

Stuart English

Northumbria University School of Design, UK.

**Creative perception; sensory, conceptual and relational ways of seeing**

Keywords: design theory, perception, creativity, relational communication, problem solving.

In this paper I hypothesise that perception is a creative event and that in order to make use of our instinct to perceive, designers create fuzzy situations that are uncertain and ambiguous. I propose three distinct but interrelated ways of seeing that are used to explore design space and conclude by mapping how the theories discussed here interrelate.

### **Foundation theories of creative design**

#### *Pairing problem space with solution space*

Most researchers consider design method to contain representations of both problem space and solution space.<sup>1</sup> Problem space aims to describe the objective limits of the problem whereas solution space involves the designer's awareness, purpose and understanding. Both terms evolve from a dualistic philosophical framework in which we as subjects observe an objective reality that exists independent of ourselves. When we design, we attempt to define problem space objectively, but in practice this can only be considered as a development of our own awareness. As a result we term design problems as 'complex' because they can never be fully objectively described.<sup>2</sup> We recognise an uncomfortable mismatch between our underpinning dualistic approach and the creative event that occurs at the intersection of problem space and solution space. This leads Dorst and Cross (2001) to describe the creative event in terms of pairing problem space with solution space.

#### *Belief in certainty and objective knowledge*

Many of us think of things as objects existing in the physical world. Typically we consider that we pass through a world of things that exists independent of ourselves and that we experience this reality as an observer. This is a dualistic view that aims to identify what is, as separate from our experience of it. There is an objective reality that exists independently of our experience of it. In exploring objective knowledge Karl Popper described three worlds of mankind; the world of physical states, the world of personal experience and the world of shared concepts.<sup>3</sup> In our typical dualistic understanding we find it difficult to distinguish the world of

shared concepts from the physical world, so we see a cup as existing in physical reality rather than as a concept we project into the physical world. This is a barrier to creativity as we continually tell ourselves that our concepts are a concrete part of objective reality.

We observe the concrete world around us to the extent that we experience the quality of matter through our human senses, however we could say that even this quality has more to do with the nature of our senses that it does with matter itself. In experiencing the world of physical states we are exploring the nature of our own being through our senses. If we consider ourselves to be observers in a concrete world, the potential for us to create that world is limited, as our concepts are interpreted as reality in our collective mind. However if we sense a quality of experience and create our perception influenced by our awareness, purpose and maturity we are more likely to hold open potential in order to create possibility.

*Creative perception and the designer's awareness, maturity and purpose*

We might consider creative perception in relation to maturity and objective knowledge. The following two stories represent difficulties of perception encountered at different stages of maturity.

A story of perceptual immaturity: An art teacher noticed that her students only used paints straight from the pot and did not mix colours. The students saw grass as green and sky as blue, they perceived no more and as a result their paintings were bland and flat. She explained to the class how they could see colour in terms of hue, chroma and shades and got them to mix colours based on this conceptual model. The next day the pupils were excited about the richness of the colours in the morning sky because for the first time they perceived and shared something they had all experienced every day.

This story illustrates the importance of concepts in creating awareness from our sensory experience.

A story of conceptual maturity: An eminent professor was researching into the way of Zen and managed to arrange a meeting with a Zen master. On meeting, the master asked the professor what he had learned and the professor proceeded to describe his theories. The professor had carried out much research and was keen to explain all he had learned without missing anything important, the master listened and made a pot of tea for them both to drink. As they sat on the floor the professor continued to explain, careful to describe what he knew. Remaining silent the master began to pour the tea but did not stop when the cup was full, still listening as the cup overflowed. The professor shouted, 'Stop!' After a short silence the Zen master spoke 'like the cup you are full, come back when you are empty'.

This story illustrates how objective knowledge can prevent us from being present to the richness of our own experience.

*The designer tolerates uncertainty in order to stimulate creativity*

The framing of a problem identifies the bounds of the designer's attention but it does not specify a particular single objective. The design frame is a window on what is possible but – as noted by Kimbell, Rittel, Webber and Basader – within that window the problem is ambiguous, uncertain and 'fuzzy'.<sup>4</sup> There are interesting similarities to be drawn here with theories of organisational dynamics. Stacy describes successful innovative organisations as operating in 'states of bounded instability' and this may be a useful way of thinking about the designer's relationship with design space.<sup>5</sup> The design frame provides the bounds in which the designer can maintain uncertainty and ambiguity in order to encourage the creation of different perceptions and new ways of seeing. If we know the way things are we cannot at the same time create them to be another way, it is thus necessary to create ways of seeing out of uncertainty.

It is important to recognise that the designer does not just construct the design space but is himself part of that space.<sup>6</sup> The awareness/consciousness of the designer therefore might be considered as much part of the brief as the cost or function. To be truly open to our experience we must be free of the perceptions by which we understand the world but to perceive what we experience we must create ways of seeing. If we know the way things are then there is no space at the same time for things to be another way, so designers create uncertainty in order to:

1. Bring their attention to their experience
2. Discuss and share their perception
3. Negotiate understanding

Since the designer is a constant part of the problem/solution space, there is a need to understand the person who designs and the mechanisms the designer employs in the process of knowing.

## **A sensory, conceptual and relational hypothesis**

### *Sensory Communication*

To appreciate our ability to communicate via sensory means we need to be aware of the nature of our sensory capacity and apparatus. Whilst researchers such as Steiner recognise up to 12 human senses,<sup>7</sup> we can identify human sensory organs that suggest our ability to experience the world through nine distinct senses. These are sight, sound, smell, taste, touch, warmth, balance,

movement and pain or wellness. The experience we derive through our senses is our own personal experience, the nature and boundaries of which may be described by the term *qualia*. *Qualia* does not relate to the concept or 'universal form'<sup>8</sup> derived through perceiving the sensory experience, but rather describes the 'feel' of the direct experience itself. This is perhaps best explained by Dennett who describes *qualia* as:

**'Ineffable**, that is they cannot be communicated, or apprehended by any other means than direct experience.

**Intrinsic**, that is, they are non-relational properties, which do not change depending on the experience's relation to other things.

**Private**, that is, all interpersonal comparisons of *qualia* are systematically impossible.

**Directly or immediately apprehensible in consciousness**, that is, to experience a quale is to know one experiences a quale, and to know all there is to know about that quale'.<sup>9</sup>

Dennett's definition excludes *qualia* from two of Poppers realities, the physical world and the world of shared concepts. *Qualia* occupies only the personal world of direct experience through the senses. Only I can know what it feels like to smell new mown grass or to watch the sun rise but if I enjoy it perhaps others will too. Sensory communication in the design space must be considered as a personal experience. Whilst the designer is able to create and develop designs through his or her own sensory experience, another person may have a different sensory experience of the same design. Although *qualia* is not directly communicable the need for the designer to have a sensory experience of his or her own design might suggest that the successful designer is in some way in tune with the sensory experience of the end user.

### *Conceptual Communication*

The way we perceive the world is a lot like moulding jelly. When we pour jelly into a mould it is a warm liquid with no form but as it cools it adopts the form of the mould allowing it to be turned out onto a plate in the shape of a fish, or a rabbit. If we think of the liquid jelly as our direct experience (as Dennett describes *qualia*) then the mould is the 'universal form' of our mental construct.<sup>10</sup> We pour our direct experience into the form of our mental concepts and project our perception into the physical world. The result is that we are able to see the universal forms of our mind in the matter around us as if these forms were physically real. We are able to agree 'that's a real chair' and 'that's an imaginary chair' and distinguish something real from something imaginary.

In conceptual communication a concept is a universal form, created in the mind and projected through our process of perception onto the physical world. The chair in both statements above is not

different but the 'real' chair involves direct sensory experience. It is not however qualia that we communicate in our statement but rather the concept in the word 'chair' and this is in no way sensory. What we might say is that we experience patterns in our neural connections that are stimulated by different *qualia*, we can easily remember and recreate the generality of these patterns in our minds. We do not need a *quale* to recreate a neural pattern because we can imagine it. Only the individual can recognise the neural pattern of a *quale* and neither the pattern or the *quale* can be communicated. However the brain allows us to make numerous other associated connections with the amazing result that communicable concepts are also associated with the neural pattern. Words, symbols, sketches and objects can all be derived to communicate a concept and as we make use of these tools in our conceptual communication we reinforce the concept as the physical reality. Thus the jelly sets, and mostly, we forget that it was once fluid and that it was us who moulded it.

We find it easy to build an objective reality out of 'set jelly'. We can argue that a chair is real because we can see it, we can touch it and we can sit on it, but the 'chair' is in fact conceptual and exists in our shared understanding.

### *Relational Communication*

Christian von Ehrenfels published a paper in 1890 entitled *On Gestalt Qualities*, in which he pointed out that if a musical melody is played in a different key none of the notes remain the same, however despite this the melody can still be recognised.<sup>11</sup> Relational communication concerns the way that one experience or concept relates to another and can therefore be used to build a contextual understanding. A good example of this might be a London underground map, here different coloured lines link station names so that it is easy to see the location of one station in relation to another and therefore how one might travel between them.

Relational communication describes arrangement, configuration or situation of one form or another. For example, a page, in a book, on a table, in a library. The page, the book, the table and the library are all projected concepts that exist in our shared perception but they gain meaning through their relationship. Additionally we acknowledge that experience is not absolute but relative in the same way that a white piece of paper appears black when held up to the sky.

Through purposeful configuration designers are able to generate navigable relationships that provide functional value in mechanical systems, architectural layout and user interface. Because relationships exist both in the physical world and in the mind of the observer relational communication can describe all of

Popper's three worlds, the personal, the physical and the conceptual. Relational ways of seeing might therefore offer a more accurate representation of what is real than can possibly be conveyed by concepts.

### *Sensory, conceptual and relational ways of seeing*

We might distinguish between sensory conceptual and relational ways of seeing by considering and describing an experience. The following exercise describes a visit to an island. The reader is asked to draw a map including words and symbols to communicate where they went, what they found and how they felt:

*You arrive on the island by boat and leap onto a wooden jetty. You can see fish below swimming in the water so crystal clear that they appear to be swimming in air. As you walk along the boards dried by the sun a gentle breeze brings new smells of the island as if to welcome you and capture your imagination. You kick your shoes off and walk down over the warm sand into the cool water that rushes between your toes with each step. A flat fish wriggles underfoot and darts away and as you look down you notice the ground is alive with tiny shrimps. Walking round the headland a giant bay opens out before you dotted with glistening pools and mussel beds. You break into a run, whispering across the expanse of sand, visiting each rocky outcrop until your attention is seized by the gurgling of a brook in the distance, you race towards the sound and splash upstream until the riverbed becomes deep and spiky. Sitting on the bank you pull on your shoes and listen to the birds singing over the background warble of the water. As you stand up you make your way towards a soft scent of on the air, in minutes you are knee deep in fields of sweet flowers that hush past your legs. As you come to a lake you notice that your shadow has lengthened and the air has cooled. A big rock feels pleasantly warm like a natural radiator; you sit on the rock and watch the changing colours of the landscape as the sun sets. In the distance you see a light and pick your way around the lake towards it in the half dark. At the cottage you push at a heavy wooden door that creaks a low old creak as it opens. You relax into a lush leather armchair in front of a raging fire and breathe in the dryness of the warm air; the butler brings rich flavours in a pot of Columbian coffee.*

In the resulting map the words and symbols demonstrate conceptual language. The shapes of the island map itself and the relative position of words and symbols are examples of relational language. Sensory language conveys how the experience felt to the individual and is not directly communicable, it would be possible for many people to visit the same island and experience it differently.

### *Sensory, conceptual and relational language and Popper's three worlds*

To more fully understand the relationship of sensory, conceptual and relational language we can consider these modes in relation to Popper's three worlds.

Sensory language, defined by Dennett as qualia, is by its nature excluded from the world of physical states and the world of mental concepts, and can exist only in Popper's world of personal experience. As soon as we perceive our direct sensory experience (making jelly) we project this into the physical world and in doing so engage in a creative event. It is this event that generates our conceptual language that from a dualistic philosophical framework we term as objective (despite being created by ourselves).

Conceptual language thus exists in the personal world and in the world of shared concepts. It is excluded from the world of physical states but because we project our mental concepts into the physical world they appear to us to be objective. Thus we tend to agree that a glass of water exists in the physical world when in fact that concept does not. To gain a better understanding of reality we contextualise our conceptual language by relating concepts to each other. Because of the construction of our brain we are extraordinarily skilled at doing this and can easily and quickly construct elaborate relational models that allow us to generate understanding and communicate that understanding. This relational language occurs in Popper's worlds of personal experience and shared concepts, but perhaps surprisingly, it also exists in the world of physical states. When we say 'this plank is three times as long as that plank' we are making an objective relational observation that actually occurs in the physical world as well as in our imagination. Relational language can thus provide an accurate description of the physical world whilst also being capable of being communicated.

### **Mental spaces for business: a case study**

Winston Churchill's famous statement 'We create our buildings; thereafter they create us' might suggest that the way we design is limited by the conceptual models we use to make sense of the world. Our buildings (indeed, all things man-made) are created out of the constructs in our own minds and may therefore be limited by shared concepts. Natural environments on the other hand may not constrain our awareness in this way, a walk through the forest or watching the waves break on the shore reconnects us with our senses and bring us back to our present experience. 'Mental spaces for business', a concept used by Mu, acknowledges the impact of the man-made (man-conceived) environment on our consciousness and aims to create working environments that are unconstrained by the common cognitive constructs of three-dimensional space.<sup>12</sup> The purpose of the designed space is to bring our attention back to our experience, to engage our senses rather than our concepts (Fig. 1).

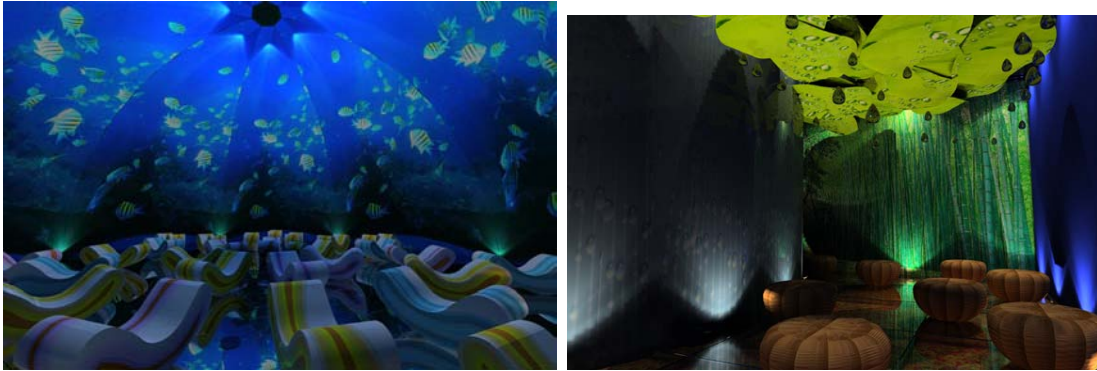


Fig. 1. Mental spaces for business (Mu 2007). Reproduced with kind permission.

In order to create interior spaces that would challenge the perception of occupants Mu purposefully rejected the instinct to use perspective sketches to convey a typical Euclidean geometry. She attempted to develop new ways of seeing three-dimensional space, and created a unique style of sketching/visualising influenced by aboriginal art.

### **Conclusion: a model for navigating fuzzy situations**

We could consider the relationship between our direct sensory experience and our perception of that experience as a cycle. As our senses are stimulated, neural patterns form through our body and mind, these patterns represent all there is to know about the experience. Instantaneously however we create our perception by generating other neural patterns that enable us to make sense of, or conceptualise our experience. In our minds there may be little discernable difference between the sensory neural patterns of direct experience and the conceptual neural patterns we create to perceive that experience. Through perception we project our mental concepts into the physical world so the matter we sense might become a chair that we can walk around and sit on. We can all agree whether a chair is real because we can all sense its concrete physical form. As we sense the chair our neural patterns are reinforced and the pattern of the quale is firmly and consistently associated with the pattern of the concept 'chair'. Hence our sensory neural pattern is intermeshed with our conceptual neural pattern to the point that it becomes difficult for us to distinguish the particular from the universal.



	<b>Particular</b>	<b>Universal</b>	
<b>Subjective</b>	<i>Popper's World of Personal Experience</i>		<b>Solution Space</b>
	<b>Sensory Neural Pattern (Qualia)</b>	<b>Conceptual Neural Pattern (Ideas)</b>	
	<b>Sensory apparatus</b>	<b>Creative apparatus</b>	
<b>Objective</b>	<b>Matter</b>	<b>Concept</b>	<b>Problem Space</b>
	<i>Popper's World of Physical States</i>	<i>Popper's World of Shared Concepts</i>	

Fig. 2. A model for navigating 'fuzzy situations' in the design space.

The model shown in figure 2 aims to draw together the key theories discussed above by plotting subjective and objective against the particular and the universal. Problem space is described as objective and solution space is described as subjective. Within this model, Popper's world of personal experience spans the 'subjective particular' and the 'subjective universal'. The world of shared concepts is classed as 'objective universal' and the world of physical states is 'objective particular'

According to this model a process of perception is described in a clockwise rotation so as we experience the physical world a sensory neural pattern is stimulated in the personal world (this is our direct experience). We perceive this experience in the context of our own awareness and generate an associated conceptual neural pattern. Barsalou describes two schools of thought regarding the relationship of sensory and conceptual neural patterns.<sup>13</sup> According to modular amodal views 'the neural pattern that represents an entity during its perception is not active during its conceptualisation. Instead neural activation in some other brain system represents the object conceptually'. Non-modular modal views on the other hand suggest that 'When a category is represented conceptually the neural systems that processed it during perception and action become active in much the same way as if a category member were present again'. Whilst the physical relationship of sensory and conceptual neural patterns may be unclear we can simulate the influence of conceptual on sensory if we imagine cutting a lemon in half and biting into it. Although the imagining of this action occurs in the subjective universal this

seems to stimulate a physical reaction as if the particular lemon were present. This would suggest that sensory and conceptual neural patterns are intermeshed and that each is able to stimulate the other. This may help to explain why we find it so easy to see shared concepts as concrete reality. The conceptual neural pattern in the world of personal experience (the subjective universal) can be interpreted into the world of shared concepts (the objective universal) that we project onto the matter we experience.

We might summarise the benefits of sensory conceptual and relational ways of seeing by recognising the design value present in each of these modes. In sensory mode we experience and are present to the value of a quale, how it feels. In conceptual mode we recognise the value of a shared idea, what it means to people. In relational mode we understand the context and configuration of elements that reveal functional value.

## Notes

- 
- <sup>1</sup> Dorst, K. and Cross, N. (2001), 'Creativity in the Design Process: co-evolution of problem-solution', *Design Studies*, 22 (5), September, pp. 425-437; Langen, P.H.G. van (2002), *The Anatomy of Design: Foundations, Models and Applications*, Chapter 1 - The Anatomy of Design, Doctoral Thesis, Vrije Universiteit, Amsterdam.
  - <sup>2</sup> Simon, H. A. (1969), 'The architecture of complexity', *The Sciences of the Artificial*, Cambridge, MA: MIT Press, pp. 192-229; Goel, V. (1995), *Sketches of thought*, Cambridge, MA: MIT Press.
  - <sup>3</sup> Popper, K. (1973), *Objective Knowledge*, Oxford: Oxford University Press, pp. 106-190.
  - <sup>4</sup> See Kimbell, L. (2007), *Wicked Problems and the Tolerance of Ambiguity*, The international conference on Design Principles and Practices, Imperial College, London, 4-7 January; Rittel, H. and Webber, M (1973), 'Dilemmas in a general theory of planning'. *Policy Sciences*, 4, pp. 155-169; Basadur, M., Pringle, P., Speranzini, G. and Bacot, M. (2000), 'Collaborative problem solving through creativity in problem definition: Expanding the pie', *Creativity and Innovation Management*, 9 (1), March.
  - <sup>5</sup> Stacey, R.D. (1993), *Strategic Management and Organisational Dynamics*, London: Pitman Publishing, pp. 146-246.
  - <sup>6</sup> English, S.G. (2006), 'Design thinking - Value Innovation - Deductive Reason and the Designers Choice'. Design Research Society Conference, Lisbon, 1-4 November; see also Schon, D.A. (1983), *The Reflective Practitioner: How professionals think in action*, New York: Basic Books.
  - <sup>7</sup> Aeppli, W. (1993), *The Care and Development of the Human Senses*, Steiner Waldorf Schools Fellowship, Sussex, UK.
  - <sup>8</sup> English, S.G. (2007), 'Creating Universal Form – Using Universals to Describe Design Solution Space', *Design Principles and Practices: An International Journal*, 1 (4) pp. 21-30.
  - <sup>9</sup> Dennett, D.C. (1988), 'Quining Qualia', *Consciousness in Contemporary Science*, Marcel, A.J. and Bisiach, E. (eds.), Oxford: Oxford University Press, pp. 42-77.
  - <sup>10</sup> English, S.G. (2007), *op.cit.*
  - <sup>11</sup> Christian von Ehrenfels, *On Gestalt Qualities*, 1890.

<sup>12</sup> Mu, M. (2007), *Mental Spaces for Business*, Unpublished masters dissertation, Northumbria University, Newcastle, UK.

<sup>13</sup> Barsalou, L.W. (2003), 'Situated simulation in the human conceptual system', *Language and cognitive processes*, vol. 18, pp. 513-562.