



**DESIGN
EDUCATION:
A Vision for the
Future**

Edited by Ken Baynes and
Eddie Norman

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We would like to thank the Design and Technology Association for permission to update and reproduce the 2010 John Eggleston Memorial Lecture given by Ken Baynes and most importantly, the contributors to this book who were able to make space in their diaries to respond to our call at very short notice. The urgency was forced upon us and we are very grateful for the high quality of the responses made despite the time constraints.

Book and cover design: Eddie Norman

DESIGN EDUCATION: a vision for the future

WHY THIS BOOK?

For now ...

This short book is intended as an angry, but measured response to the Government's new National Curriculum proposals for Design and Technology and Art and Design in England. However its scope is much wider than national or 'subject' boundaries, as it is written from the standpoint of Design Education.

The new curriculum proposals are frankly astonishing. They are a tired re-hash of old-fashioned approaches and ideas. How such a document came to be written is hard to understand but the result is not recognizable either as current good practice, or as the views of any of the organizations who might have been consulted for informed and authoritative proposals.

There is little to be gained by Loughborough Design Press joining in the chorus of criticism that will certainly be directed at this folly. We support the criticism of course, but also believe the time has come to put forward a more relevant vision of the future. Consequently:

- Christopher Frayling has written a Foreword analysing the recent history that has led to the current position.
- The Editors - Ken Baynes and Eddie Norman - have put forward their recommendations in the form of a letter.
- Phil Roberts has described the characteristics of design education and provided a means to review and develop design curricular provision and practice in general education.
- Eddie Norman has provided an overview of the research foundations for design education that have been constructed by colleagues over the last decades.

For the future ...

We believe that at a point in the not too distant future, even politicians will recognize the vital importance of design education. We have decided, therefore, to publish this specially commissioned and rapidly produced book. It is structured round the 2010 John Eggleston Memorial Lecture given by Ken Baynes at the Design and Technology Association Education and International Research Conference at Keele University. The lecture was entitled 'Models of Change: The future of design education'.

The lecture proposed seven key themes around which a future vision of design education could be framed:

- 1 The aims of design education
- 2 The significance of practical education
- 3 Encouraging the imagination
- 4 The cognitive value of aesthetic awareness
- 5 The value of learning through making
- 6 The creative relationships between designing and making
- 7 The educational purpose of doing design projects

We have invited leading academics in the design education field to develop the discussion further. Each has taken one of Ken Baynes' themes as a starting point. The aim is to identify the Agenda for a future review of design education policy that could lead eventually to a curriculum and related teaching strategies fit for the 21st Century. Ken Baynes has revised and extended his lecture to cover some of the social and cultural issues at stake and also act as introductions to each of the seven thematic contributions.

We intend this book to be read by politicians, manufacturers, business people, school governors, headteachers, interested parents, policy makers and other stakeholders. Most of all it is directed at teachers in those curriculum areas related to design education. We hope to give them a new sense of self-confidence in themselves and in the value of the ideas, knowledge and skills that they teach.

BOOK STRUCTURE

It is perhaps unusual for there to be an explanation of the structure of a book, but it seems essential on this occasion. This book is the result of contributions made freely by committed colleagues who believe in the future of design education. It is not a series of papers that have been analysed and which lead to particular recommendations presented in its concluding chapters. The recommendations are made by the Editors at the beginning of the book having read the papers but not consulted their colleagues. This was partly a result of the timescale within which this book was written, but also, and more significantly, because the papers that follow explore the rich agendas that a full understanding of design education must encompass. They are a starting point for future discussions, not papers for which the recommendations put forward here represent an endpoint.

How can we make the best use of subject traditions, skilled teachers and existing good practice? We need to revisit some knotty conceptual issues, attempt to sharpen our understanding of our aims, and engage with the fundamentals of design and designing.

The contributions developing the discussions surrounding the seven key themes move this agenda forward. It would be hoped that future curricular provision that took these issues into account would result in credible proposals for the future of design education.

Taken together these contributions provide both the key theoretical positions and practical resources to enable the development of design education curricula fit for the 21st century.

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FOREWORD

In 1988, when the Educational Reform Act made Britain the first country in the world to introduce by law mandatory Design and Technology (D&T) exams for all 16 year olds, it looked as though the academic arguments - and the specialized research - about the benefits of D&T in secondary schools had at last been accepted by the establishment: arguments about design as an intellectual/practical subject in its own right, as a way of thinking about, and approaching, other academic subjects *and* as a source of rich vocational possibilities. D&T had, it seemed, shaken off its late Victorian associations with Mr Chippy in the woodwork room and with 'low-attaining' students who had trouble coping with words and numbers - shaken it off among teachers, learners, teacher-educators, school governors, politicians and interested parents. Design had achieved 'parity of esteem' with the other core disciplines - remember that phrase? - rather than being taught in the outhouse.

The focus of the argument might change - from 'problem-solving', 'critical evaluation' via 'learning through doing', 'the iterative process' to 'the creative industries' - and the discipline might seem to be in a constant state of self-clarification which to the uncharitable resembled navel-gazing - but this was from a position of well-earned confidence and strength. When, in the mid-1990s, just after the 'Design and Make' reforms to the curriculum, 'the creative industries' argument was added to the mix, it gave design extra visibility as a key driver of economic success. Granted, 'the creative industries' were at some level a rhetorical construct which didn't really exist as a collective - I mean, what do the fashion business, the software industry, the antiques trade and publishing *really* have in common? - but it was a very effective argument in its day. I was involved, in the early part of this century, as Chair of the Design Council and Rector of the Royal College of Art, in trying hard to establish design as the hyphen between Science, Technology and Engineering - the silent partner in STEM. And for a moment it looked as though this might actually happen: a senior government minister said to me that he thought it already had happened! Oh, and a well-researched report in the early 2000s concluded that D&T had the lowest truancy rate of all school subjects: it *engaged* young people in ways other subjects could only envy. The sort of statistic that politicians love.

And then the tide turned. Quite suddenly. 'The creative industries' dropped from public discourse, to make way for 'productive industry'. Design was not included among the 'priority subjects' in the Browne Review of Higher Education - a real disaster for art and design colleges and faculties. The Russell Group of universities announced that Art and D&T were no longer to be considered credible pre-requisites - not 'challenging' enough for entry into their high achieving institutions. Politicians of all persuasions reverted to talking about Design as a pre-apprenticeship subject, filed in the box 'vocational', about training rather than education. They seemed to forget William Morris' celebrated observation that training was something you did with dogs. They did sometimes wax nostalgic

about a magic moment in the craft workshop. Then there was the dark night of the English Baccalaureate, which always reminded me of discussions in the Design Research Unit at the RCA about whether the three Rs should *really* be 'reading, wroughting/wrighting, rithmetic'; for which there was actually some historical evidence. It had looked at the turn of this century as though the message about design in schools had been thoroughly received and understood - and yet it clearly had not. What went wrong?

Some have argued that Design tried too hard to be all things to all people - raising expectations the discipline could not possibly deliver. That having been confined to woodworking, metalworking and weaving for so many years, it got into the dangerous habit of over-justifying itself: a recipe for disappointment. Others have argued that the very diversity of Design in and across the curriculum led to all sorts of muddles about where the *heart* of the subject lay (process, product, or impact), which in turn led to patchy teaching - at first because the Craft generation still dominated in classrooms, later because of the reaction 'when in doubt about simulated design projects, go formulaic' and treat the subject as linear, rigid, constrained. The Sorrell Foundation initiative JoinedUpDesignforSchools explicitly countered over-complicated projects where 'there is just too much work to do' in the time available, by foregrounding the client/design relationship in more realistic settings. Others still have argued that Design tended to remain physically isolated from the rest of the school, which did not help its supposed integral connections with other core disciplines: this was certainly my experience whenever I was asked to open a shiny new Design wing which conformed to all the latest, increasingly complex health and safety requirements. Out of sight, out of mind? Wearing my higher education hat, I also noticed that design students - if they went into school teaching - were much more likely to gravitate towards the art room than the design studio/workshop/space: they did not have the same respect for D&T, and its confusing academic claims, coming as they did from a learning environment where 'academic' was still a dirty word. Debates about whether Design had its disciplinary base in Art or Science seemed a very long way away.

Whatever the reasons - and they probably include all the above, and more besides - there is no doubt at all that Design in schools has lost ground, esteem and credibility in the early twenty-first century. In political discourse, there has been a strong swing away from Design as a core intellectual/social/academic pursuit: at its most extreme, this swing has taken the form of trying to put the clock back not just to Mr Chippy but to Mr Chips. The big arguments, which used to cut ice, have come to be seen as broken-backed: the claim that designerly thinking is valuable in all academic subjects seems to cancel out the more specific and pragmatic claim that design is central to economic/industrial development. Those of us who can remember the excitement, the sense of *promise*, surrounding design education in the years 1973-1995 - the visionary years, when we all talked animatedly of the experience of design in schools enabling learners to *make a difference* in

the cultural world, and about savvy citizens in the modern hi-tech universe - are beginning to wonder whether our conclusions were ever *really* accepted, deep down, by the powers that be. Several of those pioneers have contributed to this volume. I've been around this debate for so long that a student once called me a 'designosaur'. As has often been noted, very few senior people in public life owe their elevated position to design education - even if they *do* sometimes get misty-eyed about the good old days making table-mats. I once made this point at a design conference in Hanover, and rashly asked the delegates if they could think of a single senior politician who had specialized during their youth in art or design. One hand went up. 'Well, we did try that once, in the 1930s'. I vowed never to use that line in Germany again.

It is time to re-group, re-consider, re-research, re-energise the debate, re-iterate, re-present ideas as widely as possible through a variety of media, re-form networks and form new ones, re-consider teaching and learning *to* design and *through* design, re-explore why design in schools seems such an awkward subject. Time to differentiate very carefully indeed between advocacy and research. Time to make teaching more attractive to those with a design background. Time to have the confidence not to over-claim. Look where that has led us. In short, time for a 'vision of the future'.

The trenchant, well-argued essays in this volume, written by some of the foremost thinkers and researchers about design education, are an excellent start. Design is far too important a subject to leave to the whims of political fashion. As William Morris once said, in answer to a question about design's significance after a lecture he had just given, 'design gives us hope'.

Professor Sir Christopher Frayling

March 2013

RECOMMENDATIONS

Ken Baynes and Eddie Norman

Although the subject matter of this letter is the specific content of the English National Curriculum proposals for Design and Technology and Art and Design, the crass nature of the Government's proposals should concern us all. We are in danger of destroying something uniquely excellent in our education system. It is not simply that Mr Gove's team have ignored leading figures in the design, engineering and media industries, employers organizations and specialist teachers' associations: it is also that they have completely failed to recognize the value of Britain's contribution to design education. This is one of the few curriculum areas where we are world-leading. Art and Design and Design and Technology provide creative energy in the curriculum, encourage young people to use their imaginations, consider the needs of others and look to the future.

Countries which have previously looked to us for curriculum models and inspiration in teaching and learning approaches to design, may in future look in amazement at official vandalism. They may express sympathy but they are more likely to find us a laughing stock. Certainly the English model of design education, which crosses the boundaries between art, design and technology, will no longer be providing a relevant curriculum model for the 21st Century.

However, beyond such a loss of face, and indeed, beyond the pragmatic arguments for the importance of design education and its contributions to economic well-being and the creative industries, there is potentially an even greater loss. There has been a growing understanding of Design as a third culture, one as significant as Science and the Humanities, which has its own epistemology and language. Such progress stems from the work of Bruce Archer and his colleagues within the Design Education Unit at the Royal College of Art in the 1970s and 1980s. It had been thought that decision-makers within the educational establishment had begun to share some of this understanding and recognize its importance for children's learning. Apparently, this has not been the case, and so it is important for our voice to be heard. In this sense, it is vital that the Government listens to us.

Is design a 'proper' subject? As academics we argue that it is. Design education is backed by coherent pedagogical theory and a substantial body of research. Over the past month we have 'plied our trade' and contributed to a book of recommendations and essays which is about to be published by Loughborough Design Press. The aim of this short book is to provide a launch pad for a future design education curriculum. We have also addressed the immediate situation and produced a freely downloadable paper available at www.ldpress.co.uk which summarizes the essential nature of design education, reviews relevant research and makes a number of recommendations.

That all this has been done in a very short period and on a non-profit basis by authors and publisher alike, is a measure of how seriously we take the Government's actions.

These are the recommendations. The Government should:

- Establish a new institution in higher education devoted to researching the theory, content and pedagogy of design education and offering courses for teachers. It would also work with existing institutions offering teacher training.
- Establish a 'Commission' with the task of developing a design education curriculum. It should be able to fund experiments and trials in schools.
- Adopt Professor Roberts' paper as an initial framework for the future development of design education.
- Recognize the research contributions that have been made towards the understanding of design education.
- Set up two or three 'research consortia' of schools (primary and secondary) who would attempt to achieve exemplary practice in design education.
- Re-establish a new body based on the 1970s confederation of organisations devoted to the development of design education. Teachers' professional bodies, designers' professional bodies, pressure groups etc. If they can be persuaded, it should be established under the auspices of the Royal Society of Arts.
- Organize a travelling national exhibition of exemplary design work from primary and secondary schools.
- Establish an authoritative body representing universities, business, the design professions and schools to draft new GCSE and A-level design examinations based on the submission and assessment of design projects backed with theoretical papers on technology, materials, aesthetics and design history and seek wide acceptance of the examination and its methods of assessment.

And, in the immediate future, whilst the effects of these actions are coming into play:

- Abandon the current proposals for reforming Design and Technology and Art and Design within the National Curriculum while acknowledging the national importance of design education as an element in both these subject areas.
- Listen to the advice it has received through, for example, the Design and Technology Association.
- Do nothing, or implement one of the credible proposals that have been developed during the consultation phase as an interim measure.

CHARACTERISTICS OF DESIGN EDUCATION : Reviewing and developing design curricular provision and practice in general education

Phil Roberts

1 The concept of *Design* encompasses a very wide range of everyday human experience, enterprise, and action – that is, not to just the disciplines and areas of professional design practice. Within this, the concept of *designing* refers to taking purposeful action in and on the world. Such action is intended to have effect: *viz*, to bring about some kind of *change in the world*. It can also, obviously enough, have unintended consequences as well as those which are intended; not all design activity – consciously intended or otherwise - is necessarily or inevitably ‘good’ in its outcomes or its ‘added value’. In the context of general education, *design-educational activity* is primarily intended to bring about some *change in the learner*: that is, in capability, in knowledge, in understanding, or whatever. Thus, designing is essentially and at the highest level of generality to do with bringing about required or desirable change - in some aspect of the world, or in the agent of the activity, or in both.

Hence, the objects, functions, and outcomes of design-educational activity can be understood both as *a means* towards achieving some desired or required end (*eg*, the design and making of some tangible artefact, with the artefact as the required end) and as the moving towards an *educational end* (*eg*, enhanced design cognition). At this point, we need to be aware of the risk of confusion illustrated, for instance, in a question such as: ‘Are we to appraise the artefact or some aspect of the pupil’s development?’ Complexity is no surprise though and, especially, because designing and learning display similar logics-in-use.

People are enabled to take part in designing through the possession and use of a distinctive capacity of mind: *viz*, for making images and models of the world - ‘in the mind’s eye’ we say – as it is and as it might be. The capacity for engaging in *cognitive modelling* is essential to the practice of design activity, to designing-learning, to apprehending the phenomena of Design, and to manipulating aspects of experience and future visions. It follows that the fundamental objectives of any design-educational curriculum include the development of the capacity for cognitive modelling, along with the capacities for addressing real-world states-of-affairs. The latter, being problematised for pedagogic purposes, are in principle boundless and, even when brought to a sufficient ‘definition’ within curricular activities, are therefore not to be confined within school-subject boundaries.

2 The phenomena of Design, real-world states-of-affairs, curriculum subjects, and the activities of designing-as-learning can collectively be referred to as the *design dimension* of the school’s entire formal (and informal) curriculum. If Design is thought of as a broad *field* or as a broad *dimension* of a school’s curriculum, it also has recognisable *areas* (including, as examples, communication design, graphic

design, product design, textiles/fashion, design & technology, environmental studies, etc). Experience in such areas is offered, in general education, through the provision of *school curriculum subjects*, most obviously in the secondary age-range of general education although the 'informal curriculum' is significant too. Design activity is evident, then, across and beyond the curriculum.

3 In a mature educational world, teachers themselves would be responsible for, and would lead, the development of educational practice. They would identify and continuously refresh their subject matters, and their teaching & learning.

And, indeed, deliberate and effective teacher-led attention to design as a dimension of the curriculum can of course be found; and exemplars of design-related subject-based practices and curriculum activities are not rare. What is interesting is how some practitioners retain the freshness in their teaching and learning, and how such a quality of teaching and learning might be institutionalised.

In reality though, any headteacher can embody and enact an approach via his or her oversight of a school's curriculum; any head of department can; a lone teacher (specialist or not), can also ensure and provide the conditions for significant teaching and learning.

What follows is one approach towards achieving a continuously lively design education, but one which is no more than one instrument of many possible instruments and approaches. There are other voices, other instruments, other points of view. Its principles need to be considered and used in a 'loose-fit' way: it's certainly not something to be adopted in a simplistic check-list approach: that, ironically, would be precisely against its spirit and intention, and be counter-productive. The check-list approach – or, more precisely, using uncritically the check-lists of others – is rarely effective in ensuring quality. Not all the questions may be considered pertinent; and others might be devised that are considered to be more useful to particular circumstances. Some modification would doubtless be especially appropriate when considering the primary school age-range curriculum. The strong view, of course, is that which regards all check-lists with scepticism and, also, that teachers should be fully responsible for devising, in a principled way, their own curricular and course contents, and their own curriculum review processes. So, with those caveats in mind, we need to proceed in as generous a spirit as possible of 'trying it for size' and being willing to use it as possibly no more than a starting point in our own institutional circumstances. And, of course, we would need to be alert to providing the substantiating evidence that would support our responses.

4 A review and development schedule (for want of a better term: the focus is to do with the processes of appraisal)

Generally:

- Does the school/department/section ensure the particular or unique contribution of [*here the user should insert the name of whichever school subject(s) he or she wishes to consider – Design, Art, Art & Design, D&T, IT, Textiles, Environmental Studies ...*] to children's learning and reflection upon their experience?
- Does the school's curriculum and its timetable organisation enable cooperative learning and collaborative teaching between subject-based departments?
- By what means and in what range of activities are pupils enabled to reflect on their experience, and to make images and artefacts which explore or express something of their experience?
- By what means and in what range of activities (and school subjects) are pupils enabled to express and communicate aspects of personal identity, value, and meaning?
- What kinds of activities do pupils engage in which will enable them to identify and respond personally to the qualities and character of the visual communications, products, and surroundings that make up the natural and man-made world (beginning with the school)?
- Do pupils use media and forms appropriate to their intentions, 'audiences', and subject matter?
- Do the pupils have access to, and use, a range of tools and materials to increase awareness of their functional, technical, and aesthetic potential?

With regard to the development of historical and cultural awareness:

- What activities enable pupils to identify, express and respond personally to the social, economic, technological, and aesthetic factors and values which underlie the historical development of the made world (and which are displayed in a variety of cultures)?
- How are pupils enabled to recognise and respect cultural diversity and the cultural values underlying the surface appearance of visual communications, products, and places?
- Does the [*here, insert particular subject title as appropriate*] programme reflect a balance between well-established, developing, and new technologies?
- Are [*here, insert particular subject title as appropriate*] activities biased (in whatever direction) with regard to their cultural framework? Are [*insert particular subject title*] activities biased (in whichever direction) with regard to gender?
- Are pupils enabled to use a number of the analytical methods developed by historians and critics in understanding their own work and the design activity of others?

With regard to the development of abilities to think, to image 'in the mind's eye', to plan, design, invent, and produce:

- What kinds of activities, and what range, give pupils experience of identifying their, and others', needs, wants, and visions of the future that can best or only be explored through [*here, insert particular subject title, kinds of activity, or whatever*]?
- Do the activities extend from those which are inwardly motivated to those which are externally stimulated?
- Do pupils use, and make transformations between, two- and three-dimensional forms and media, language, and notational systems and do they have access to information technologies?
- Do design [*and other*] assignments, tasks, and projects give pupils experience of making significant decisions?
- Of choosing against criteria (theirs and others')?
- Of recognising and accepting the potential and actual consequences of their actions/Designed outcomes?
- Of recognising different points of view?
- Do assignments, tasks, and project-based activities give experience of 'defining' (or articulating sufficiently), analysing, and resolving (rather than necessarily solving) problems (or states-of-affairs) in the areas of visual communication, product, and environmental design?

With regard to the development of critical skills in [*here, insert particular subject title as may be required*]:

- Do assignments enable pupils to analyse their own work together with a characteristic range of others' design work?
- Do they experience different role views?
- Are pupils enabled to discuss in writing, words and images, and from a variety of viewpoints, the feelings, motivations, values and achievements exhibited in their own and others' work?
- Does such discussion include the work of artists, craftspeople, and a range of specialist professional designers?
- Are pupils enabled to evaluate the functional, visual, economic, and social consequences of their own and others' decisions?
- Are pupils enabled to define, explain, and justify – using appropriate media – a personal stance in relation to their own and others' design work?

With regard to the scope and extent of the design curriculum: breadth, balance, relevance, and differentiation:

Breadth and Balance

- How wide a range of skills, techniques, media, technologies does each pupil experience?
- Is there a considered balance between work in two- and three-dimensional forms?
- Is a range of tools, materials, and technologies accessible to and used by all pupils?
- Specific to Art [or to Art & Design], is experience balanced between the Fine Arts & Crafts strand and, on the other complementary hand, the more-applied design strand of Art & Design?
- Is there a balance in the pupils' experience with regard to the roles of artist, craftsperson, designer, maker, user, critic, citizen?
- Does the work give pupils a balanced experience with regard to visual communication, product design, and environmental design?

Relevance

- Does the work (whether to do with exploring and expressing matters of identity, value, and meaning, or with more-applied designerly activities) derive from and relate to pupils' lived experience, aspirations, and visions of the future and their own futures?
- How do activities and subject matter relate to the pupils' developing biographies (including possible career aspirations)?
- What criteria of 'relevance' do the staff use?
- Do pupils or staff or both determine 'relevance'?
- If there is disagreement about 'relevance', on what basis are decisions made?

Differentiation

- To what extent do assignments, projects and activities take account of differences of abilities and dispositions of pupils?
- Is the subject matter likely to have similar appeal to girls and boys? Does it matter?
- Is differentiation in subject matter made which takes account of possible gender-cultural interests and concerns?
- Are assignments, worksheets, teaching aids, resources, and 'design briefs' pitched at a number of different levels of complexity and difficulty?
- Is there group work and project-based work which enables pupils of (currently) different abilities to learn from each other?
- Is there a considered balance between individual and group work?
- Are tasks, exercises, and assignments set that have specific learning objectives?

With regard to learning and teaching beyond that provided by a single department:

- Does the design work enable or require access to other departments?
- Does the school's curriculum and timetable organisation facilitate or hinder this?
- Is there co-operative learning and teaching between departments, informally or formally?
- Are there discussions with teachers in other departments/sections to consider whether certain content might be taught, or competencies developed, through co-operative approaches to teaching and learning?
- Are there aspects of an activity or of subject matter which might better be taught and learned by using collaborative approaches and arrangements?
- Are other teachers invited to see pupils' work and to hear the educational objectives of design activity, and to see pupils at work?
- Is comment, advice, and criticism invited?

With regard to the design curriculum: issues of curricular progression and continuity, and the assessment of pupils' development:

- What account is taken of pupils' curricular design activities and experience gained in earlier schools?
- How refined a notion of progression and of 'necessary' sequence is possible or justifiable?
- Do these include reference to, for example, the notion of the 'spiral curriculum'?
- How does (any) one activity, assignment or project stand in relation to others?
- How do curricular activities relate to the different 'stages' of the pupils' personal and cognitive development?
- Does subject matter, or do objectives, emphases, or organisation of teaching and learning, change relative to the school's age range; the pupils' age group; the stages of pupils' development?
- What criteria are used in the assessing of pupils' learning-through-designing?
- Do these criteria distinguish between *means* and *educational ends* when considering any artefacts that are made? (Or, between process, tangible artefact, and cognitive or other achievement?)
- Are the essential educational natures, purposes and objectives of design activity similar wherever they are practised, or are there significant and defensible differences of emphasis and intention according to context (*viz*, the primary school, the 11-16 secondary school, post-16 provision in general education, Further Education vocational provision, Higher Education provision, the design studio/workshop)?

5 Some concluding comments

Any teacher reviewing and appraising curricular provision in the design curricular dimension of general education might be well advised to be alert to some conceptual pitfalls which lie in wait. Some of these conceptual distinctions have been offered in this paper: *viz*, between design as a general *field* of human experience and activity; as a *field* of professional disciplines with *disciplinary areas*; as a *dimension* (of the schools' curriculum) with some *school subjects* having an especially significant contribution to make. Then, it's useful to be alert to the dangers of using the word *design* as both verb and noun and, particularly, of using design as an abstraction which has the power to do things (as in, for instance, 'Design adds value', which is almost meaningless and certainly does nothing to help understanding: it is human activity – *designing* - which may, or may not, add value). Thus, useful distinctions can be observed between *design* and *designing*: they are not synonymous.

Similarly, there are careful distinctions to be observed between design educational activity, professional design activity, and non-professional design activity.

As it happens, it is similarly the case with the concept of *technology* and its usage. The concept refers, first, to the general relations between human purpose, materials, energy, and activity. But it is often used, secondly, and somewhat confusingly and not helpfully, as though it were a verb, and as though it were or could be an agent of action. Finally, it is frequently used without any distinction between the high-level of generality and the lower-level of specificity with the result that the particular is offered as though it were the general case. (Hence, *technology* – a non-specific concept - is frequently confused with some particular technology, *eg*, electronics technology.)

All this is to stress the need to be as precise as possible; the critic might see it as 'mere' pedantry. In reality however, the more precise use of language and the more precise usage of concepts matter because they affect, and effect, the general understanding and, more to the point in the world of action and of education, they affect fundamentally the nature and quality of education and of action in and on the world. The language of discourse and the meta-language of design matter.

One final iteration with which to conclude. A person can be engaged in designing, and in technologically-based activity, in the fullest sense, without there being any necessity to produce an artefact. That is, there is a transitive mode of designing which is as good an exemplar as the more commonly accepted instance which is exemplified in the designing and production of things (or artefacts). The design and production of things is a particular case of designing, not the general case. Designing can be characterised, at a high-level of generality, as being to do with *change* or, better, with *changing*: change in the agent of the activity and change brought about through the activity. Artefacts are means, not ends; the required ends consist in change.

DESIGN EDUCATION RESEARCH

Eddie Norman

Design education research is not a new area of activity, and there is a plausible case for considering its origins in the work of Pestalozzi (1746-1827), Fröbel (1781-1852), Cygnaeus (1810-1888) and Salomon (1849-1907), who developed the Sloyd approach (see Ólafsson and Thorsteinsson, 2009). As Table 1 indicates, research contributions concerning design in general education are well documented back to around 1970. The Table has been updated from Norman et al (2009), and paints a picture. The author is grateful to colleagues for their comments and suggestions relating to this table, but of course accepts full responsibility for any errors or omissions. However, it is clear that the last two decades have seen much activity as colleagues have sought to support the emerging practice relating to Design and Technology in general education.

The online hub, www.dater.org.uk, was established in 2008 to provide a central access point to the archives of research outputs (estimated number of outputs in brackets) from *IDATER* (397), *D&T Association International Research Conferences* (178), *NADE (National Association for Design Education) journals* (90), *Orange Series publications* (11) and *Design and Technology Education: an international journal* (195) and its predecessors (1158). The hub facilitates a simultaneous online search of over 2000 research outputs. These are all open access, so that all teachers have access in support of practitioner research. The origins of these research outputs are highlighted in Table 1, and it can be observed that there are many other important sources that do not feature on the online hub eg the *PATT* and *CRIP*T conferences and academic journals such as the *International Journal of Technology and Design Education*, *The Journal of Technology Studies* and *The Journal of Technology Education*.

There will be debates about the rigour of the quality control procedures associated with some of these research outputs, but nearly all were peer reviewed. Hence academic colleagues at the time of their publication believed that they were worthy of publication.

The essential difficulty with reviewing design education research is its breadth and one way of considering contributions is through 3 categories.

- The designer(s): the individual(s) their capabilities and their competences for designing.
- The design context: the analysis of the knowledge, skills and values that they might possess.
- The interface: tools for designing and organisational structures that enhance designer's capabilities, competences and access to their context.

The derivation of these categories and their use in the analysis of the nature of effective contributions to design education research can be found in Norman (2011). The conclusions of this paper were that the characteristics of effective research in design education, perhaps unsurprising, paralleled those of the 'design

research' strategy proposed by van den Akker *et al* (2006) for researchers in general education.

'... design research may be characterised as:

- Interventionist: the research aims at designing an intervention in the real world;
 - Iterative: the research incorporates a cyclic approach of design, evaluation, and revision;
 - Process orientated: a black box model of input-output measurement is avoided, the focus is on understanding and improving interventions;
 - Utility orientated: the merit of a design is measured, in part, by its practicality for users in real contexts; and
 - Theory orientated: the design is (at least partly) based upon theoretical propositions, and field testing of the design contributes to theory building'.
- (van den Akker *et al*, 2006: 5)

Many such contributions have been made over recent decades, and they have not been given the weight that they might have been in determining future curriculum policies.

TABLE 1 KEY RESEARCH EVENTS 1968-2009 SURROUNDING THE EMERGENCE OF DESIGN AND TECHNOLOGY IN ENGLAND

Year	Research events
1967	• <i>Project Technology</i> started at Loughborough College of Education (ended 1972)
1967	• <i>The Keele Project: Design and Craft Education</i> started (ended 1973)
1968	• <i>Studies in Design Education and Craft</i> (later <i>Studies in Design Education, Craft and Technology</i>) launched
1969	• <i>Art and Craft Education 8-13</i> project started at Goldsmiths' College (ended 1972)
1974	• <i>Design in General Education</i> project started at the Royal College of Art (ended 1975)
1973	• <i>International Perspectives of Design Education Conference</i> , University of Keele
1980	• Keith-Lucas report on <i>Design Education at Secondary Level</i> published by the Design Council
1982	• <i>Understanding Design and Technology</i> report by the Assessment of Performance Unit published
1984	• Graded Assessment Project - Kings College and ILEA: GAME, GAML, GACDT. Origin of 10 National Curriculum levels
1985	• <i>First Pupils Attitudes to Technology Conference (PATT)</i> • <i>APU D&T Project National Survey launched (1985 – 1990)</i>

1988	<ul style="list-style-type: none"> • 1st DATER (<i>Design and Technology Educational Research and Curriculum Development</i>) Conference at Loughborough University. One of a series of annual conferences. • <i>Best of Studies in Design Education, Craft and Technology</i> published
1989	<ul style="list-style-type: none"> • <i>Studies in Design Education, Craft and Technology</i> relaunched as <i>Design and Technology Teaching: a journal of new approaches</i> • <i>The Journal of Technology Education</i> is launched by the ITEA
1990	<ul style="list-style-type: none"> • TERU (the Technology Education Research Unit) was founded at Goldsmiths, University of London
1991	<ul style="list-style-type: none"> • Final APU Report of <i>The Assessment of Performance in Design and Technology</i> published • <i>The International Journal of Technology and Design Education</i> is published by Trentham Books
1992	<ul style="list-style-type: none"> • DATER relaunched as an international conference IDATER • <i>Teaching Design and Technology</i> published • Loughborough University's <i>Orange Series</i> of publications is launched • 1st PATT Conference held in association with the ITEA • Journal of the National Association for Design Education launched (... published until 2002) • INCOTE (International Conference on Technology Education) Weimar, Germany
1994	<ul style="list-style-type: none"> • Nuffield Project, RCA Schools Technology Project and TEP launched
1996	<ul style="list-style-type: none"> • <i>Design and Technology Teaching: a journal of new approaches</i> is relaunched as <i>The Journal of Design and Technology Education</i> • <i>Understanding Practice in Design and Technology</i> published • JISTEC (Jerusalem International Science and Technology Education Conference)
1997	<ul style="list-style-type: none"> • Publication of <i>The International Journal of Technology and Design Education</i> transfers to Kluwer • 1st CRIPT (<i>Centre for Research in Primary Technology</i>) conference at Birmingham City University (formally the University of Central England). The first of a series of biennial conferences • 1st TENZ (<i>Technology Education New Zealand</i>) Conference • <i>Assessing Technology</i> published
2000	<ul style="list-style-type: none"> • <i>Design and Technology International Millennium Conference</i> in London • Publication of <i>Teaching and Learning Design and Technology: a guide to recent research and its applications</i> • Engineering Council publications launched <i>Interaction: the Relationship between Science and Design and Technology in the Secondary School Curriculum</i> (2000), <i>Design and Technology in a Knowledge Economy</i> (2001) <i>The Continuum of Design Education for Engineering</i> (2001) • WOCATE conference in Braunschweig, Germany • 1st Biennial Technology Education Research Conference in Australia organised by Griffith University. The first of a series of biennial conferences.

2001	<ul style="list-style-type: none"> • 14th and final IDATER conference at Loughborough University
2002	<ul style="list-style-type: none"> • 1st Design and Technology Association Education and International Research Conference. The first of a series of annual conferences
2003	<ul style="list-style-type: none"> • Publication of <i>Designs on the Curriculum? A review of literature on the impact of design and technology in schools in England</i> • Strategy Group Report <i>The Unique Contribution of Design and Technology</i> published
2004	<ul style="list-style-type: none"> • Loughborough's Design Education Research Group and the D&T Association jointly publish <i>Designerly Activity and Higher Degrees</i> (2004), <i>A Framework for Design and Design Education</i> (2005) and <i>Design and Democracy</i> (2005)
2005	<ul style="list-style-type: none"> • <i>The Journal of Design and Technology Education</i> is relaunched as <i>Design and Technology Education: an international journal</i> • PATT-15, the 20th Anniversary Conference was held in Haarlem leading to the publication of the first of a series by Sense Publishers: <i>International Handbook of Technology Education</i> • Project <i>e-scape</i> was founded at TERU
2006	<ul style="list-style-type: none"> • <i>Defining Technological Literacy: Towards an epistemological framework</i> published by Palgrave
2007	<ul style="list-style-type: none"> • <i>Researching Design Learning: Issues and findings from two decades of research and development</i> published by Springer • <i>Analysing Best Practices in Technology Education</i> published by Sense • First IDATER Online conference proceedings published <i>E-learning in Science and Design and Technology</i> • <i>Design & Technology – For the Next Generation</i> published by Clifffeco
2008	<ul style="list-style-type: none"> • <i>Researching Technology Education and The Cultural Transmission of Artefacts, Skills and Knowledge</i> published by Sense • The Online Hub www.dater.org.uk is launched and action research poster distributed to schools by D&T Association • New MA in Design Education launched by Goldsmiths
2009	<ul style="list-style-type: none"> • Launch of Loughborough University's 'Modelling' seminars and associated Orange Series publications • Launch of the DRS DESIG • <i>International Handbook of Research and Development in Technology Education and Project-based Learning: an Integrated Science, Technology, Engineering, and Mathematics (STEM) Approach</i> published by Sense
2010	<ul style="list-style-type: none"> • Design education strand included in the DRS Conference in Montreal • <i>Teaching & Learning Technology</i> conference held in Vancouver • Technology Education Research Group (TERG) formed at the University of Limerick • IDATER Online Conference on <i>Graphicacy and Modelling</i> at the University of Limerick

2011	<ul style="list-style-type: none"> • 1st Cumulus/DRS Symposium in Paris • Design education strand included in the IASDR Conference in Delft • <i>Positioning Technology Education in the Curriculum, Fostering Human Development Through Engineering and Technology Education</i> and <i>International Handbook of Primary Technology Education</i> published by Sense
2012	<ul style="list-style-type: none"> • DRS Conference in Bangkok results in a Special edition of <i>Design and Technology Education: an international journal</i> • <i>Technology Education for Teachers</i> published by Sense
2013	<ul style="list-style-type: none"> • <i>Design: Models of Change</i> and <i>Design Education: Visions for the Future</i> published by Loughborough Design Press • 2nd Cumulus/DRS Symposium in Oslo to result in a Special edition of <i>Design and Technology Education: an international journal</i>

The thousands of research contributions that have been made relating to design education demonstrate the commitment of teachers to evidence-based practice as the majority of them are founded on practitioners' research. They provide rather more than a starting point for curriculum planning, but it would appear that policymakers do not yet see their value. It is important that the messages embedded in these research contributions are made both evident and visible, so that, if they are ignored, the foolishness of the policymakers is also evident and visible