A Silent ‘D’

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By the time this Editorial is published, the forth seminar in the *Models of change: the impact of ‘designerly thinking’ on people’s lives and the environment: modelling and society* will have taken place at Goldsmiths’ University of London and a new government might be in place in the UK. If there is a new Conservative government, then James Dyson might be helping to implement the ideas put forward in his recent report *Ingenious Britain*. This report is supportive of design and technology:

> ‘To a large extent the STEM agenda has also ignored its silent D (design). Used as a tool to make products a reality, design links engineering to business. At school level Design and Technology should receive the same priority status as Science and Maths. And in higher education, it must receive the same preferential treatment by the Higher Education Funding Council for England (HEFCE) as Science and Engineering
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> (2010: 21)

Such strong statements are very important to those who are currently fighting a ‘rearguard action’ to hold the position that Design and Technology has, but from a research perspective, the key question must be how is that ‘STEM’ came to recognised internationally as an important focus, rather than say ‘DEMS’? The emergence of the STEM and its associated research agenda will be the focus of a Special Edition in Issue 16.1 of the journal, and the Call for Papers can be found towards the end of this one.

There are some new aspects to the issues that have placed emphasis on Science, Technology, Engineering and Mathematics, such as globalisation and the power of the Internet, but the economic circumstances and environmental concerns are not so different to those in the 1970s that led to Bruce Archer giving an important paper to the Royal Society of Arts in which he saw Britain’s industrial future as dependent on a wider appreciation of the importance of design. This is what he said.

> *‘Design is described as* **useful** *to distinguish it from the expressive arts, many of which explicitly deny there is operational value to their expressions.*
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> *Design is described as* **productive** *to distinguish it both from Science, which is explanatory, and from Humanities, which are reflective, and to place Design in the world of action. Design is always seen as setting in train the production, and the introduction into the world, of some real thing, system or change in behaviour.*
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> *Design is described as* **intentional** *to distinguish it from serendipity, or discovery by chance, and to place it in the social and commercial world, where practitioners are obliged to make judgements on difficult and complex issues, and to take decisions in the face of imperfect information and the capricious turns of event that confront everyone in the practical world.*
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> *Design is described as* **integrative** *to reflect the fact that a design has both to be complete and coherent internally, and to be well adapted to the environment in which it will be sold and used. A designer has the right and the duty to employ information drawn from any and every field of knowledge that happens to be relevant to the case in hand. In this sense, the body of knowledge in support of Design has to be regarded formally as unbounded.*
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> *Design is described as* **inventive** *because it necessarily demands the introduction of something new. Whilst it is not completely unknown for a designer to be asked to produce a specification, drawings or data for an absolutely standard, unoriginal product, such a task would not normally merit the description ‘design’. The inventiveness of Design is in many ways its most distinctive feature. The world ‘creativity’ is often used in this context. The term ‘creativity’, however, more properly describes a combination of inventiveness with productivity. Inventiveness itself has many facets. A design may be inventive in a functional sense, that is, it may perform an operation or supply a service that has not been offered before. It may be inventive in the operational sense, that is, it may perform its function in a new and more efficient or more convenient way. It may be inventive in the technical sense, that is, it may embody a mechanism or a construction that has not been proposed before. It may be inventive in the sense of offering aesthetic, stylish or marketing configurations that have not been seen before.*
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> *Finally, Design is described as* **expedient** *because design activities are justified by their results, rather than their reasons. In contrast to the overriding importance of methodology in the conduct of Science, the conduct of Design is validated by its efficacy rather than the rigour of its methods. Designers can, and do, on occasion, seize upon chance information, adopt*

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capricious ideas and exercise untidy methods in the course of a project. None of this matters if it delivers a satisfactory result. The two procedures in design methodology that really do need to be conducted rigorously are the procedures for determining the precise design requirements and the procedures for determining the validity of the design result'.

So Design could be described as useful, productive, intentional, integrative, inventive and expedient. These powerful ideas were very influential, and it seemed had led to recognition of the important place that Design holds in sustaining society, economically, yes, but essentially in shaping preferred futures. Archer's ideas were instrumental to the formation of the 'design education movement' in England and, no doubt, to all that followed worldwide. The following passage is taken from Ken Baynes' recent seminar concerning 'Modelling and Society'.

In the 1970s the design education 'movement' attempted to resolve the contradictory pressures on the design curriculum by regarding design ability as an attribute of all human beings. Some might eventually become designers and earn their living by practicing their specialist skills in design but all would benefit by developing their general awareness of design and design skills. The idea was that an approach to and within design education could be developed which would be essentially generalist but which would also provide the necessary grounding for eventual specialists.

Design education sought to identify the central core of design activity and to educate children by encouraging them to engage directly in these core activities. The move was a logical part of the wider interest in 'learning through doing' that characterised much educational thinking in the three decades after 1945. It was a radical approach because it assumed that the children would be partly engaged in steering their own education and that, as adults, they would be actively involved in shaping the future of material culture through personal decision-making and citizenship.

It was thought, for example, that children should choose their own design projects and that they could appreciate the idea that a design has to serve human needs and improve a situation. Children were encouraged to offer a critique of existing products and places and to make proposals for improvement. They were expected to discover that people have conflicting views and requirements, that cost and value are important factors and may be in conflict, and that tools, materials and technology are the essential resources of design change and innovation. Most importantly, they were to be introduced to their own cognitive abilities to imagine, model and develop ideas for the future. This unfulfilled agenda looks even more relevant today.
(2010)

So, what happened to reduce Design to a silent D in STEM? Participation in the determination of preferred futures requires understanding of designerly thinking and methods. With the consequences of poor judgements become more evident by the year, it is essential for design education to establish its full role in educational curricula. Economic ills bring the issues to the fore, but it is full participation in a democratic society that should be the real driving force in design curriculum renewal and it is this that is the focus Ken Baynes' seminars. The can be freely downloaded from Loughborough University's Institutional Repository (https://dspace.lboro.ac.uk/dspace-jspui/handle/2134/1686). As one of the events marking the end of this seminar series, Ken Baynes will be giving the John Eggleston Memorial Lecture at the Design and Technology Association's Education and International Research Conference – *Ideas worth Sharing* – at Keele University in July.

The research papers included in this issue indicate well both the range of issues that need to be addressed in developing effective practice in design and technology education. Moshe Barak's paper reports research concerning a model of system design in the context of general education. A three phase model relating conceptual design, structural design and detailed design is proposed and its application with students aged 17-18 was researched. The paper concludes with the recommendation that students should be engaged in tasks of increasing complexity during their school careers in order to develop capability. Such a theoretical position would be expected to attract both support and criticism. Constructed tasks of this kind would not be seen by some commentators as designing, but, in the view of others, they provide the path to developing technological capability. This paper provides a valuable contribution to the on-going reflection on practice in this area.

Sarah Pulé and John McCardle's paper explores the modelling of technological concepts from the area of electronics and how such models influence teaching and learning. The development of novel teaching aids – both physical and virtual – is discussed and principles governing their design are proposed. The pilot research was conducted with undergraduate students at the University

of Malta, but it very clear that the approaches being developed have much wider application. They were the subject of a PowerPoint presentation at the 2009 D&T Association Education and International Research Conference, which was very positively received. Resources relating to this research are likely to be available online in the near future.

The paper by Ronah Harris concerns the use of mobile phones and their importance for increasing access and designing innovative educational activities. Mobile phones are rapidly becoming a ubiquitous technology and this research explored their use by African American youth. There has been something of a tendency to recognise the negative, rather than the positive potential of mobile phones in educational contexts and this paper goes some way towards redressing this balance. The educational possibilities of creative digital content creation have yet to be fully researched.

Debra Lilley and Vicky Lofthouse’s paper addresses the ethical issues surrounding design for sustainable behaviour. Such ethical issues arise because the designer has become a specialist undertaking much of the thinking for others in the determination of preferred futures. The paper reports design intervention strategies which enable designers to passively or actively influence user behaviour in sustainable direction and debates the issues surrounding how an appropriate direction can be determined in such circumstances. The outcomes of a pilot study designed to test new teaching materials addressing these issues with industrial design undergraduates is reported, but the issues will be a source of emerging debate for design educators at all levels. The ethics of design has not featured as strongly as it could, or should have done over recent years.

The paper by Denis A. Coelho explores another important area of emerging pedagogy. User-centred design and methods for achieving greater engagement of users with designing are becoming ever more significant in professional practice. Students also respond positively to the rich contexts that user-centred design can provide and this paper reports research conducted through activity theory to develop and analyse an appropriate curriculum intervention. The goal was to enable creative, user-centred responses through designing. This curriculum development programme was again conducted for industrial design students, but both the methods employed, and the outcomes reported carry much wider significance for design education research.

There is also a review of the important new publication International Handbook of Research and Development in Technology education, which was edited by Alister Jones and Marc de Vries and is reviewed by Professor Robert Bowen.

References

Ken Baynes (2010) *Models of change: the impact of ‘designerly thinking’ on people’s lives and the environment: modelling and society*, Department of Design and Technology, Loughborough University, UK

James Dyson (2010) *Ingenious Britain: making the UK the leading high tech exporter in Europe. A report by James Dyson*

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