Making Choices in Design

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This paper explores the nature of choice in design. Attention is given to visual perception, to a role for aesthetics in research, and to the context and evolution of design. There are concluding comments on some implications for Design Education.

Choice in design may embrace — often at the same time — objective facts (such as dimensions), partly-objective facts (such as convenience) and wholly subjective attitudes and opinions; so it is important to try to understand how people form preferences in design, and to understand the contexts within which design choices are made. Consider for a moment these comments on the failure of the 1960's redevelopment of cities.[1] The bogey was industrialised system building.

Graham Shanklyn (architect and planner at Liverpool): It was 'not a plot by Corbusier's disciples'. The real authors of system building were national politicians who 'set out to meet targets of 300,000 houses a year'. 'Mistakes were made by elected people acting with the best of intentions'.

Sir James Gibb (editor, Architectural Review): 'There were political pressures on Local Authorities to build large numbers (of houses) . . . They were sold system building by proprietors quoting speed of construction'.

Nicholas Taylor (architectural journalist and politician): It is about 'a failure of a democratic process . . . Laymen were seduced by great dreams'.

Yet however people are involved in decision-making, for example through democratic processes or through market demand, in industrialised societies there will be designers and planners with responsibilities for giving form to products, environments and services.

Coventry inner city area, Hillfields:
Three approaches to housing
(a) 1960's high-rise
(b) 1970's Victorian street renovated as pedestrian space
(c) 1970's new low-rise housing

Designers need to be sensitive to peoples needs; and consumers need to articulate their views effectively. In particular people must be aware of the conflicts of interest that are involved in many design matters.

Perception

To what extent can an understanding of visual perception clarify the complex issues of choice in design? A key point brought out by recent research is that we actively search for things to see, and that we see mainly those things that were expected. Individuals act in this directed way partly due to inheritance, but also due to what they learn.

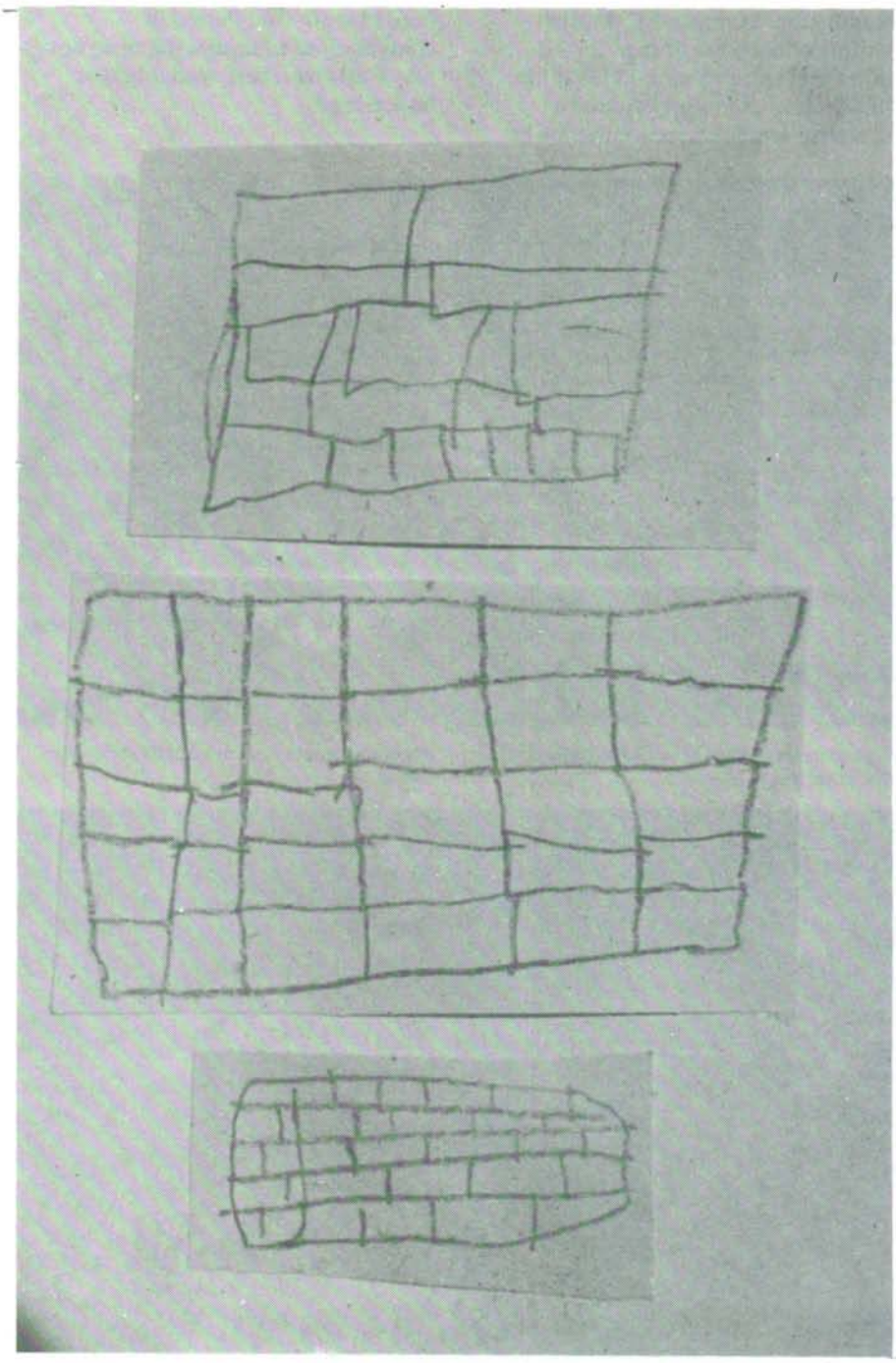
Our ability to make sense of the visual world seems to depend on matching internal models to the visual field, thus determining what we decide to attend to in searching for an interpretation of the environment that meets our needs. Young suggests that selected complexes of nerve signals in the brain provide symbols of the features of the world that interest us.[2]

Art teachers in particular will be aware of the symbols that children use to represent their world and teachers will be aware of the limitations that these images have in relation to more mature perceptions of the environment. But the symbolic world of the adult is also limited, for example it will tend to be selective, partly as a result of mental economy: we attend mainly to what is necessary, and to what we value. Gombrich argues that all communication is by symbolism: that in art there is no sharp distinction between representation and expression.[3]

It is certainly reasonable to talk about how we learn to see, and what we learn to see. We talk about a 'trained eye' in specialist situations. For example ornithologists are able to recognise species (even at a fleeting glance) that would be impossible for the 'untrained eye'. Ornithologists know what to look for and can recognise clues to the features expected to be present. Significantly, ornithologists don't start from scratch because they know that at certain times of the year, and in certain environments, it is likely that particular species should be present. However, a problem with the 'trained eye' is that it may be too selective. One sometimes says of the specialist: 'He knows what he is looking for'. This indicates a skill, but also a bias.

In design research, a bias in perception resulting from specialised knowledge could be a handicap to the extent that unexpected but potentially relevant information may be overlooked. Clearly, one of the key issues for Design education is an understanding of the nature and balance of the skills of perception, and of visualisation, which designers bring to bear on various tasks. In design it is important to keep an open mind about sources for ideas and about the form things may take. But it is also clear

Drawing showing different levels of understanding
In these drawings of a brick wall by infants, only the bottom drawing shows a clear appreciation of horizontal rows with bonding



that, visually, an open mind is far from being a natural state of affairs.

A Role for Aesthetics in Research

It is here that aesthetics can play a key role. Aesthetics has to do with the most general kind of visual symbolism — the significance of abstract form. One is not referring here to the role of aesthetics in design to do with refinement of form, but to a fundamental role related to modes of enquiry. For example, F.C. Bartlett writing of the work of the experimenter in science says that 'the thinker is . . . in the position of a spectator searching for something he must treat as being in some way "there" all the time. His search is rational, but it is often emotionally sustained, and if it is, the emotion is appropriate to that which is associated with the contemplation of form and beauty of form, and is aesthetic or akin to the aesthetic'.[4]

Although a designer is not an experimenter in the scientific sense, a designer will often need to be an inventor, and research will include a need to see or find things, or combinations of things, that may not previously have been recognised or understood.

Randomness in form gives rise to curiosity
Dried-up bed of lake

Regular structures can be visually satisfying
Basket

It's worth looking briefly at examples of the levels of awareness and of the responses arising through aesthetic judgements.

A fundamental response is that of curiosity. A general visual curiosity may result from randomness in the visual field, particularly when it is sensed that there should be some evidence of pattern or order. For example, a biologist may be curious about apparently random behaviour in groups of animals; or a painter may be curious about a random play of light through trees. And using touch, sight, and ears an engineer may be curious about slight random vibrations in a mechanism, and may say that a mechanism 'feels rough'. At one level then, aesthetics supports perceived degrees of order or of relationships, in contrast to some background state.[5]

Degrees of aesthetic awareness can therefore be a motivating force. An example, would be the satisfaction or delight found when informal visual relationships are suddenly seen to make sense (rather like finding an elusive combination of pieces in a jig-saw puzzle).

Formal relationships will also tend to be aesthetically significant. Regular geometry (such as found in the bonding of brickwork, or crystal structures, or the woven structure of textiles) will tend to be seen as significant and possibly satisfying where this is associated with things that work well, for example in objects showing structural durability.

Between the extremes of formality and informality there is a wealth of visual meaning which it is not necessary to consider here. But it needs to be said that to appreciate this range in aesthetics calls for visual awareness and sensitivity based on appropriate knowledge and experience.

The important point is that aesthetics handles the most general classification of form and formal relationships, and in particular those relationships that are independent of particular objects. For example the painter may be more interested in the shapes *between* things rather than the things themselves. This abstract thinking process may assist the transfer of ideas, for example from one class of object to another. Thus, a beam structure in engineering may be seen to have a formal relationship to skeletal

structures in nature — even though the transfer of form from one to the other may be physically impossible.

So, open-ended research can be valuable in practical design matters. For example, last year Dr Robin Wootten of Exeter University received a £31000 grant from the Science and Engineering Research Council to study how butterflies fly. It is expected that the three-year study should reveal similarities between insects and the performance of hang-gliders, sails, wind surfers and microlight aircraft. Dr Wootten said: 'Insect wings are full of all sorts of clever devices. But I don't want to be blown up as the designer of the next generation of sails. My work is a straightforward study of wing shapes'.

Practical Purpose, Symbolic Value and Aesthetics

In making choices in design it is necessary to guard against mistaken 'aesthetic' judgements — sometimes arising through the confusion of aesthetics with more specific symbolism. Consider for a moment a simple obect, a nail. The practical purpose of a nail is obvious; but a nail can also take on symbolic value, for example in the story of the Crucifixion — as a symbol of persecution. Aesthetically on the other hand, nails may be seen as short abstract lines (or dots, if seen end on) that can be pushed together randomly or organised into patterns or forms as nail sculpture (and thus also take on other symbolic meanings).

Or, compare two kitchens in the home. Do you prefer 'High Tech' — clean surfaces and control panels, or something more natural — say pine tables and chairs and traditional materials? Both can be equally practical. And both can embrace aesthetic interest through the appropriate use of line, colour, shape and texture. More likely, choice would depend on the specific symbolic messages that each interior says about the values and interests of the people who choose one or the other.

For present purposes it is not necessary to look in depth at the relationships between utility, symbolism and aesthetics. But it should be said that it is the *context* within which an artefact is used or found that is significant. For example, just as the same word can have different meanings in different sentences, so, artefacts may take on different meanings in different circumstances.

Traditional forms can provide a very satisfying balance of design elements
Violin

The Context and Evolution of Design

Consider the significance of structure. The visual significance of structural pattern in design, as in nature, is that it shows the result of structural forces, or how a thing is built, for example from bricks, or frame components, or crystals, or cells, or (more generally) in animal forms, from the relationship of bone, muscle, and fat etc. An aesthetic awareness of structural form can be a useful framework for more specific interests and knowledge.

For example in the 18th century, landowners who were breeding horses required appropriate records of their finest animals. Not being satisfied by simply imitating the lines and proportions of these horses, animal painter George Stubbs found it necessary to dissect horse carcasses in his studio to understand their anatomy more fully. As a consequence he came to produce his celebrated 'Anatomy of the Horse'. Stubbs has subsequently been seen as a painter of distinction as opposed to being a mere 'animal painter'.

Today, we would see the dissection of a horse as more suited to the work of a biologist; but in Stubbs' day this work had not been done. Supported by a general aesthetic interest, the fertile ground between science and art, or between design in man-made artefacts and design in nature, is often worth exploring and can be overlooked in our specialist world, and in education.

In the 19th century Darwin proposed that in nature the 'survival of the fittest' had resulted in incremental changes in animal forms and that this process was sufficient to account for the origin of the species. Subsequently the idea has been proposed that some 'big steps' in evolution also probably took place — and the debate continues.

In the evolution of design too, incremental change and 'big steps' can both be seen. Arguably, many of the artefacts of design and technology can be traced back to a few tools. Traditionally, incremental change has been the way that the man-made world has evolved, resting on practical experience. A 'big step' is more likely to have followed technological change. Even after a 'big step' resulting from technological change, such as the availability of plastics, incremental change may then be traced within particular new technologies. This is not very surprising since new technologies will also have their own physical and economic limitations.

So does development in design depend on something like a process of the 'survival of the fittest' in nature? Probably not quite, because just as society tends to protect all of its members, society may preserve past or present traditions in design for various reasons, as well as supporting new products and systems. But in the longer

Survival of the fittest
1930's tractor: a brutal adaption to provide tracked drive.

view the analogy may not be inappropriate: and at the level of consumer goods it can be directly relevant — for example, we do not buy a poor camera if a better one is available at a comparable price and if we know the facts.

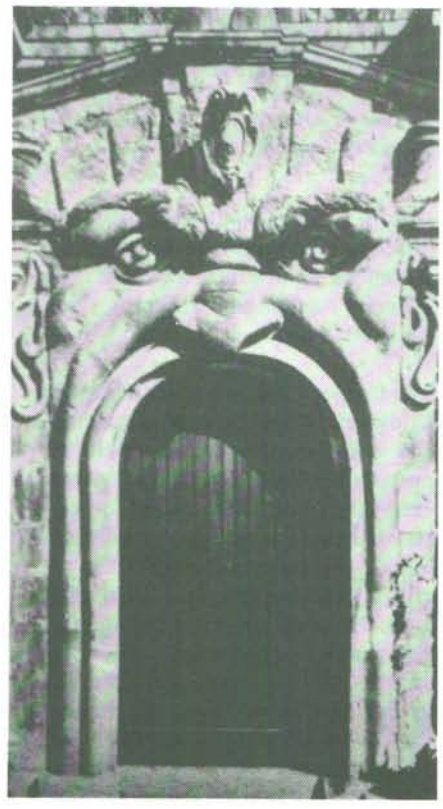
Significantly, many aspects of technological change are not deliberately planned by society. We may choose to *regulate* the use of various technologies (for example those of communications, and computer data) or society may choose to *develop* particular technologies (such as atomic energy). But there will be unintended outcomes — some positive and some negative. So, when Edison invented the 'phonograph' he did so intending to record telephone conversations at telephone exchanges because he thought that most people would not afford to have telephones in their homes.[6] Society did not anticipate the scope of the audio and communication industries of today.

In any event, some of the results of technological change are more subtle than legislation can cope with. An example would be the increase in standardisation. Many people would see standardisation as threatening, but standardisation has been acceptable where it can show benefits — for example in costs or reliability: if I buy a replacement part for a car, I shall expect the part to fit exactly and do the precise job that is required as cheaply as possible. On the other hand we do not want standardised housing, or clothes, even though we will respond positively to rational production and distribution methods that keep costs down and quality predictable.

This touches on the problems that William Morris failed to resolve satisfactorily. His rejection of the 'machine' tended to mean that only the comparatively wealthy could afford to buy his products. But we need not accept a so-called 'machine aesthetic' as part of an economic advantage, except where it meets our needs. The fashion industry shows quite well how variety in dress is possible using combinations of relatively standardised items of clothing with the addition of some personal — possibly hand-made — items as accessories.

Clothing and housing have to be practically sound. We would not be happy if roofs leaked, or if clothes could not be washed easily, et cetera. Beyond this it might be wiser to see houses, and clothing, and many other personal things, as communication, as scene setting, and sometimes as fantasy — almost as living theatre.

But system building disappointed on all fronts: it was not practically sound (there is a tendency for leaks and structural problems) and it has not proved economically attractive in the long run; but just as important, it had nothing to say; or what it had to say was boring and impersonal, symbolically and aesthetically.



Design as a visual message
Doorway late 16th C. Italy — grotesque fantasy
Front Door 19th C. Victorian Street — simple pride?

Legislation may help to provide a safeguard against obvious vandalism but it cannot satisfy our design needs. Nor can we rely on enlightened patronage. Typically, what we have is a measure of choice based on the alternatives presented to us.

Here, a key role is that of the designer or entrepreneur who may offer ideas or products which present alternatives to us that are genuinely attractive, and which we may not have considered for ourselves — like the household spin-dryer which is so much better than the mangle! This is a creative responsibility which can successfully embrace more complex issues.

We might be wary of designers' grandiose schemes for 'cities of the future' such as those proposed by Corbusier, and others. We may recall Corbusier: 'We must create the mass-production spirit . . . We must create the spirit of living in mass-production houses'.[7]

Aesthetic contrasts
Brooch. Informal centre within formal frame

But what about the earlier work in England of Ebenezer Howard? Howard also believed that society needed a new kind of city. Howard's Garden City visualised small communities in which the virtues of town and country were married. Significantly, Howard did not call himself a planner. He referred to himself as an inventor: he was he said 'the inventor of the Garden City idea'. He succeeded in carrying out his schemes because he was able to persuade people to lend support to his ideas. For example, his Garden Cities were to be self-financing: philanthropists were to get 5% return on capital. But particularly, people wanted to live in the kinds of places he had in mind.[8]

This paper doesn't assume particular criteria for 'good' design: only, that in practice, design shall meet the needs of users in the areas of practical utility, and meaning. In achieving this, successful design may show elegance, or economy, or conviction, and be more than a sum of the parts (in the same way that the meaning of a sentence is more than the individual words). We usually refer to the summation of design as the style of an age, or period, or culture. This recognition of style follows events: it doesn't precede them. We don't design by following the externals of style except where a pastiche is deliberately intended, perhaps for fun or just for variety: this is where the fashion industries meet our needs.

Design Education

What are the implications of these issues for Design education in schools?

As well as providing active and relevant experiences of 'designing and making' for all pupils, Design education in its various forms should also involve related work on broader design issues — ideally, growing from pupils' research for their own design and make projects. Though the experiences provided by various aspects of Design education will differ, there will be some common ground. Part of this common ground is the broad issue of choice in the context of design.

We know that in some work, in Art, a visual problem or expressive theme may not be fully understood until a developed statement has been reached: choice of direction of work may be a kind of 'feeling the way' involving a continual redefinition of a problem or of direction of work. Decision-making and development of work in Art, as in Design, is a complex human process not easily embraced in education by simple problem-solving models. But this complexity and subtlety may mask a lack of direction or a genuine development in pupils' art work, perhaps involving plagiarism or cliche-ridden or merely repetitive work.

'Art and Design' education can gain from informed decision-making, particularly at the level of visual research. Pupils need to begin to understand *how* they see and how this relates to their knowledge and experience of the environment. A developing awareness of reality then offers scope for comment and reflection where it is not appropriate to distinguish rigidly between design work and work in fine art. Visual research has to do with an understanding and a personal development of the processes of visual perception, and is worthwhile both as an

end in itself and also in relation to communication, to design problems and to issues of choice. In addition the habit and skill of presenting a train of thought is particularly useful as a means of self-analysis and as a means of evaluating the direction of work either in expressive statements or in more specific design problems.

If Art can use informed decision-making in support of human values, then CDT can gain from deeper insights into the human condition in support of technological relevance. The role of visual perception and aesthetics in design research may be undervalued in CDT, particularly at the general level of curiosity and enquiry (in addition to uses relating quantifiable information to other design considerations). Technology can also be presented as an extension of the senses, influencing our interpretation of the world and thus influencing the choices we are able to make. This human emphasis could help to broaden the appeal of CDT and, at the same time, strengthen the practical and economic relevance of CDT through a clearer understanding of peoples' perceptions and preferences, and how these are expressed through design artefacts and systems.

Home Economics also embraces activity enquiry methods, including Design work. What more natural practical area is there for actively exploring the consumer issues which shape our material culture in attempting to satisfy human needs? There is information to be gathered, persuasion to be assessed, and an enquiry into the utility and values of goods to be experienced. All these are issues which, if fully explored, can enlarge a subject's educational scope and practical influence.

In conclusion we may argue that if enough people make informed, sensitive and interesting design choices, whether as consumers or designers, taken together these choices could strengthen the quality of our environment and goods, could help to make our industrial products and services competitive, and could help to foster interesting and useful members of society. Design education, in its various forms, should embrace these issues firmly.

References

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No Comment

There comes a time in the life of every boy when he craves with an irresistible appetite what may be called food for his physical nature; when the senses are most acute; when he is exquisitely conscious of his growing strength, his increasing power over the external world; when his budding manhood opens the door into the great workshop of nature and he is satisfied with nothing less than actual contact with concrete forms and tangible forces. At this period the records of the past have little interest for a healthy boy. He must feel and act for himself; he must turn the key with his own hands, and himself unbar the gates. He has no natural aptitude to destroy. He destroys because he cannot create. He can destroy without being taught how; but how to build, how to construct, how to execute — these require instruction, training, system, and they yield the keener pleasure. The boy demands reasons; and arbitrary unmeaning rules are extremely distasteful. Until he has a basis of personal, physical experience, with which he may digest the experience of others, books have little meaning and are of little value.

Then is the time to give him manual training. Give him his saw, plane and chisel. Give him his lathe, his forge, and anvil. Give him his blowpipe and crucible, his magnet and his engine, and teach him their reason and their power. His mind will absorb them with infinite relish. In their forms and uses he will read the thoughts of men for many generations.

From *Metal Work for Schools* by J.G. Stevens and Frederick J. May, published by George G. Harrap & Company Ltd., 1932.