Sustainability: an on-going conversation in design and technology education

Dr Eddie Norman, Loughborough University, UK

The 1970s were a period of great economic and social turbulence in the UK. They were also the years when environmental concerns became part of the international political agenda following the publication of the Club of Rome's report on 'the predicament of mankind', *The Limits to Growth* (Meadows et al, 1972). And a time when the 'design education movement' was being shaped, and arguably led by Professor Bruce Archer through his leadership of the Design Education Unit at the Royal College of Art (RCA) in London. Bruce Archer died earlier this year, in May 2005, but his work will undoubtedly be influential for many years to come.

DATA recently published *Designerly Activity and Higher Degrees* by Professor Bruce Archer as part of its programme for supporting research by new lecturers on initial teacher education (ITE) programmes in design and technology. The second publication in this series, *Design and Democracy: speculations on the radical potential of design, design practice and design education* by Professor Ken Baynes has now also been published. A review and response to this publication by Steve Kierl is published in this issue of the journal. The final publication in this series *A Framework for Design and Design Education: a reader containing key papers from the 1970s and 1980s* is now in the final stages of preparation. This book contains key papers by Professors Bruce Archer, Ken Baynes and Phil Roberts, which all have their origins in those exciting years at the RCA in the 1970s. Their value is not just as an historical record, but as part of the conceptual framework which has facilitated the emergence of design and technology education. This editorial draws selectively on this rich resource in order to illustrate the on-going nature of many current debates and some of their conceptual origins.

Firstly, a passage taken from the introduction:

The 1970s and 80s were particularly difficult times in Britain. Design and design education developed against a background of relative economic and industrial decline. Old industries were closing with a catastrophic loss of jobs. It was far from clear what would replace them. Some of the protagonists of design argued that it could perform a key role in the nation's economic survival and renewal. A number of politicians, notably Margaret Thatcher, were also persuaded. They argued that in essence what industry needed to do was to make and market products that people wanted to buy: only more attention to design could enable that to happen. The argument for design education in schools became entangled in arguments about British economic success. Britain needed young people capable of forming a cadre of designers, design managers, manufacturers and retailers who, supported by a design-aware public, would put Britain back on the world's manufacturing map.

Interestingly, few people at that juncture foresaw a further area where design would prove essential to economic and social renewal. It was far from clear that tourism, service industries and mass media would later become so important or that there would need to be environmental renewal on a grand scale replacing old industry with new international venues. (ibid:10)

So the seeds of the perceived relationship between design education and economic renewal, which underlie many current and recent initiatives, both in the UK and internationally, were firmly planted many decades ago. There are, of course, echoes here of the introduction of metalwork and woodwork in UK schools to help meet a perceived skills gap following the 1851 Great Exhibition in the Crystal Palace in London. Design and technology education is undoubtedly seen as a key driver for the development of national economies and this was reflected in the Keynote presentation given by Janet Davies at the recent DATA International Research Conference, and which is published here. In her review of the revision of the national technology curriculum in New Zealand, she notes that '(t)echnology education was the
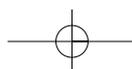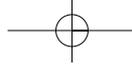
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primary tool in the new National government's reshaping of the curriculum to promote national economic growth' (p. 23).

The first of Bruce Archer's publications in the reader is entitled the 'The Three Rs' and it both distinguishes Design from Science and the Humanities, and identifies the key role of modelling as the medium for designing. For many these remain unresolved matters and there are on-going debates concerning the nature of designing. This is evident in Pat Hutchinson's discussion of 'Design and Technology for the Conceptual Age', which was the John Eggleston Memorial Lecture at this year's conference, and is also published in this issue. It is apparent that the nature of design problems and the methods and strategies through which they can be legitimately pursued remain live issue in America. With the advent of aspirations for 'knowledge-based economies', and the drive for creativity and innovation to support competitiveness, as well as the confusion surrounding the meaning of skills in the context of designing, it is planned to produce a special issue of this journal in the next volume concerned with 'designing and vocationalism', which will revisit all of these issues. However in 'The three Rs' Bruce Archer also refers to the tasks for research resulting from the 'lack of scholarly regard for practical skills and the subjects associated with them', and it is his introduction to these that I have chosen.

It is sobering for those of us who are actually engaged in postgraduate research and teaching in the Design area to record that the most strenuous attempts to break that vicious circle have been made by secondary school teachers of design-related subjects. The movement which led to the introduction of the term Design to describe this area of education and which caused the Minister of Education and Science to commission my department's enquiry entitled Design in General Education was a grass-roots movement. It was started by teachers of art, craft and technical studies, and to a lesser extent by teachers of home economics and others, all of whom were gravely concerned

about the relevance of education to the major problems facing mankind today – that is, to the quality of life, the urban environment, the use of physical resources and so on. It is even more sobering for some of us who teach or practise mainstream design activities to record that it was not until these same secondary school teachers, and the educational philosophers who work with them, asked fundamental questions, that we looked seriously at the knowledge base for our own activities.

Bruce Archer goes on to describe the taxonomy he used for organising his own research programmes, a framework which is still of great value to design researchers, but the quotation also indicates the long history and tradition of teacher-led initiatives that have shaped design and technology education in the UK. DATA, and this journal, have always supported research undertaken by teachers, notably action research programmes, and with good reason. The case for the efficiency of centrally-planned initiatives has been somewhat undermined by the recent lessons of history. In complex, real world situations local initiatives, driven by people 'on the ground' are much more likely to result in effective innovation. Pat Hutchinson refers to the 'reflective practitioners of an emerging discipline' that she met in her visit to the UK in the mid-1980s, and it is such people who have continued to provide subject leadership in design and technology. One of the interesting aspects of Janet Davies's paper is her discussion of the use of action research strategies at 'national level' in the review of the New Zealand technology curriculum.

The second of Archer's papers in the reader is perhaps less well-known than 'The three Rs' and concerned 'The need for design education'. It was prepared for a UK Department of Education and Science Conference in 1973. It was written following the United Nations Conference on the Human Environment in Stockholm in 1970 and the publication of *The Limits to Growth*. The following discussion is picking up from these milestones and concerns some of the difficulties in achieving sustainability.
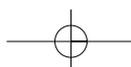
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And on top of these four crises, there is a dilemma of crises; that is, the ironic fact that the more we do to control the problems of population, pollution and the depletion of resources, the more restriction we put on personal freedom, on personal participation, on the diversity of values and therefore the larger and more irksome become the institutions, which we are already somewhat disenchanted with. One reason why these crises are difficult to resolve and could be impossible to resolve, is that the profound shift of values which was referred to in Sinews for Survival *is tending to attach instincts which are very deep in our animal natures. The animal instinct for growth and expansion is an instinct to build up resources against the coming of possible famine, pestilence and deprivation by other species. Our animal instinct for exploration is always to allow our young men to climb mountains, to explore, because there may be another green valley the other side of the mountain which we may need one day. Our instinct for exploration causes us to scatter in order that some members of our species may be in some safe havens so that when the pestilence comes there will be some survivors to redevelop the species. The law of nature is not "survival of the fittest", the law of nature is "random mutation and survival of the fittest" and it is part of our biological nature to mutate in order that there shall be some variants who will be fit to survive under changed conditions. It may be that these deep instincts underlie a lot of what we do. The community at large, for example, seems to be willing to support or at least to tolerate artists, scientists, philosophers, eccentrics in almost anything that they desperately wish to do, provided that they seem to be able to do it against almost overwhelming odds and seem to have some chance of actually succeeding. So the conventional wisdom is that what can be done should be done. If a man can climb a higher mountain this is admirable and we will provide him with the minimum he needs in order to carry out an expedition, if it is possible to run a faster mile we will applaud him. If it is possible to split the atom we will*

give him the apparatus to do so. This is part of a satisfaction of our primeval urges. So if we were to say now, in the light of modern environmental crises, "there are no more green valleys", "growth is evil", "change, novelty and newness are not necessarily good", "exploration is anti-social", "consumption is contra-indicative for survival", we are attacking instincts which are at the mainsprings of our animal life, at the mainsprings of our biological function, and can only cause deep perturbation and stress.

And in this context, Bruce Archer goes on to discuss the need for a new approach to design education.

Thus, the case for a new approach to design in general education rests on two issues of major importance: first, the need for public sensibility to environmental, planning, social and aesthetic problems, and secondly, the need for a fundamental value base in general education to restore lost confidence. The purposes and problems of design education of the general population is analogous to literacy and numeracy. Literacy as we understand it is more than just the ability to read, although obviously it must begin there. Literacy includes the ability to appreciate and to be enlarged by literature. Similarly numeracy is more than just the ability to manipulate numbers, although obviously one must begin there. Numeracy includes the ability to appreciate and be enlarged by mathematical logic. Similarly design education is more than just the ability to draw or possess plastic sensibility. It is more than the ability to produce and comprehend two-dimensional and three-dimensional information. It is more than simply acquaintanceship with the contents of "Which" magazine. If we want to construct a pedagogic equivalent to literacy and numeracy, meaning the state of being able to appreciate and be enlarged by design, then I think we have to have a better approach. I am going to use the term "design awareness" for design literacy in this special sense. You may ask "What are the components of design

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awareness?" Clearly art is part of it. Art offers perception, sensibility and handling of emotional meaning. But aesthetic sensibility extends to other things. Athletics and home economics are aspects of dexterity. Clearly science is part of design awareness, that is to say knowledge of facts, knowledge of laws, knowledge of relationships. But knowledge and reasoning of the type we see in science extends also to mathematics, to language, to philosophy. The approach to design awareness in my view is more than just building bridges or understanding the interfaces between art and craft, science and languages. In my belief design awareness contains two additional elements: one of which is basic to the primitive nature of man, and one is at the very limits of our modern intellectual ability to reason.

The primitive element is concerned with that quality which distinguishes man from most of his fellow creatures, that is the capacity to fashion tools to adapt the environment to suit himself, instead of adapting themselves to their environment. The advanced additional element is concerned with his capacity to impose qualitative considerations upon quantitative considerations; to impose aesthetic, spiritual and ethical elements upon physical, economic and rational elements.

Modern conditions made the ordinary man in advanced technological society quite incompetent to fashion his own tools. We use electric drills but we could not cut ourselves a reed whistle. We use thermostatically controlled central heating, but do not know how to survive on a mountainside. The carworker on a production line could not build himself a chair that would be both light enough to carry and strong enough to support him. We have lost our personal control over the environment. We have lost a large part of our toolmaking confidence and we have lost a large part of our folk knowledge about nature, survival, and dexterity. We have put layers of delegation and layers of material between us and what we want to do. Perhaps the ecological

irresponsibility of society is one product of this lack of direct contact between a man, the individual and the natural elements. Perhaps the urge to do it yourself, the urge to get away from it all is an instinct to get back to our tool-making nature.

The crisis which calls into question all education, not just design education, relates in a similar way to what I called the second distinguishing element of design awareness, and that is our capacity to impose qualitative considerations upon quantitative considerations. Aesthetic, ethical, social, ideological considerations, (the subjective and qualitative), are not only different from economic, technical and physical consideration, (the objective and quantitative) but they also subsume them. C. West Churchman, Russell L. Ackoff, who are both distinguished operational research scientists and Peter Medawar, distinguished medical scientist, have all three in recent publications asserted that all so-called hard scientific fact rests upon value judgements, and not the other way round. Even so-called hard scientific facts rest upon an agreement about the suitability of the axioms which underlie the theories, on the relevance of the evidence which is admitted into consideration, about the appropriateness of the measuring techniques, about the quality of truth in proofs. Moreover, it is not the objective facts of systems which leads us to accept or reject them. It is not the width, the strength, or the cost of the motorway which causes us to accept it or reject it, it is its convenience, its intrusiveness, its comfort, its beauty , its ugliness. It is the subjective attributes which cause us to accept or reject, not the objective physical properties. And it is the unfortunate case that man's ability to manipulate, reason with and operate with the quantitative has completely outrun his ability to manipulate the qualitative. The fact is that quantitative relationships are simply a special case of relationships. The tools are there in New Maths which is the mathematics of relationship, in logic, in the techniques of debate, the techniques of judgement.

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Bruce Archer ended this paper as follows:

It is my sincere conviction that a massive broadening and deepening of design education in secondary schools today is overwhelmingly the most important urgent need for the survival as well as the happiness of mankind.

This was a huge statement concerning sustainability in 1973, and there is a need to take stock of our progress, but I think it is a statement I would still be willing to support. The quotations in this editorial are largely from Bruce Archer, as it has been written, in part, as a tribute to him. The reader also contains important papers by Ken Baynes and Phil Roberts, from which selections could have been made, but on another occasion. The reader will be available through the DATA website in due course.

In addition to the two Keynotes from the recent research conference, this issue also contains a research article by Yau Che-Ming and Ong Cheng-Cheng concerning the review of pupils' attitudes towards design and technology in Singapore. As design and technology education emerges as a world-wide movement, it becomes ever more apparent that similar issues recur. The survey indicated parallel issues emerging for students in Singapore to, for example the experiences of UK students, and notably, uncertainties about the fundamental nature of the subject.

The abstracts for the papers presented at the 2005 DATA International Research Conference *Inspire and Educate* have also been included. The Conference Book can be purchased through the DATA website, or by contacting Pam Osborne: pam@data.org.uk.

E.W.Norman@lboro.ac.uk

References

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EDITORIAL