artificial Intelligence programming language called Prolog and attempting to produce what was called a 'knowledge-based system'. Technology back then wasn't what it is now and I remember sending my first email in 1990, though I knew of only one other person that had an email address, and browsing my first web-page in 1992.

I also worked with videotape to study architects, product designers, and engineers – unlike now there wasn't much video of design activity around then. I asked them to solve design problems while getting them to think aloud, in a procedure known as protocol analysis. The theory is that thinking aloud gives us access to someone's immediate thoughts through their ability to verbalise the contents of their short-term memory as they carry out a task. That means we can follow a persons focus of

attention and work out what information they are processing.

This is a sequence (see video) from an early study I did where I asked a number of architects to design a primary school on an existing site in Sheffield.



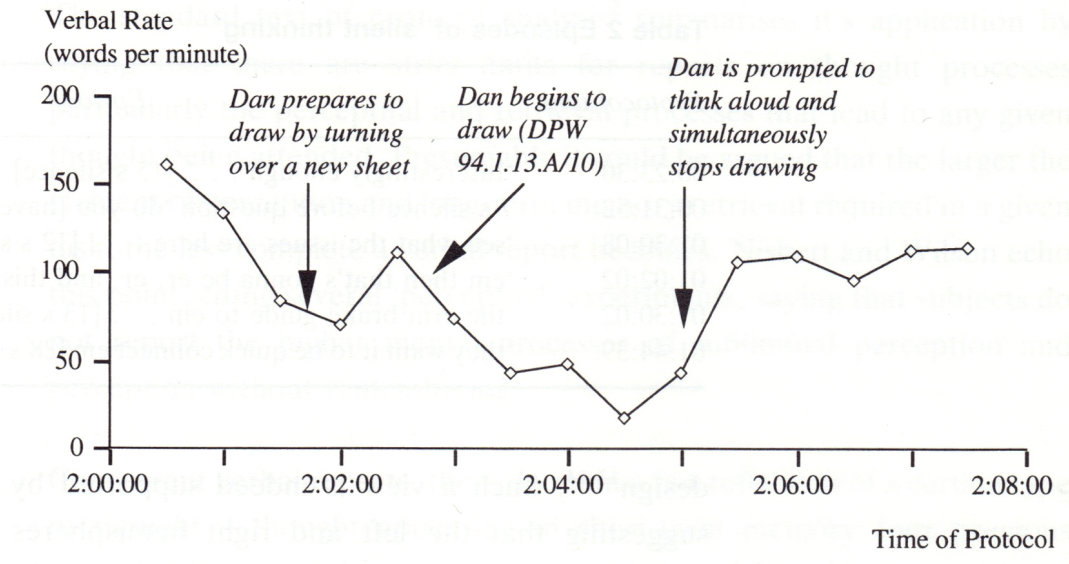
You can see how over the course of an hour a design emerges through the exploration of different alternatives for siting, form, and functional details, while all the while the architect verbalises her thoughts aloud.

What you get in an experiment using protocol analysis is pretty garbled information – participants aren't meant to try and make sense of what they say, just to say, without thinking, what comes into their mind. From these verbal accounts it is possible to identify the different cognitive mechanisms and strategies that designers use. For

example, you can tell whether they're thinking about the problem in some way or thinking about a solution – I found that engineers think a lot more about problems while architects think much more in terms of solutions, though the very nature of design is that problems and solutions are connected in what is termed a 'wicked' way. Wicked means that once you propose a solution you start to develop a different idea of what the problem is, so in turn that means the solution needs to change, and so on, as you work towards what is sometimes called 'the problem of the problem'.

But there are limitations with this method of trying to verbalise thought. As you saw in the sequence the design process isn't just verbal but visual, and it doesn't take long to realise that the verbal and the visual work together. (And also that this process is pretty impossible to model on a computer). Over the page is a graph from another study I did, this time with an industrial designer designing a bicycle accessory. The method of asking designers to think out loud means that you have to continually remind them to keep doing it. This graph illustrates what happens when you do.

The line shows how the verbal rate – the rate of talking in terms of words per minute – decreases almost to zero as the designer prepares to sketch. What this shows is that the visual has taken over short-term memory to such an extent that it has squeezed out the ability to verbalise. The designer has gone into a different way of thinking entirely. When prompted to think out loud again he abruptly stops his sketching activity and starts verbalising again.



So the method of trying to access the thing we are interested in – verbalization – interferes with the process we are trying to access – the Design Process. That's because design is much more than a task of short-term memory. It is a process that draws heavily on experience – memories and patterns buried deep in long-term memory, or even – if we are to get Freudian or Jungian – in the unconscious.

It is also a process where thought is externalized. In the primary school example, the sketching provides a way for the designer to converse with herself. To project outwards in order to project inwards again. The sketches help her to learn about a possible future and to develop a more accurate way of dealing with and shaping it. She can say: "The door could be here, no wait, let's put it over there, what would happen then?" She can move a door around in seconds!

These are the kinds of questions that a designer seeks to answer by externalizing their thoughts into sketches, diagrams, models, prototypes, and computer visualisations. The Educationalist Donald Schon describes it as "having a reflective conversation with the materials of the situation". What designers do with the words they speak is try to make sense of them, to use them in their process of design as things to think with. So what starts out as a simple method of verbalization to access 'pure' thought – turns into another version of the design process itself – an external projection that drives inward reflection – a dialogue with self, in other words.

Dialogue with Others

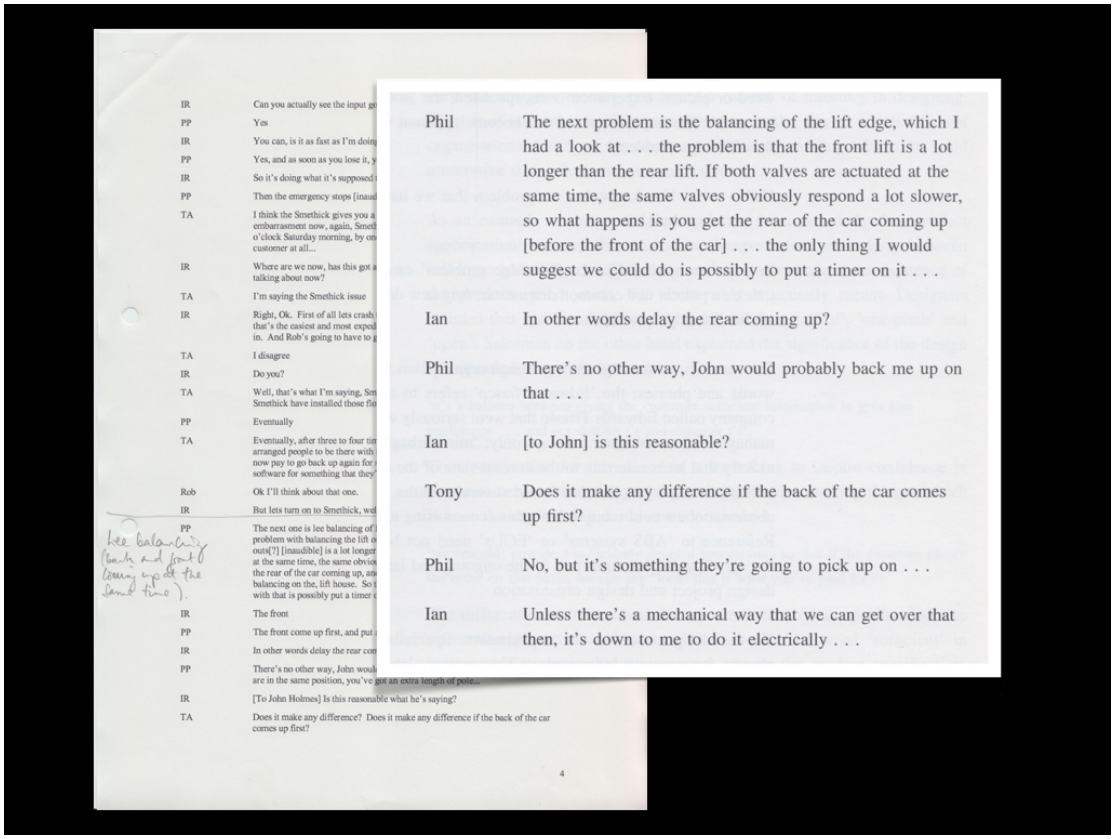
This idea of projection becomes much clearer when you step out of the laboratory and into the commercial world of design. If you walk into a design office and sit in design meetings, as I did for a number of years, or even just quietly observe what's happening, you experience lots of talking, lots of conversation, lots of pointing, showing, describing – lots of collaborating. The models, representations, sketches and schemes are still there, but they're overlaid with a talk that explores their integrity, their meaning, their look and feel, the way they 'work'.

These arrangements and details matter and at the heart of any design process is choice between alternatives: the generation and weighing up of problems and solutions. "Is it better like this or like that?" "Should the door be here, or there?" "Maybe a

combination of both?" It's also a process where there is inherent uncertainty – while the implications of various alternatives are worked through. You saw that with the architectural sketches I showed earlier. Designers have to be comfortable with that uncertainty (the Romantic poet Keat's called this *negative capability* – "capable of being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason").

So designing is speculative but it's also much more of a social activity than a cognitive one, a process of garnering agreement between different parties and disciplines. People come to a design process with different sets of professional expertise and experience: architects, project managers, structural engineers, product designers, interaction designers, manufacturers, coders – all come with a language of their own. Larry Bucciarelli, a colleague from MIT, refers to these languages as 'object worlds' where an individual's disciplinary experience has the sheen of being objective [subjective-objective]; though in a design process that involves other disciplines there are many different versions of 'objective' – that is what demands negotiation and agreement. A new world around the problem and solution has to be constructed and that is usually first formed in discussion and in language. As before, words become 'verbal sketches', outward projections to think with, though this time in a social context, so it is a dialogue with others, rather than a dialogue with self, that develops.

You can get some sense of this in the conversation shown over, from a study I did some years ago where I 'sat in the corner' of an engineering design company for a number of weeks. The segment is from a meeting that was called to discuss problems in the design of a rolling road. A rolling road is something that tests a car's performance (and yes, if you're asking, the same type of rolling road that some Volkswagens detected so they could automatically activate their infamous 'defeat device' to fool the emission testers – a clear illustration of how design decisions are ethical in nature).



Phil The next problem is the balancing of the lift edge, which I had a look at . . . the problem is that the front lift is a lot longer than the rear lift. If both valves are actuated at the same time, the same valves obviously respond a lot slower, so what happens is you get the rear of the car coming up [before the front of the car] . . . the only thing I would suggest we could do is possibly to put a timer on it . . .

Ian In other words delay the rear coming up?

Phil There's no other way, John would probably back me up on that . . .

Ian [to John] is this reasonable?

Tony Does it make any difference if the back of the car comes up first?

Phil No, but it's something they're going to pick up on . . .

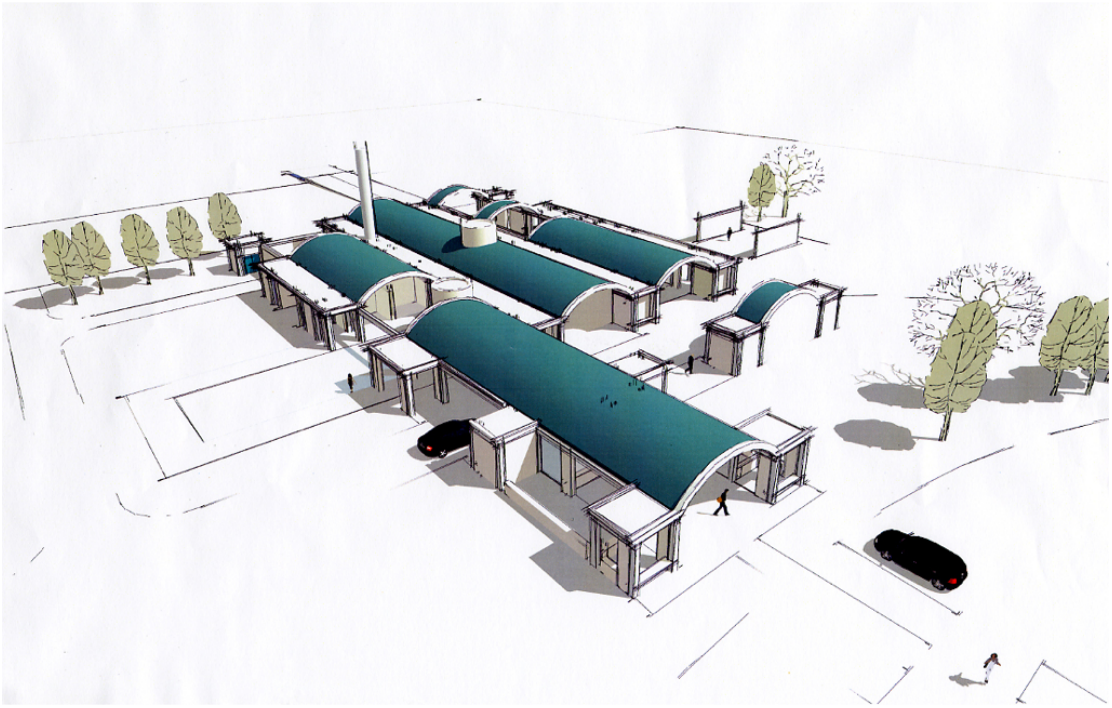
Ian Unless there's a mechanical way that we can get over that then, it's down to me to do it electrically . . .

I won't read the example through but you can see the form of the exchange. A subjective-objective account is first given that narrates a technical problem. A discussion takes place exploring possible solutions involving technical principles, client perceptions, and, later on aesthetics – it's amazing how often engineers use aesthetic language to describe what they like. In other words the type of conversation that plays out everyday in all types of design organisations up and down the country. The normal design I referred to earlier.

In the agreements that are made a language develops relating the form of the emergent thing to the thoughts and discussion that goes into furthering that form. The problem you see discussed here is later collapsed into a phrase – 'balancing the lift-edge' – that acts as an economical shorthand in referencing the discussion in later conversation. These words and phrases are constructed as the virtual thing itself is constructed and they appear everywhere in design discourse.

Another example comes from a more recent project that I did together with Janet McDonnell from Central Saint Martins. The project followed the design process of a new Crematorium in Milton Keynes over a number of years – the building is now finished and operational, but we tracked the process from the very first discussions

between architect and client. This is one of the early visualizations of the crematorium.



Waiting in a crematorium isn't as straightforward as it sounds. The waiting area, which is directly behind the person walking out of the building in the image above, can be emotionally-charged, reflective, or more routine. Sometimes informal or even formal segregation is necessary as people meet who may not have seen one another for some time. And waiting time, though often short, can be variable.

Over the course of 10 minutes or so in the meeting, the idea of 'waiting' expands to take on quite a number of dimensions, meanings and associations – first it is small, then it is made larger, before finally being decreased in size again, it is first a simple space, then a more complex arrangement with an external waiting space added for a time. Again the word '*waiting'* is loaded with meaning and association as the design process progresses, carrying the ideas for the waiting space that have been discussed. The concept of waiting is thus constructed and refined as solutions are explored and the problem develops.

As we saw before in the dialogue with self, the words and language are not extraneous to the design process, but constitutive of it; they function to explain, to describe, to evaluate, to tell stories, to articulate and capture experience, and they not only refer to and relate solution forms, they are themselves solution forms.

Here is Peter Medway again at a conference I organized in 2001:

> "Architects assume that all the associations and meanings and metaphorical connections get communicated through the drawings and then through the built structure. That's not necessarily the case, which is why many buildings don't have the effect that was intended … I'm just struck by the narrowness of the funnel that this whole thing has to get through before it goes out into the world. What leaves the office is so ascetic, so stripped down, so tenuous and attenuated, compared with this huge great mass of associations and metaphors. It's like do not inflate your life jacket before you leave the aircraft."

Design Outside of Discipline

What the quotation describes, although about architectural design, could be about a design process in any design discipline. It could equally apply to other disciplines where 'things get done through the production of things' – disciplines where plans get made, texts get produced, menus get written, music gets played, experiments get conducted. There is plenty of design activity that takes place without an 'official' designer being present.

The blog I write records some of this designing outside of recognised design disciplines. At the beginning of this lecture I talked about the design hacktivism of Aaron Swartz but there are other diverse examples.

Satoshi Nakamoto is the person who created Bitcoin, a currency that doesn't need a bank or government to certify and guarantee its value. I'll repeat that: a Bitcoin doesn't need a bank or central reserve to give it exchange value – that's quite an idea! Nakamoto is a specialist mathematician: a cryptographer, or someone who makes and cracks codes. Bitcoin itself is essentially a cryptographic algorithm that generates a chain of numbers – very special numbers, like prime numbers, but numbers, and each individual Bitcoin is mined by computer, much like the search for ever higher prime numbers.

In an echo of David Hume and the argument from design earlier on, the identity of Nakamoto, if indeed it is one person, remains a mystery. One of the few remarks she or he or them have made about producing the Bitcoin currency, however, was that: "much more of the work was designing rather than coding". There are a whole host of aspects to payment transactions than just coming up with the basic cryptographic code. The facility to quickly verify authenticity, making the code hackproof, as well as keeping it simple and easy to use, are just some of the aspects that need to be designed into the currency. It has to be 'user-centred' in other words.

An entirely different example of design outside of traditional disciplines comes from football. I was intrigued by the following recent quote from the Arsenal manager Arsene Wenger about one of his midfield players, Mesut Özil, shown in the photo:

The quote runs:

> "Wenger thinks the player he bought for a club record £42.5m from Real Madrid two summers ago is readier than he has ever been to excel, to design the game, consistently and decisively."

How do you design a game of football while you're playing it? I would suggest through trial and error, through collaboration, through an imaginative engagement with self and others, through a conversation with the materials of the situation.

The two aspects of the design process that I have described – the dialogue with self, and the dialogue with others – also serve to underline that these are, to a greater or lesser extent, aspects of everyone's behaviour when we try to think about things in the future. What I'm suggesting is that much of our activity, both in our professional lives and our personal lives, could be considered as designing. A colleague of mine, Nigel Cross, has coined the term 'designerly' in arguing for designing as a distinct form of intelligence (*pace* Howard Gardner), present to some extent in us all; a way of dealing with the world by changing it; thinking about problems by proposing solutions.

(Design) Education

How do we build on this insight? Why do we need to teach people how to design if they already have the ability to do so? The answer is partly a technical one – the languages or 'object worlds' represented by disciplinary knowledge do form a necessary part of professional design processes, but they are not sufficient in my view, particularly as 'non-designers' – clients and users, for example – generally play important roles in any design process. Having these people with a greater understanding of what designing is, particularly being comfortable in that space of uncertainty that any design process opens up, allows a richer, more productive, dialogue to take place.

Partly the answer is also about the development of any intelligence – if one spends time working at it, then one gets better at it. That doesn't mean that everyone ends up as a professional designer but it does mean that the general understanding and appreciation for design increases.

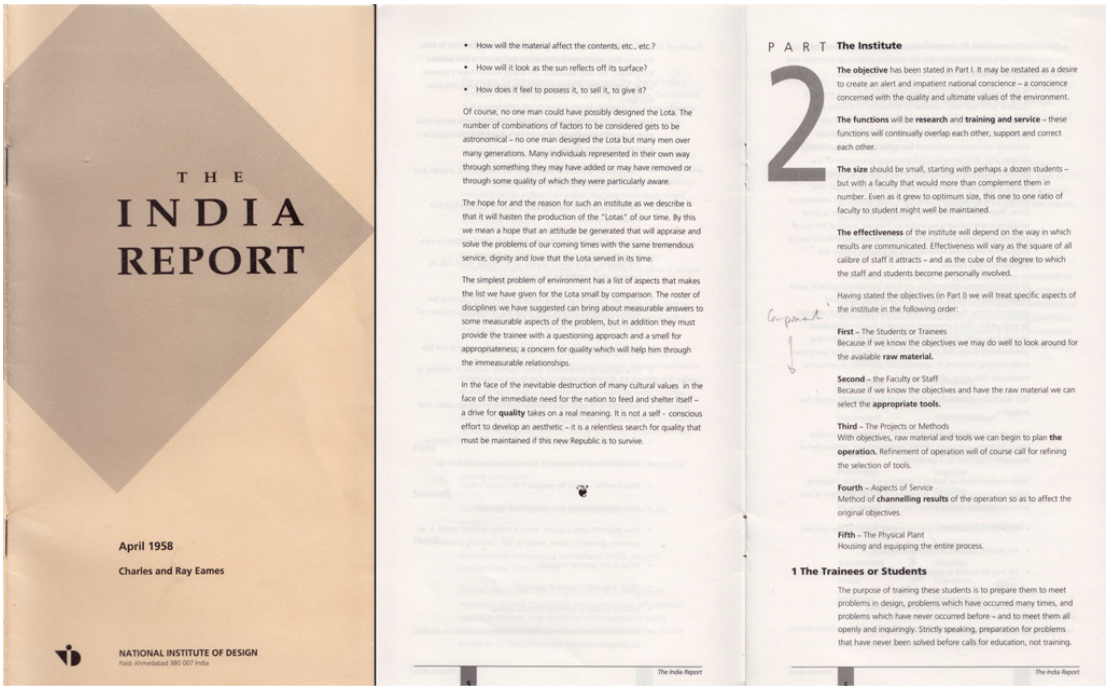
With this in mind while I was at the Open University, before I came to Brighton, I led a large team of academics and developers in putting together an online course in Design Thinking.

The picture above shows the creative welcome pack that students received through the post at the beginning of the course, though that was the only thing they did receive.

The idea behind the course was to teach the methods of design and designing in a contextual way; a way where people could frame and solve design problems within the confines of their daily lives: at work, at play, or at home – you should remember that most students study part-time at the Open University while they work. Since 2010, when the course launched, a huge diversity of more than 3000 people have completed the course and from all walks of life: teachers, librarians, health workers, people in business, military personal, people in prison, even a Scottish shepherd have developed their skills of thinking like a designer. This is a kind of design education where people learn to build on the work of others through online connections, using the creative power of a network as it's educational engine.

Well-known designers have also proposed curriculum for teaching Design. In 1957 the American design partnership of Charles and Ray Eames, whose work is currently on show in an excellent exhibition at the Barbican, were asked by then Indian Prime

Minister Nehru to look at how the poor quality of Indian consumer goods could be improved. They came up with this, the India Report, proposals for an institute and curriculum for Design Education and shown here.



THE
INDIA
REPORT

April 1958

Charles and Ray Eames

NATIONAL INSTITUTE OF DESIGN
Paldi Ahmedabad 380 007 India

- How will the material affect the contents, etc., etc.?
- How will it look as the sun reflects off its surface?
- How does it feel to possess it, to sell it, to give it?

Of course, no one man could have possibly designed the Lota. The number of combinations of factors to be considered gets to be astronomical – no one man designed the Lota but many men over many generations. Many individuals represented in their own way through something they may have added or may have removed or through some quality of which they were particularly aware.

The hope for and the reason for such an institute as we describe is that it will hasten the production of the "Lotas" of our time. By this we mean a hope that an attitude be generated that will appraise and solve the problems of our coming times with the same tremendous service, dignity and love that the Lota served in its time.

The simplest problem of environment has a list of aspects that makes the list we have given for the Lota small by comparison. The roster of disciplines we have suggested can bring about measurable answers to some measurable aspects of the problem, but in addition they must provide the trainee with a questioning approach and a smell for appropriateness; a concern for quality which will help him through the immeasurable relationships.

In the face of the inevitable destruction of many cultural values in the face of the immediate need for the nation to feed and shelter itself – a drive for **quality** takes on a real meaning. It is not a self - conscious effort to develop an aesthetic – it is a relentless search for quality that must be maintained if this new Republic is to survive.

The India Report

PART 2 **The Institute**

The objective has been stated in Part I. It may be restated as a desire to create an alert and impatient national conscience – a conscience concerned with the quality and ultimate values of the environment.

The functions will be **research** and **training and service** – these functions will continually overlap each other, support and correct each other.

The size should be small, starting with perhaps a dozen students – but with a faculty that would more than complement them in number. Even as it grew to optimum size, this one to one ratio of faculty to student might well be maintained.

The effectiveness of the institute will depend on the way in which results are communicated. Effectiveness will vary as the square of all calibre of staff it attracts – and as the cube of the degree to which the staff and students become personally involved.

Having stated the objectives (in Part I) we will treat specific aspects of the institute in the following order:

First – The Students or Trainees
Because if we know the objectives we may do well to look around for the available **raw material.**

Second – the Faculty or Staff
Because if we know the objectives and have the raw material we can select the **appropriate tools.**

Third – The Projects or Methods
With objectives, raw material and tools we can begin to plan **the operation.** Refinement of operation will of course call for refining the selection of tools.

Fourth – Aspects of Service
Method of **channelling results** of the operation so as to affect the original objectives.

Fifth – The Physical Plant
Housing and equipping the entire process.

1 The Trainees or Students

The purpose of training these students is to prepare them to meet problems in design, problems which have occurred many times, and problems which have never occurred before – and to meet them all openly and inquiringly. Strictly speaking, preparation for problems that have never been solved before calls for education, not training.

The India Report

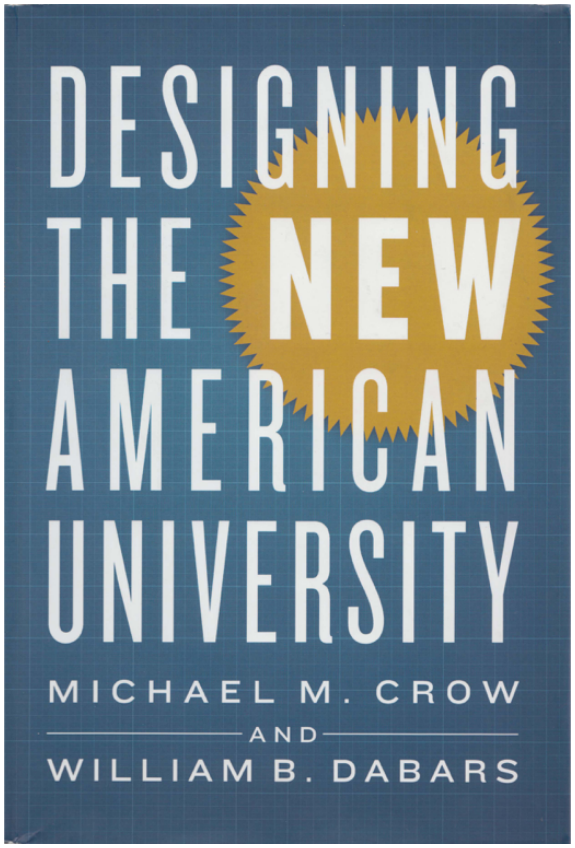
At just 15 pages, the report is said to have outraged those who commissioned it, but in the way that it lays out ideas about students, staff, projects, methods, estate, and impact it is model of economy and clarity. In its sparseness is its beauty and in its beauty is its longevity; the report and its recommendations remain right up to date, and not just for India.

This is one of their introductory remarks (remember this is 1957):

> "the change India is undergoing is a change in kind not a change of degree. The medium that is producing this change is communication; not some influence of the West and East. The phenomenon of communication is something that affects a world not a country."

That phrase could equally apply to modern-day America in the age of the internet and I was interested to find that some Universities are re-thinking not just how we educate designers, but how we redesign the University itself.

This book came out last year and describes the design process by which Arizona State has grown into America's largest public university while increasing inclusivity and moving into the top tier of American research Universities.



The authors – one of whom is the President of the University – addressed a simple problem. In a higher education market were the 'top' research institutions are highly selective in who is allowed to study with them (think of Oxford, Cambridge, Harvard, Stanford, MIT), how is it possible to extensively widen access to higher education but also improve research quality? In other words how do you expose people from more disadvantaged backgrounds, perhaps people who haven't had the chance to develop as they might have, to leading research ideas, to new knowledge?

Aaron Swartz had one solution to this – to shepherd that research from those highly selective institutions into the public domain, but Arizona State have designed another, under the banner of 'one university in many places' – including online places – and a trebling of funding for inter-disciplinary research addressing 'grand challenges'. Which actually isn't so far from what we do at the University of Brighton, so perhaps this is a book that we are already beginning to write ourselves [building on the foundations that Bruce and others have put down].

The internet has changed the way we do many things – for good or ill – but most of all it has put us both into a new relationship to knowledge and provided new ways in which we can access, and crucially *design* access, to that knowledge. The things we

know are increasingly outside of our heads; a young designer goes to Google now, the new version of long-term memory and collective unconscious. We're better informed than we have ever been but that has somehow made the problems of our time, and the solutions to those problems – think of Syria, for example – more elusive than ever. We continue to think in disciplines

Below is a picture from St Andrews University. On the left is the entrance to the Department of Moral Philosophy. On the right is the entrance to the Department of Logic and Metaphysics.

Two branches of philosophy and all those years staff and students have made one choice or other, morality on the one hand, logic on the other. And a choice reinforced by the structure of the University, and the difficult to move doors that are very obviously here and there. (As an aside, and if the positioning of the cigarette bin is anything to go by, the smokers seem to be moral philosophers.)

It seems to me that our problems often don't understand these disciplines, that problems of climate change, gender inequality, global finance, and education – to name a few – have a complex dynamic of their own. The internet, and particularly

creative commons, has pointed the way to some of the solutions. The organization and website TED, which stands for Technology, Entertainment, and Design has given us a broader idea of how design can traverse and connect disciplines, and the Open Source movement, where anyone can contribute to a larger project, like Wikipedia and Wikihouse, has given us new models of how we can work collaboratively and productively, and where outcomes are continually evolving.

We don't just need to be developing solutions though, we need to be framing and working on the right problems. The trickiest, most important problems always involve established interests in the political, legal, corporate, social, and technical spheres. Framing those tricky problems requires imagination and that is perhaps one of the most effective aspects of design thinking – to help us see problems outside of traditional disciplines and categories and to propose new forms, new shapes, new structures, new transitions, with which we can address them.

The Design Council's designer of the year in 2007 was someone called Hilary Cottam. The award sparked a big debate in the Design industries because Hilary wasn't a conventional, discipline-based, designer. She works on thorny public service projects addressing prison reform, urban poverty, loneliness, and unemployment. She does this by drawing in traditional design expertise when it was needed, using it alongside other types of knowledge, particularly the knowledge of those who might contribute, or be affected by the designs she works on. The shape of her solutions lean more to social arrangements than physical form, putting people in new relations to one another and strengthening good connections. When I interviewed her for a research project a few years ago she told me she was given her Designer of the Year award by the famous German designer Dieter Rams, whose influence on modern design, through his work for Braun, is huge, not least through being an inspiration for the Head of Design at Apple, Jonathan Ive. Dieter Rams told her: "This is really, really exciting because the best chair and the best shelf have been built now, so let's use these skills for shaping society."

Imagination and Ethics

Design affects us pretty much every minute of every day, in all kinds of things: traffic

flows and ticket machines, computers and cars, electric fans and electricity bills, mobile phones and mobile homes, it's all designed. These things regulate and mediate our behaviours, they nudge us one way or another, towards this door or that one. The process of design has consequences for us. Mostly these are well-intentioned consequences, but this direct effect on our behavior, along with the fact that unintended consequences often arise, means that designing can also be understood as an ethical activity. Some of you may have heard of a philosopher called Mark Johnson, who wrote a very influential book together with his co-author George Lakoff called *Metaphors We Live By*. It's a careful and convincing analysis of how our language draws on 'root metaphors', the way we describe an argument in terms of war, for example (a conflict metaphor), or the way we couch the idea of 'understanding' in terms of 'seeing' (a visual metaphor). These metaphors carry with them basic values and associations and one doesn't have to look at a design process for long to realise that metaphors play a large part – they help to inflate that lifejacket of the earlier quotation. Indeed the basic functioning of a metaphor – the way that one thing can be thought of as another – often appears to be the driving creative force behind a design process.

A later work by Johnson focuses on the idea of moral imagination and towards the end he describes how such a faculty like this can be developed: "We must cultivate moral imagination by sharpening our powers of discrimination, exercising our capacity for envisioning new possibilities, and imaginatively tracing out the implications of our metaphors, prototypes, and narratives."

Possibilities? Metaphors? Prototypes? Narratives? That sounds like design thinking to me. That link between design and ethics in terms of a thinking process underlines the importance and potential of design both as a valuable activity in itself, to develop our thinking about possible futures, and as something that will save the world, as the T-shirt says.

This is design outside of traditional disciplines – a creative and essential element to every discipline; a way of opening up our future, not closing it down.

Thank you very much for reading.