Media Matters

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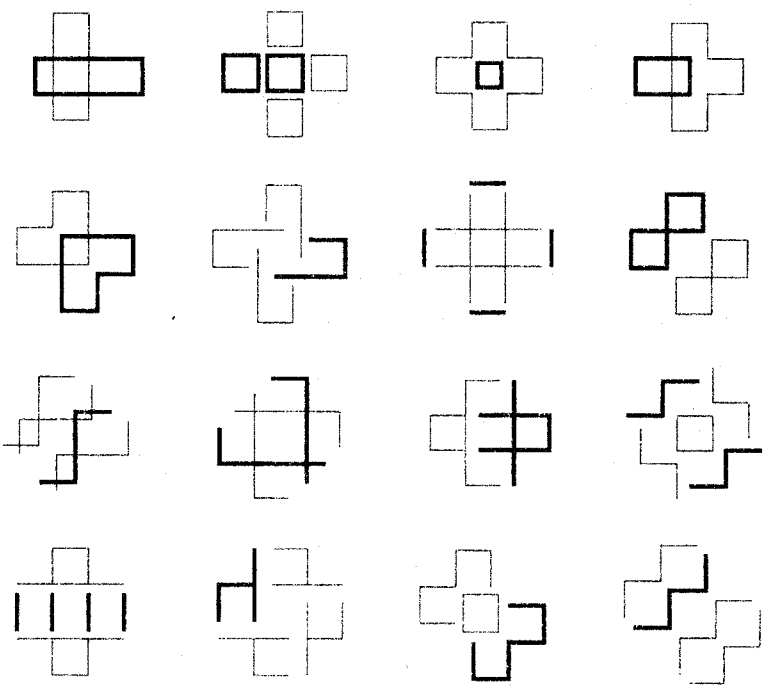

Some Reconceptions of a Shape

A cognitive explanation is offered on why media matters in designing. The explanation provides a conceptual framework for distinguishing types of design tools.

Media over Mind

In the well known encounter between Gertrude Stein and Pablo Piccaso, she complained that her new abstract portrait bore little resemblance to her. Piccaso assured his troubled client that it *eventually* will!

Perhaps more than anyone in recent history, Piccaso understood the enormous power of the medium over the mind, and went on to develop a form of representation which irreversibly changed the way we now perceive the world around us. Despite our conservative proclivity, the fact that we can adjust to a radically new way of portraiture, acquire a liking for post-modern architecture or whatever novel styles, or, in Goodman's terms, develop "many ways of worldmaking"[1] testifies to a uniquely human attribute: *the ability to go beyond the given.*

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1 Goodman, N. xxx. *Many Ways of World Making.*

Designs do not come ready-made in a flash. Their multiplicity of considerations are deliberated over time and taken through many stages of refinement. At each step, various forms of representation are used to transcribe the state of progress. These summary depictions are not merely static presentation material but are also the staging points to advance the designs. In as much as these intermediate representations function as feedback to the designer, the medium on which they are encoded determine to a large extent the developmental potential of the work.

We understand the persuasive power of advertising — the use of limited resources to capture our imagination and influence our choices. Media can be used to suppress or illuminate certain aspects of a message or idea. The way these are achieved depends largely on the inherent nature of the media used. Our choice of media can significantly affect the way an idea is perceived by others and ourselves. For example, the pattern of design exploration using a soft pencil is qualitatively very different from building cardboard models. The possibilities can even be divergent. In this sense, designing is like conversations with friends — our train of thought is influenced by the attributes of the media (or person) we interact with. If this is so, an understanding of the alternating transaction between design representation and perception is crucial to effective choice, usage, and invention of new design tools.

The Limits of Mental Designing

> Some artists and designers, it seems, practice a pure kind of Platonism; ideas are fully formed in their heads, and they only need to transfer them on paper, materialize them in stone, record them in databases of CAD systems, or whatever.
> — William Mitchell[2]

The romantic idea of the self-sufficient designer-mind lingers on. It is an alluring proposition, shrouded with the mystical powers of the creative genius. It elevates the contemplative mind as the incomparable fountainhead for innovative ideas as well as the shaping force in their development. It is as if the external world, including the designer's own interventions, did not matter. The design, whether fully executed or in sketch, is considered an end-product of a one-way process, and design tools are necessary only to assist in the role of recording the fully-formed ideas. The representations are not expected to influence the creative mind; media does not matter. The creative mind, it seems, is best kept autonomous in meditative isolation. Especially, it must not be contaminated by any form of external representation.

In naiveté, we often overrate our mental capability. In a series of landmark psychological surveys, Amos Tversky and Daniel Kahneman exposed our appallingly high levels of illogical thinking,

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2 Mictchell, W.J. 1992. "Plato and the Network Surfers". In J. Wojtowicz (ed.). *Digital Folio*. Vancouver: University of British Columbia.

subjective bias and recurrent or 'systematic' errors[3]. Graphic and diagrammatic illusions (despite their popularity in juvenile publications) provides another serious source of evidence against the notion of the impeccable mind. In Figure 1, for example, we continue to perceive spirals even after discovering that the diagram is made up of concentric circles.

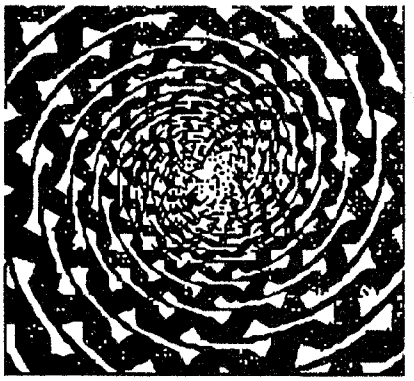

Figure 1: Circles or Spiral?

Even if it were possible to practice this Platonic idealism, the cognitive limitations of mental processing pale against the supplementary use of the simplest of organised marks, symbols or graphics to partition the problem into more manageable chunks[4]. Mental designing is like being blind-folded — just as visual-impairment limits our speed and capacity to perceive space, so the lack of media constrains our scope of design exploration to the feeble limits of our memory. Whilst it may be possible to mentally work out a simple problem, most design issues are too complex for the mind to handle without the need for external representation. In fact, this is a reason why designs develop over time rather than forge in a flash. We need to make intermediate records of a design in progress in order to free the mind to ponder on more and better solutions. But (thankfully) the mind can go beyond what is given.

Design as Information Processing

There is little mystery in the power of representation in shaping the mind of the designer. Whether it is in composing music, solving engineering problems or designing buildings, it is usually

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3 For example, Tversky, A. and D. Kahneman 1982. "Judgement under Uncertainty". In Kahneman, Slovic and Tversky, eds. *Judgement under uncertainty: heuristics and biases.* Cambridge: Cambridge University Press.

4 E.g., see Newell, A. & Simon, H. 1972. *Human Problem Solving.* Englewood Cliffs NJ: Prentice-Hall. Also, Perkins, D.N. 1981. *The Mind's Best Work.* Cambridge, MA: Harvard University Press. For a more emperical study of this issue, see John-Steiner, V. 1985. *Notebooks of the Mind.* New York: Harper & Row. For a more philosophical treatment, see Langer, S. 1957. *Philosophy in a new Key.* Cambridge MA: Harvard University Press; and Bruner, J. 1986. *Actual Minds, Possible Worlds.* Cambridge MA: Harvard Unaiversity Press.

taken forgranted that complexity is unmanageable without any form of representation outside the mind[5]. Therefore, the form of the external representation of ideas *reciprocates* as stimuli for the mind engaged in transforming it to the next level of resolution[6]; in other words, output becomes input (see Figure 2).

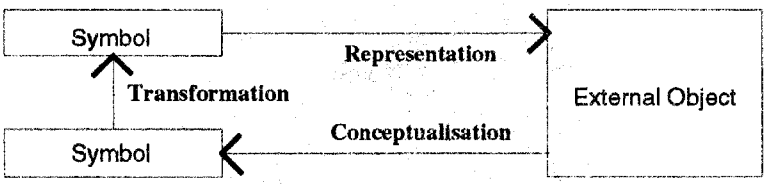

Figure 2: the transformation cycle

In the early stages of architectural design, this process is best exemplified by the sketch — an architect would typically develop a design by making a series of rough, free-hand drawings, often tracing a new version over another using transparent or 'butter' paper[7]. The abstract lines of a sketch would immediately function to suggest new possibilities or direct a train of thought; prompting ideas which are not necessarily pre-empted, planned or foreseen.

It might seem like a circular argument to suggest that a destination should depend on the route chosen. (Along the lines of an old Irish joke, "I won't start here if I want to get there".) But a solution or means to a solution often depends on how the problem is framed. For example, the success of think tank or brainstorming sessions often depend on the capability of the participants to reframe the issues. Figure 3 and 4 show how a problem can be simply solved using an intermediate representation. In creative designing, it is vital to recognise that intermediate representations can be open to new and different interpretations which may lead to new fruitful lines of inquiry.

Figure 3: Problem: given the diameter of the white circle, what is the area of the shaded portion?

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5 E.g., see Simon, H.A. 1981. *The Sciences of the Artificial* (2nd. Ed.). Cambridge MA: MIT Press.

6 This process of external drawing and internal abstraction corresponds well with Kenneth Craik's model of thought as a recursive cycle of decoding and encoding [Craik, K.J.W. 1943. *The Nature of Explanation*. Cambridge: Cambridge University Press.

7 For an engaging discussion of the sketch vis-a-vis other notational systems, see Nelson Goodman's *Languages of Art* [1976. Indianapolis: Hackett Publishing].

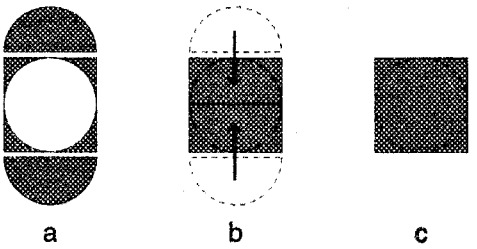

Figure 4: A solution by reconceptualisation and transformation operations.

The process of representation assumes a complementary process of conceptualisation. To understand this relationship, try different ways to describe the shape in Figure 4.

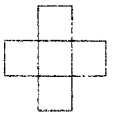

Figure 4: A simple cross shape?

The frontispiece for this paper shows a few ways how the shape can be decomposed into different types of constituent parts. These are different ways the figure can be "seen as". The Gestalt psychologists would 'naturally' describe the figure as two intersecting rectangles — according to the Gestalt law of "good continuation" we should tend to preserve a definition with fewest lines. But, as shown, the more interesting descriptions are unlikely to be found by consensus.

To "see as" is simply to conceptualise — to ascribe different things as the same by equivalence; to group objects (or events) into classes and respond to them in terms of their class membership rather than uniquely[8]. Concepts are necessary because our perceptual world can be carved up in an infinite number of ways. Ultimately it is about making a distinction of similarities to defy absolute separation.

In design, given a shape conceptualised in a particular way, transforming and representing it is a relatively straightforward (problem-solving) task — the constituent parts and their essential properties begin defined by the concept. But concepts in creative activity are seldom either 'given', complete or beyond contention. The creative mind does not inhabit a ready-made world and is therefore free to seek or modify problems, and not just to solve them. Choosing to see the shape in Figure 4 in the few ways suggested in the frontispiece require the use of different conceptual filters. These are the media of representation which determine in no small ways the developmental potential of the shape.

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8 For a full treatment of the subject of concepts see Smith, E.E. and D. L. Medin 1981. *Categories and Concepts*. Cambridge, MA: Harvard University Press.

conclusion

The developmental potential of an idea is affected by the medium on which it is represented. Since external representations are an integral part of progressing a design, the particular characteristics of the medium constrain the way an idea is encoded. Therefore, an idea which is hard to represent (in a medium) is hard to transform, and consequently hard to develop. Conversely, every medium of representation has characteristics which make it partial to a specific universe of possibilities; there is no such thing as a completely 'blank slate'. Gombrich has argued that "the innocent eye is a myth"[9].

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9 Gombrich, E. 1960. *Art and Illusion*. Princeton NJ: Princeton University Press.