Design: from material to digital and back

changes in design discourse

cosmetics, surface, appearance, deception

an ontological diagram of design

interface as the central category of design

re-assessing design

appropriate technology

design in the periphery

design as a constitutive category

the basic elements of design

effective action

the specific character of design innovation

technology and industrial design

physical efficiency and socio-cultural efficiency

the structural affinity between language and design

In the course of the last four decades the term 'design' has undergone a number of changes, which are reflected in changes in the central issues of design discourse. To put it simply, one can describe the change as follows: in the fifties the focus was on productivity, rationalization and standardization. Industrial production, exemplified by Henry Ford, was the model for distinguishing design from the fine and the applied arts on the one hand, and on the other hand, to give it credibility in industry as a new discipline. This debate grew more important in Europe during the reconstruction period after the Second World War. There was great demand for goods, and this could be met by mass production, which enabled consumer goods to be offered on the market at affordable prices. The times had not yet come when design mainly meant product differentiation.

In addition to this central issue of design, growing interest became apparent in design methodology, reaching a peak in 1964 with the publication of Christopher Alexander’s book Notes on the Synthesis of Form, which has become a classic.

The third issue in design discourse is the relation between design and the sciences, both the natural and the social sciences, and the humanities. At a very late stage design entered the management and marketing discourse, a process not yet concluded.

In engineering driven companies and in Latin American companies generally, design remained a fringe phenomenon, because it went beyond the traditional criteria of company management, planning and engineering. This is also true for companies that operated in economies of ‘real existing socialism’.

Any attempt to see design from the standpoint of engineering encounters difficulties, and it generally ends in the – hardly surprising – verdict that design is only a cosmetic exercise, in which a few decorations are merely added to the blueprints produced by product development departments. This narrow view is still found in many software companies, where the contribution made by the designer is generally reduced to the idea of screen design and adding visual effects or ‘souping up’.

If industrial production is seen within the categories of engineering, the designer is bound to appear as a make-up specialist, albeit one with the generally enviable ability to sketch and visualize. But design is not drawing. Design is also thinking, and thus a cognitive process. It is important to stress this, since the general public tends to closely associate design with the ability to draw.
The topic of cosmetic intervention has a long tradition in design discourse. In the fifties Max Bill was objecting to what he called the view of the designer as hairdresser. There can be no doubt about the negative connotations of such phraseology. The implication is that design is superficial, of minor importance, and that it need not be taken seriously. With differing nuances this attitude has survived in a tendency to see the aesthetic aspects - appearance and form - as the primary elements of design. The whole subject is then elevated to the level of an artistic and creative process shrouded in an atmosphere of mystery. When one does not know what to do, one can always hide behind the smoke screen of individual creativity.

Designers should not be astonished to see their activities interpreted in such a reductionist fashion. However, they could argue that their malign design contributions are actually of central importance to very many people. The survival of entire firms is dependent on these supposedly ‘cosmetic’ exercises.

Instead of the view that the designer creates wrappings for the technical structures evolved by engineers, a more differentiated approach may be helpful - it is the ontological design diagram.

This diagram consists of three domains which, as will be shown, are linked by a central category.

**Firstly** we have a user or social agent who wants to realize an action effectively;
**Secondly** we have a task which the user wishes to perform, e.g. cutting bread, putting on lipstick, listening to rock music, drinking a beer or performing a root canal operation;
**Thirdly** we have a tool or artefact which the active agent needs in order to perform this task effectively - a bread knife, a lipstick, a walkman, a beer glass, a high precision drill rotating at 20,000 rpm.

It must now be asked how these three heterogeneous areas - a body; a purposeful action; an artefact, or information in an act of communication - are connected. They are linked by the interface. It should be emphasized that the interface is not a material object, it is the dimension for interaction between the body, tool and purposeful action. This is not only true of material artefacts but also for semiotic artefacts, for instance, information in communicative action. This is the essential domain of design. This position is not meant to dismiss design as immaterial, and certainly not to dispel its materiality. On the contrary, the interface goes beyond the duality of material/immaterial, it covers what they have in common. It covers the design of a spanner just as it covers medical software for the purposes of diagnosing skin disease.

The interface is the central domain on which the designer focuses attention. The design of the interface determines the scope for action by the user of products. The interface reveals the character of objects as tools and the information contained in data. It makes objects into products, it makes data into comprehensible information and - to use Heidegger’s terminology – it makes ready-to-hand (Zuhandenheit) as opposed to present-at-hand (Vorhandenheit).
Three examples will show what the interface achieves: a thumb-tack, a pair of scissors and a travel information kiosk.

The human body consists of a soft mass which is enclosed in a sensitive membrane that can easily be penetrated. To use a thumb tack we need a smooth surface provided by the head of the thumb-tack. Without that interface using thumb-tacks would not only be painful, it would be simply impossible.

An object only meets the criteria for being called scissors if it has two cutting edges. They are called the effective parts of the tool. But before the two cutting edges can become the artefact 'scissors' they need a handle in order to link the two active parts to the human body. Only when the handle is attached is the object a pair of scissors. The interface creates the tool.

The third example is from digital technology, which is where the term 'interface' originates, and it makes the essential function of the interface and its design very clear. The digital data stored (on a hard disk or a CD-ROM) are coded in the form of 0 and 1 sequences and have to be translated into the visual domain and communicated to the user. This includes the way commands like 'search' and 'find' are fed in, as well as the design of the menu, positioning on the screen, highlighting with colour, choice of font. All these components constitute the interface, without which the data and actions would be inaccessible. As we know, the first generation of computer programmes that worked with cryptic commands were so difficult to use that the term 'user-friendly' was invented to describe the obvious fact that a digital product also has to be usable. Otherwise it is a mere thing or non-thing - it is merely present-at-hand (Vorhandenheit) without being ready-to-hand (Zahandheit).

Without interface there are no tools. This fact makes interface a core concept providing a stronger argument for design than the culturally oriented interpretation that sees design as primarily concerned with aesthetics.

Let us return to our simplified account of the predominant themes in design discourse: the radical criticism of consumer society and alienation in the sixties gave rise to hopes of an alternative design, a new product culture and the possibilities for design in the planned economies that, for lack of a more appropriate term, are now characterized by the derogatory term 'real existing socialism'. It seemed plausible that a society organized by different criteria could also create a different material culture, a world of consumption but without addiction to consumption.

The political processes since the end of the eighties appear to have put an end to that idea. The product culture of the planned economies has been wiped out by the wave of commodities produced in market economies. Although design was promoted by government institutions, difficulties were encountered when integrating design into industry. Possibly this was due to the predominance of quantitative criteria in production. However, it may also be the result of a planning discourse where design and innovation remained foreign activities that would disturb the normal flow of production.

In the seventies the subject of appropriate technology entered the debate. Moreover, for the first time the Euro-American concept of 'good form' came under fire. Arguing on the basis of 'dependency theory' Third World countries insisted on the development of their own design. Once the socio-economic difference between central and peripheral countries was recognized and accepted, this in turn provoked doubts about the validity of a universal definition of design originated in the West.

It was not only the difference in GNP which grouped countries into two classes. To a greater extent it was the debilitating effect of industrialization, which is evident in the gap between a minority oriented to consumption patterns of the central countries and the marginalized majority, vegetating at bare subsistence level. These wide gulfs in the peripheral societies inevitably give any debate on design in the periphery a political bent.

It is hard for the central countries to understand this. In the periphery the problems of design are primarily political, and only secondly are they technical and/or professional. This predominance of political factors can give the impression that the discussion on design in the periphery is
politically or - even worse - bound to an ideology. By contrast, the seemingly unpolitical and sublimely impartial attitude found in the central countries is bound to appear naive or cynical. It is a contradiction on the one hand to proclaim the end of ideology and on the other to indulge in the mass pilgrimage to the temple of the American (consumer) Dream.

Peripheral countries' attitudes concerning design in the central countries have sometimes been ambivalent. The technical quality of design in the central countries was undeniable, and it often served as reference or model - acknowledged or unacknowledged - for the design that was aspired to. But the lack of technical know-how about processes and finish could easily mean that the design actually produced was second-rate, particularly in its formal and aesthetic aspects. Attempts were made to compensate for this weakness, which was vaguely perceived, with a passionate search for a design identity - and this was occasionally combined with a nostalgic orientation to the formal codes of natives who had survived the massacres during colonialization. One may ask: why not simply do design, instead of wasting time searching for an identity? The undertones of nationalism in the Third World can easily provoke the laconic and ironic verdict that nationalism is the last option left to the poor. But this negative assessment overlooks the link between identity and dignity. The search for identity is motivated by the wish for autonomy, and this means being able to have a say in determining one's own future.

In the eighties criticism of rationalism and functionalism, or, to be more precise, criticism of a caricature of functionalism, revived in various guises. The time of personal gestures had arrived again. The question of the social relevance of design was doomed, and discussions on style and form again predominated in the design scene. Design objects acquired the status of cult objects. A neo-craft of small series production evolved, especially in furniture and lamps, with prices comparable to those on the art market. The slogan was that design should first and foremost be 'fun'. The customer was not paying for design but for a lifestyle signalled by the exhibition of design trophies.

Now, in the nineties, environmental compatibility and design management are the main focus of design discourse. The talk is no longer of development generally, but of sustainable development, which readdresses the seventies theme of appropriate technology, including its plea for development suitable to the needs of different countries, and taking into account technical and financial resources available locally. Today we talk about self-sustaining growth, and this can be interpreted as a recommendation: the periphery should attempt to cope on its own, while the central countries focus on their own concerns, as long as the debtor countries pay the interest punctually on the loans given during the failed accumulation process. It failed because industrialization was conceived and implemented without the dynamic factor of innovation.

To judge from the design publications and media coverage, the subject is now being shoved into the limelight. Never before has it been possible to incorporate design as a decisive factor in discussions on the efficiency of firms and national economies. But this also reveals the contradiction between the widespread use of the term 'design' and the lack of theoretical grounding. Today design is a phenomenon that has not been researched theoretically, despite its omnipresence in our everyday lives and in our economies.

What is the explanation for this lack of theoretical research? Without attempting to give a definitive answer, one can assume that there is a mutual relation between the shallowness of design discourse and the lack of a stringent theory. So far, design has been an area without a proper foundation, where talk is 'small talk'.
A reinterpretation of design which looks beyond the 'good form' frame of reference and its inherent socio-pedagogical aims, may help to open a new perspective. This interpretation also looks beyond the concept of 'lifestyle', where design functions as the supplier of interchangeable items in a scenario for disoriented acquisition potential. The reinterpretation is presented here in the form of seven theses on design:

**Thesis 1:** Design is a domain that can be manifest in any field of human knowledge and practice.

**Thesis 2:** Design is oriented to the future.

**Thesis 3:** Design is related to innovation. The act of design gives birth to something new.

**Thesis 4:** Design involves body and space, in particular the retinal domain.

**Thesis 5:** Design aims to facilitate effective action.

**Thesis 6:** Design is located linguistically in the field of assessments.

**Thesis 7:** Design is concerned with the interaction between the user and the artefact - be it an object of daily use or software. The domain of design is the domain of the interface.

The first characteristic of design as a domain of human action takes it out of the narrow frame of disciplines with which the term 'design' is generally associated, that is, industrial design, graphic design, fashion and interior design. There is a risk of falling into the trap of vague generalizations like 'everything is design'. Not everything is design, and not everyone is a designer. The term 'design' does refer to a potential to which everyone has access and which is manifest in everyday life in the invention of new social practices. Everyone can become a designer in his special field, but the field that is the object of design activity always has to be identified. An entrepreneur or a manager organizing a company in a new way is designing, though he probably does not realize this. A systems engineer who works out a process to reduce the misdirection of luggage at an airport is designing.

A genetic engineer who develops a new variant of corn that is resistant to external influences is designing. The inherent components of design are not solely concerned with material products, they also cover services. Design is a basic activity whose capillary ramifications penetrate every human activity. No occupation or profession can claim a monopoly on it.

The future is where design belongs. Design is only possible where confidence and hope are united. Where there is resignation, that is, no belief in future prospects, there is no design.

The terms 'innovation' and 'design' partly overlap. But they cannot be treated as synonymous. Design, as it is understood in this context, means a particular form of innovative action that focuses on the concerns of a community of users. Design without innovative components is an evident contradiction. But innovative action, which creates something new, something that did not exist before, is not sufficient to describe all the aspects of design. For that reason the idea of concerns needs to be introduced, and this establishes a link with ethics.

It may be maintained that all design ultimately ends in the body. Perceptual space occupies a prime position, because people are first and foremost creatures with eyes. In the case of tools - both material and immaterial (software) tools - the task of design is to attach the artefacts to the human body. That process is described by the term 'structural coupling'.

The traditional interpretations of design use the terms 'form', 'function' and 'style'. Instead of linking design to these categories it is to be more fruitful to see design as located in the domain of effective action. The answer to the question why products are invented, designed, produced, distributed, sold, bought and used, is simple: products are invented, designed, produced, distributed, bought and used in order to enable effective action.

To assess an action as effective, the implicit standards always need to be identified. To an anthropologist a lipstick is an object for the production of a temporary tattoo, which is applied as part of a pattern of social behaviour that we call seduction and self-representation. The criteria by which its effectiveness is judged are very different from those that would be applied to a text editor, a concert poster or a bulldozer used in road construction.
There is no point in talking about effectiveness without also stating the scale of values by which a product is judged as effective for a certain action.

The concept of interface will help to explain the difference between engineering and design, insofar as both are design disciplines. A designer looks at the phenomena of use with interest that focuses on socio-cultural efficiency. Categories in engineering do not include user functionality; they are based on the idea of physical efficiency, that is accessed through the means of the exact sciences. Design, however, builds the bridge between the black box of technology and everyday practice.

Originally presented as a paper for the Cultura y Nuevos Conocimientos symposium, Universidad Autónoma Metropolitana, Azcapotzalco, Mexico, 17-20 February 1992.

1 Elmar Altvater has commented on the inexact nature of the terminology used by the former socialist countries: “The term ‘real socialism’ came into use in the Brezhnev era and it is used to avoid problems with terminology. These problems would be even greater by using phrases like ‘societies in transition’ (transition from what to what?), Eastern European countries (there have been socialist experiments in other areas as well as Eastern Europe), ‘post-revolutionary’ societies (can one really speak of a revolution in many of the countries that are practising real socialism?), centrally steered economies (a term from the neo-liberal theoretical debate), planned economies (this blurs the specific quality of the social model) and so on.” Altvater, Elmar, Die Zukunft des Marxismus. Münster: Westfälisches Dampfboot 1992, 2nd revised edition, p. 22.