Design Research and Visual Analysis

Daniela Büchler

Design research has been built on the method and contextual paradigms that have been the traditions of a range of other research areas. This situation creates distinct issues and challenges for the researcher and the research community. Particularly in methods available for the visual analysis of product shape, it was sensed that the existing ones were not enough to provide information that was significant to design concerns.

For the analysis of artefacts, there is a plethora of methods readily available. However it is our experience that, as *borrowed* investigative tools, these do not supply design-relevant information on consumer products. We discuss the need for a new way that effectively considers products as design artefacts while focusing exclusively on their outward appearance.

A debate on design research methods

The idea that research in design lacks and needs specifically crafted methods is actively debated. In a more recent and visible debate[1], it was stated that a recurring subject in the creative design disciplines, is whether the academic design community uses established research methods from other disciplines, whether there are research methods that are specific to design, or whether researchers in this area should invent their own methods.

The above debate revolved around the central issue of whether there are research methods that are unique to design. The discussions focused on the similarities between both the activity of research and that of design, as well as on the differences in nature and outcome of research in design as opposed to research in other disciplines. The consensus seems to be that academic design research makes use of a combination of established research methods from other disciplines, and of design methods ultimately embedded in these (Niedderer, 2004).

These methodological approaches are legitimate research routes and reflect many practitioner-come-researcher real case scenarios. However, the constant attempt at building new and more appropriate methods for investigating the produce of design, hints at the inadequacy and/or insufficiency of the existing methodology.

Illuminated by the above discussion, an unanswered question leaps to mind: In researching design, can we simply change the way in which established models and methods from other disciplines are used, or is it necessary to customize these methods and ultimately develop new ones in order to extract design-relevant information?

It is our contention that merely reviewing and tweaking existing methods is not enough to produce knowledge on and for design.

A debate on product visualization

To analyse visually is human. Academic disciplines take advantage of our ability to orderly classify into categories (Bowker, 1999). Biological and chemical research, for example, have benefited from very clear and psychologically grounded levels of classification (Lakoff, 1987). Specific methods have been traditionally used to group and sort artefacts in the interest of museology, anthropology and archaeology.

Science works around the assumption that we see and then classify. Both the disciplines of cognitive science and visual perception agree that the mind envelops both processes analysing images formed, arguably, therein[2]. The design product as a sign may be divided roughly into

---

[1] The referred debate is available at PhD-Design@jiscmail.ac.uk on-line discussion list under the title "defining Design Research Methods".

[2] Nelson Goodman discusses the existence of a 'mental image'. He debates whether or not what we see is indeed represented in the mind and, if these mental images hold any resemblance to the real object observed.

material and semiotic dimensions. Both dimensions grant that products are visible images, have a very objective content and are displayed as three-dimensional representations (Petterson, 2001).

There is thus a difference between the concrete and the abstract qualities of products. This may reflect another divide – that of the visual process, between visualization as a mechanical process and an experiential one. Seen in this light, is it conceivable to split the act of seeing a product into distinct instances? Although eliciting various mental connections and personal meanings, could the visual experience with the materialized product be broken down and each visual process studied independently?

This sparks the debate between the semiotic and the cognitive view. The semiotic perspective regards visualization as strictly experience-bound. It is deemed impossible to disassociate form from content. This goes back to the very core of semiotic theory, where all that is, represents and signifies; there is no materialization without meaning (Vihma, 1995).

The cognitive position on segmentation of visualization is grounded on physiology and perception. According to Marr[3], our visual process is goal-oriented, therefore, depending on the task to be performed, different processes and equipment come into play:

> *"A framework such as Marr's allows us to make sense of the functions played by the neurophysiologic machinery of vision, in terms of a more abstract description of the goals sub served by that machinery."* (Humphreys, 1989: 21)

If we take visual cognition to accept the segmentation of visualization, we must establish where the partition would lie. Cognition considers levels of understanding in the process of acquiring knowledge. Once information is perceived – either actively or passively[4] – analysed and interpreted, it then comes to mean or represent something. The understanding of the object as meaningful would put it in the semiotic realm. The assumption made here is that prior to that understanding – where the product is seen, identified and classified – an investigation of the purely physical features could theoretically take place.

Gunnel Pettersson describes products as signs discussing their semiotic level:

> *"The scope of isolating the form from the content is to focus on the concrete descriptive visual information that can be observed independent of the work. This ability to abstract the three-dimensional visual structure that is inherent in all products, adds objective viewpoints to the creative process of shaping a form."*
> (Pettersson, 2001: 6)

In other words, it is important to be objective and, apparently, semiotic writers could stand for isolating form from content in the name of enhanced objectivity. To quantify is perhaps the more objective of the analytical processes, immune to subjective interpretation so often in conventional visual analysis methods. In being objective, there is also the idea of an experience prior to emotion and subjectivity where we can try to define what we are *able* to see.

There is also the idea of making visual analysis more universal. Typically, the design activity is aimed at and tries to impact the consumer or user. Humanistic approaches consider the individual; the marketing and design activity frequently look at niches and markets; the scientific approach in psychology may provide the physiological benchmark equating all as humans. If visualization is relative to the observer, it may also contain a psychophysical relation where some aspect of the physical product impacts all human perceptual systems in the same way.

---

[3] The British neurophysiologist David Marr described visual constructions by analogy to information processing in computers: 'Vision is a process that produces from images of the external world a description that is useful to the viewer and not cluttered with irrelevant information…' Marr thought of vision as an active process that produces useful descriptions.

[4] No assumption is made here on the nature of perception, merely an acknowledgement of the different theories in existence, i.e. J. J. Gibson's view of perception as the active pursuit of relevant information, where the agent seeks out from his surroundings that which should be noticed.

Again, the matter is what we are able to see in objects. This comes before the question of what we understand when we see them. The aim of the discussion is whether it is possible to objectively measure what we can see. The possibility would mean a reduction of segmentation to one overriding class: humans over markets and individuals. This is obviously very ambitious but, presuming such universalism is shown to be possible would suggest the existence of more stable underpinnings to people's interaction with products.

A debate on the need for a new way

Evidently the existing methods for visual analysis of objects are rigorous and time-honoured. The question here is not the value of these for use in product analysis, but rather of the possibility of visually assessing a product.

Visualization could be regarded as a process involving roughly two aspects: seeing and interpreting. These two stages are separated by the experiential moment where we gain understanding of what is being observed. Following this rationale, it would be possible to divide visualization into more subjective and more objective considerations. Further experimental testing is required to elaborate on the experience of seeing and the mechanics involved in seeing. Nevertheless, the argument in this discussion is for visible differentiation and the search is for an adequate design analysis method to carry out the comparative evaluation of groups of products.

We should also consider if such a need exists. Is it possible to analyse products in this way and what purpose would it serve?

The concept of product differentiation comes from marketing theory. Our central premise taken from that concept is that when designers make subtle physical alterations to products, as opposed to radical innovations, they run the risk of the product change not being evident or clearly noticed. In a variety of areas of product design, small style changes are now often used to provide greater choice and thereby stimulate more frequent shopping trips. It is therefore likely that a context in which differences between competing products are not noticeably visible would negatively impact sales.

A better understanding of what product features are seen under what conditions could help make shape differentiation more efficient and chances of a design difference being visibly evident, more predictable. The issue becomes one of accessing this design-relevant information contained in product shape in order to define what constitutes a visible design difference.

However, if accessed, are the findings relevant, informative or too reductive? Would the dismemberment of our visualization of products map back on to the holistic visual experience with them? Is our visual interaction with products too complex to study in a way other than through those traditionally employed in consumer research? Are the abstract product qualities hopelessly meshed with the concrete ones?

The way Nelson Goodman refers to the process of purifying talk of images can be heard as a call for structured analytical methods of visual analysis:

> *"What goes on is replacement of statements ostensibly about images by statements about objects and events. That cannot complacently be left until after the psychological investigations have been carried out in ordinary parlance; for our image-talk raw and unprocessed is a terrible tangle."*
> (Goodman, 1990: 362)

Like the terrible tangle he describes, our talk of product perception without due quantification is also less useful.

References

Bowker, G. C. and Star, S. L. (1999) *Sorting Things Out: Classification and its Consequences*. Cambridge: The MIT Press.

Gibson, J. J. (1966) *The Senses Considered as Perceptual Systems*. George allen & Unvwin Ltd., London: UK.

Gibson, J. J. (1950) *The Perception of the Visual World*. Cambridge: The Riverside Press.

Goodman, N. (1990) "Pictures in the Mind?" In.: Barlow, H. *Images and Understanding*: 358-364, Cambridge University Press: Cambridge.

Humphreys, G. W., Bruce, V. (1989) *Visual Cognition: computational, experimental and neuropsychological perspectives*. Lawrence Erlbaum Associates Ltd.: East Sussex, UK.

Lakoff, G. (1987) *Women, Fire, and Dangerous Things: What Categories Reveal about the Mind*. The University of Chicago Press, Chicago: USA.

Marr, D.(1982).*Vision. A computational investigation into the human representation and processing of visual information*. New York: Freeman.

Niedderer, K. (2004) "defining Design Research Methods" PhD-Design discussion list, 17 October, 2004. *PhD-Design@jiscmail.ac.uk*. Archived http://www.jiscmail.ac.uk/lists/phd-design.html Retrieved 19 October 2004.

Petterson, G. (2001) "Products as signs – An implication of semantic and three-dimensional visual analysis in product development" http://design2.maskin.ntnu.no/fag/PD9/2001/Artikler/Petterson_II.PDF

Vihma, S. (1995) "Products as representations. A semiotic and aesthetic study of design products". Helsinki: University of Art and Design Helsinki UIAH.

Biographical note

Daniela Büchler is a Brazilian architect with an MA from the Faculty of Architecture and Urbanism, São Paulo University, Brazil, where she is a visiting lecturer. She is currently working on her PhD at the Faculty of Arts, Media & Design at Staffordshire University, UK, where she is a part-time lecturer. Since her undergraduate studies, her research has been devoted to Product Design, more specifically ceramic tableware. Her research interests span from corporate design and marketing strategies to visual analysis of consumer products. In conjunction with her academic work, Daniela has put her designs into production and has successfully inserted them in the Brazilian market, receiving Honourable Mention in national design competitions. She has presented and published her professional and research work in a range of national and international events. (d.m.buchler@staffs.ac.uk)