DESIGN

MODELS OF CHANGE

The impact of designerly thinking on
people's lives and the environment

Ken Baynes

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The impact of designerly thinking on people's lives and the environment

- ❑ Humans use mental models of the world to act on the world

- ❑ Designers use mental models of the world to imagine the future of made things

- ❑ Everyone uses mental models to imagine the future of their own environment

- ❑ Media, marketing and design promote models of a high consumption lifestyle

WHAT NEXT?
Can designerly thinking help humans make mental models of a sustainable future?

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Figure 1 Humans begin to use and understand models from an early stage of development. This drawing by Joe (age 4 ½) shows a model of the world that locates his own family – some live in the United States – on the familiar globe of the earth. The drawing has been annotated by Joe's grandmother (Joe's drawing courtesy of Yvonne Allison).

ACKNOWLEDGMENTS

ILLUSTRATIONS

A number of the illustrations in this publication come from QUICK ON THE DRAW, an exhibition about the everyday uses of drawing. The show was organised by Brochocka Baynes in conjunction with the City Art Centre, Edinburgh; the Harley Gallery, Welbeck; and Croydon Clocktower. It was shown in addition at Loughborough University in Autumn 2009 where it was accompanied by seminars and events about the significance of modelling and the value of drawing as a modelling medium. Other illustrations come from items in Ken Baynes' collection. Many thanks to Dr Xenia Danos for her work in photographing many of the items from QUICK ON THE DRAW and her help in identifying further examples.

Figures 2.24, 2.25, 2.26 and 3.15 are reproduced from *A Framework for Design and Design Education: a reader containing key papers from the 1970s and 80s* by Bruce Archer, Ken Baynes and Phil Roberts and published by the Design and Technology Association (2005). Permission has been given by both the Design and Technology Association and Loughborough University who jointly own the copyright.

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Figures 2-5 Everything that people make has to be imagined before it can be made. First it is modelled in the 'mind's eye' but it has to be further developed and shared through physical models – often drawings but also mathematical and 3D models. These drawings are for a 'pyrotechnic spectacle' by The World Famous, a company based in Kent. Full Circle follows the unfolding of the seasons marked out and symbolized by synthesized and live music, gouts of flame, smoke, changing lights, a blazing symbolic tree and extraordinary fireworks.
(from the Quick on the Draw exhibition)

Full Circle was shown first in Falkirk and has since been seen in London and Turin.

A collaboration between The World Famous (directed by Mike Roberts) and the Slovenian band Terrafolk, Full Circle is an IN SITU show. IN SITU is a European network for artistic creation in public areas financed with the support of the European Commission. Full Circle was commissioned by the Big in Falkirk Festival and IN SITU and co-commissioned by Without Walls.

Figure 2 Initial design sketches by Mandy Dike.
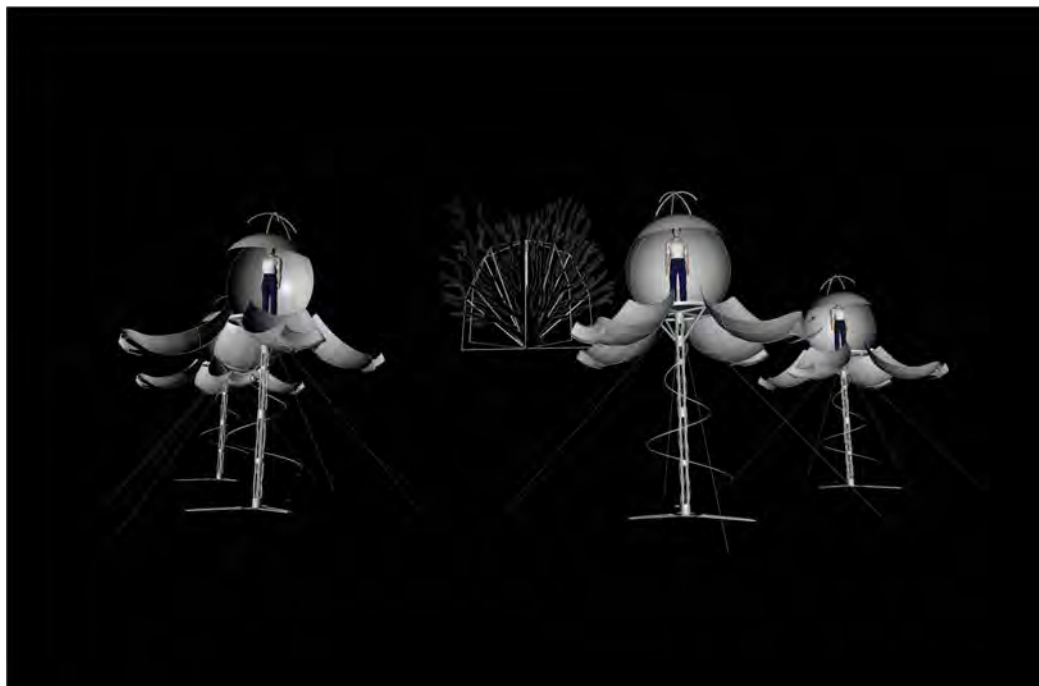
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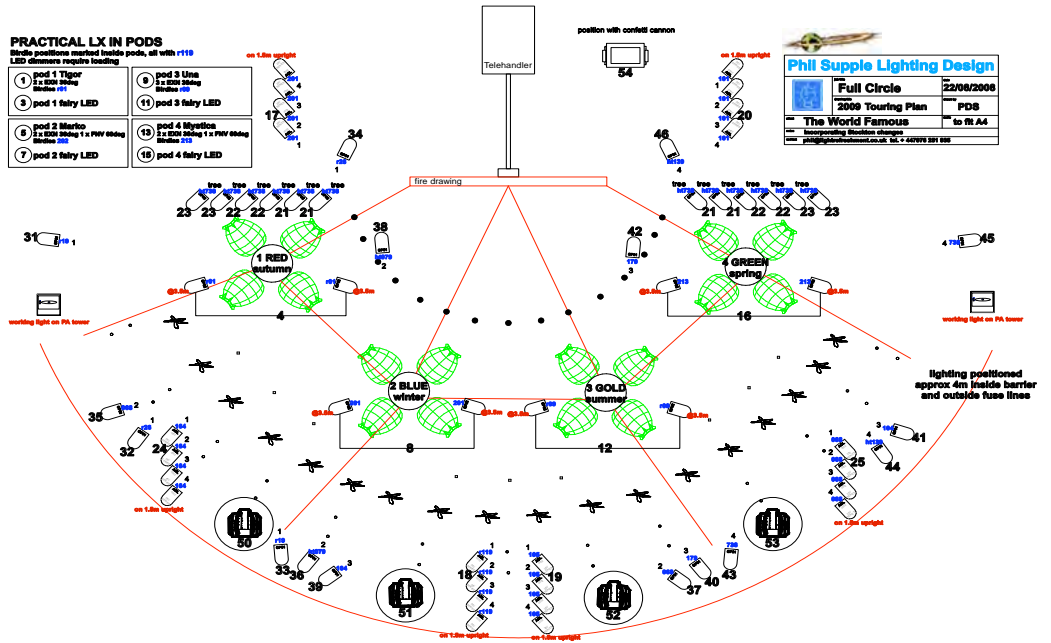
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Figure 5 Layout plan for the pyrotechnics by Maria Hingerty.

INTRODUCTION

The impact of designerly thinking on people's lives and the environment

Humans engage in design activity to create a made environment within the natural environment. In many ways this is positive. However, it also poses dangers for the future. It is important to be able to forsee and so control the results of design decisions. Here work is in progress for the 2012 Olympics, transforming a huge site in East London.

(Photograph by Padmayogini/Shutterstock.com)

INTRODUCTION

Unlike other animals, human beings do not survive only by adapting to their environment, they also change their environment. Not only do they change the natural environment, they also create a human environment. This human environment is a complex of ideas, institutions, knowledge, communications, systems, things and places. It is dynamic. Human culture is itself constantly changing. Each generation of people are part of a process by which they are subtly different from the generation before and will, in turn, have children who are subtly different from them.

People's impact on the planet has been substantial and, in the last two hundred years, has become potentially dangerous. Using the human environment as their base, people have begun to deplete and damage the natural environment. Over much of the earth's surface the evidence of human activity overshadows the natural world. The ravenous appetite of industrialization is directly responsible for destroying plants and animals and depleting and polluting the land, the oceans, and even (through global warming) the atmosphere.

Of course, human beings have not set out to damage their home planet. The paradox is that the negative impact on the natural world comes from some of the most creative and intellectually daring of people's activities. Science, technology and design have interacted with the driving force of free market economics to shape contemporary culture. In many fields of enquiry, the human mind finds itself exploring ideas and worlds of meaning that would, quite literally, have been unthinkable a hundred or even fifty years ago.

Evolutionary biologists have tried to identify the circumstances and capabilities that have led *homo sapiens* to occupy such a dominant position. They focus on our 'general purpose intelligence'. It is this that allows us not only to learn from experience but also to react in new ways to new situations. However, humans do more than react. They are curious and speculative. They are constantly trying to construct a framework of meaning to explain the world and their place in it. They make artefacts and images not only to achieve practical goals but also to embody and express meaning. They often try to preserve the status quo but equally they may want to try something new, almost for its own sake. This desire to open up new possibilities goes beyond any narrow interpretation of problem solving. Problems are indeed solved but there is also a search for new horizons. Ironically, the search for new horizons may produce new problems so that a part of the dynamic of 'progress' is the emergence of unforeseen and unwanted side effects.

Since the industrial revolution, material culture has hugely expanded in scope, far outstripping our grasp of the intellectual, economic, technological and social forces at play. It almost seems that our genius for making new things is out of control. We often find that the results of technological and design activity are not what we thought they would be. The ramification and multiplication of things has results far beyond everyday practicality. The organisation of the world of things implies matching changes in the organisation of the world of people. For example, new communications technologies

reach into lived experience and affect how people view themselves and how they relate to one another. It turns out that changes in technology impinge on spiritual and aesthetic values as much as they do on work or shopping or travel.

In view of its importance in the contemporary world, the mental capacity involved in shaping the environment has been surprisingly little studied. Compared with the significance attributed to language, it is allocated an inferior position. However, the argument advanced here is that the very survival of human civilization depends precisely on our developing a better understanding of this aspect of ourselves.

Cognitive science now recognizes that the mind engages with the world through the medium of mental models. These represent or stand for external reality as presented through the senses. They are neurological constructs which can be manipulated neurologically. Memory uses models of past experience. This enables us to learn from our actions, to store knowledge and to have a sense of continuity with our ancestors. Even more remarkably, the mind can also model things which do not exist. These can be fantasies but equally they can be plans for the future – proposals for things, events or institutions which might one day be brought into existence.

Designing is one of a number of 'intentional activities' through which humans shape the future. The particular arena for design is material culture in all its complexity. Material culture is not simply 'practical', it is the result of beliefs and desires, ideals and values as much as functional necessity. A useful way of looking at material culture is to say that there are always two aspects to 'function': function in the sense of physical performance; and function in the sense of carrying cultural and other human values or messages. The two are inseparable. Performance and values interact with each other to create an environment which attempts to support and reflect the purposes of human beings.

Although the focus of professional design activity is material culture, this does not mean that it is solely concerned with shaping the future of 'things'. The contents of material culture take their significance from the human activities which they support and enable. Design activity is essentially concerned with human behaviour and human potential far beyond the obvious boundaries of 'things', reaching out into the wider field of intentional activity in general. Material culture is a dynamic and changing arena which is as much about what people do and want as the physical world they inhabit. In fact, it links the two.

Although design activity is a universal aspect of human societies, its character varies dramatically between one culture and another. The way designing is carried out, who does the design work and who controls what is done, depends on the beliefs, values, resources, political organization and technological know-how of a particular culture. Living in a democratic society dominated by the market economy gives us a view of design which is very different from that which prevailed in medieval times. Beliefs, values and economic priorities have a powerful influence. Contrast, for example, the prominence of social buildings (hospitals, town halls, water works, libraries) in the nineteenth and twentieth centuries with the cathedrals, monasteries and castles

of the thirteenth century. Design effort goes where society wants it to go, or where power and wealth directs it.

In pre-industrial societies, it is often difficult to distinguish designing from making. The maker or craftsperson was also the designer and more often than not he or she was reproducing something made before. Skill in making developed and refined what was made and demand sometimes led to incremental improvements in details of the product. However, there was not specialist design activity. Rather it was design activity fully embedded in craftsmanship.

Design activity, practiced as a specialism, emerged as society grew more complex and embarked on ambitious attempts to shape and control the environment. Inevitably, those in power were in control. Early design specialists included architects for temples, memorials and palaces; experts on water and irrigation; military engineers; and scribes. It is clear that these prototype 'professionals' made use of modelling techniques: they were often depicted with drawings or physical models and it is clear from what they designed that they made effective use of basic mathematical modelling.

For example, the emergence of a cadre of naval architects in the Tudor period reflected the growing competition for trade with distant lands and the matching developments in naval warfare. Contemporary illustrations show these new professionals at work using drawings and mathematics as modelling tools, first to explore the design of innovative ships and then to control their production. The same period saw a dramatic development in map-making and the graphic design of maps. These maps were needed not only by mariners but also by merchants and politicians who were looking across the seas for wealth and power. They provided a picture or model of a wider world and were a key to gaining power over it. They could be used to show conquests and to record the rights of new ownership.

In classical times, the Roman architect Vitruvius had already written on the importance of models in architecture and engineering. His work, in turn, influenced Renaissance designers. By the eighteenth century the stage had been set for the explosion of design activity that marked the Industrial Revolution. Throughout this time, the key modelling media were drawings and numbers. In the new graphic forms of technical, engineering and architectural drawing, the two came together to create a very flexible, well-understood medium for developing and communicating proposals for future designs.

The value of modelling in relation to design was clearly recognized in Britain, France and North America in the nineteenth century, though the term 'modelling' was not used. Skill in sketching, measured drawing, technical drawing and model making were an essential part of the training of architects, engineers and industrial designers as well as soldiers, surveyors, cartographers and many others. Skilled artisans were expected to be able to make informative sketches. Publishing technical illustrations to convey ideas and proposals became widespread.

It was less widely understood that drawing was not simply a way of conveying information but also a tool of the imagination. There was a clear picture of designers – particularly engineers – as people who shaped the future. How they did it, what mental processes they used, and what tools they used to do the job was not much considered. Skills in the key modelling media were taught but there was little theory to explain why they were effective or how a designer should go about the job of designing.

The twentieth century saw the emergence of much polemic on design and its role in society. Some of this had a theoretical flavour and there was a re-evaluation of design activity from radical social perspectives. The best known venue for these developments was the Bauhaus in Germany. This institution proved extremely influential and suggested that rational and systematic approaches to design and designing would prove appropriate in an industrial, mass democracy. In fact, the Bauhaus was building on attitudes to design already visible in the work of nineteenth century engineers who believed that form should follow function and that rational and scientific principles should be paramount. Design theorists in the 1920s and 30s suggested what designers should think about and where in society they should direct their energies. However, in spite of the growing interest in psychoanalysis, there was little speculation about the way the designer's mind worked or what, if any, special capacities it had.

The Second World War gave a further decisive boost to science and rational management. It was believed - rightly - that the War had to an important extent been a struggle between scientific elites for technological supremacy. The command of superior technology gave victory. At the same time, the conflict gave birth to the computer, a modelling tool which in a remarkably short time has come to dominate every area of life and every area of design activity from weaving to animated films to aeronautics.

The 1960s saw new interest in the management of design, the psychology of design and the systematisation of design into a bureaucratic process. Much of this was driven by the Cold War and the Space Race but it was also a response to the demand for large and complex design teams to work together on social housing, hospitals, schools, new technological equipment, motorways and airports. The nature of the post-War economy needed designers to form teams and become a part of management.

One result of this was a new interest in design methods. The proposition was that if designers used the appropriate methods throughout the course of a particular piece of design work, the resulting design would be fit for its purpose. It soon became clear that this was optimistic. However, what also became clear was that designers relied on a distinctive mode of thought which could be identified and fitted into emerging theories of intelligence. In the past decade exciting developments in neuroscience have begun to shed more light on the status of the brain as a living, biological electro-chemical system with extraordinary powers of 'mind', particularly learning and imagination. Evolutionary biologists are now able to interpret the capacity and nature of the human brain as an outcome of the evolutionary niche occupied by humankind.

Disciplines such as semiotics and epistemology have begun to explain how it is that words and images convey human meaning and can inspire human action. Educational psychologists place the development of mind in the context of each child's unique genetic heritage and the singular experience of being born and growing up in a particular environment.

The aim here is to utilise some of these insights to explain more precisely how it is that designers can in fact design. I hope one effect will be to remove some of the mystique from design activity and to show that it is a common or normal aspect of everyday human behaviour. I believe we are all 'designers' in our everyday lives.

Is this important? I argue that it could hardly be more important. In the light of the environmental challenges facing humanity, it is essential that we gain a better insight into what might be called 'designerly thinking'.

It could be said that the ability to use models as a way of shaping the future – designerly thinking – is one of the most dangerous of all human characteristics! It is the use of mental and externalised models in conjunction with our adaptable 'general purpose' intelligence that has allowed us to achieve dominance over the whole of the natural word. Specialist design modelling, when associated with science, technology and the market economy has led to an extraordinary expansion of the made world. This has been driven by economic growth but has also created economic growth. Design has had the key role of bringing technology to market, creating and helping to sell a stream of innovative products and services. Designers work with the media to promote a life of consumption. Taken almost for granted in the 'developed' world, many consumer goods are totally inaccessible to very large segments of the world's population. It remains far from certain that these taken for granted products and services could ever be extended to the whole of the world's population without causing catastrophic environmental collapse.

The challenge is that the widespread use of 'designerly thinking' has, over a period of two hundred years, changed the material circumstances of many people's lives and revolutionized the cultural climate in which they live. It has now become urgently necessary that society should better understand how this mental capacity 'works' and how it can be focused on imagining the existence of a lifestyle capable of being sustained into the future.