Designing Total User Experiences: design, value creation and physical space

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Introduction

This paper addresses “total user experiences”, i.e. a topic or “label” that has been around for the last 10 years or so, which has triggered interests, but still remains ambiguous and is only partly understood. Use is often associated with consumption. This, however, is only a fraction of the user experiences with products and services.

The simple consumption view is probably a reminiscent from old-fashioned economic thinking where firms were supposed to produce in the meaning of creating value, while households were seen as mere consumers that added no value by itself. Such a view does not explain the activity of people, for instance that they constantly improve their homes and add to the value of individual products e.g. by (re) framing them in connection with other items, or putting them in a spatial context that is meaningful and practical for these people. A multitude of books and magazine articles on households, addressing how good practical sense and taste may form people’s homes in ways that add value to the “bundle of commodities” belonging to the households. An interesting insight may be taken from Christine Frederick (1912/1926) who argued for “scientific management” in the kitchen. Without pursuing that idea per se, it is interesting to note, that Christine Frederick clearly saw a potential for the consumers own value creation, of what we may call “prosumption”, Toffler (1980).

Although there has been some research dealing with these issues, we are far from a general understanding of for example how environments such as kitchens, living rooms, and sleeping rooms etc. Such insights are important of several reasons. For example, how people use their environments may influence their creativity and well-being in general. For firms, such insights may be of importance to create a competitive advantage. We particularly think of firms in the building- and furniture industry, architects, equipment manufacturers, kitchen manufacturers, housing corporations etc; firms that represent considerable amounts in the sense of economic terms.

In this paper, we examine what can go on when people, based in a spatial context, attempt to provide value creation in a total user experiential view. In particular, we are interested in what the recent studies related to “embodied cognition” may contribute to the understanding of these problems. We conceive work related to embodied cognitive science particularly relevant because these studies focus on how people use the physical context, or how such context may extend the abilities of the mind. The remainder of the paper is organized as follows: First we introduce some methodological issues. In the next section we will briefly review some of the literature on the effect of space on well being. Thereafter we shall explore what the cognitive research may add to this perspective. We reconsider the issue of value creation as a process that takes place in time and space in households. At last, we deal with the issue of design of “affordances” for total user-experiences (“enabling design”).
Some methodological explorations in cognitive theory

A basic assumption underlying this section is “situated cognition”. The central assumption is that cognitive activity takes place in the context of a real-world environment and inherently involves perception and action. The following example may serve as an illustration and clarification: When we are driving an automobile in a real traffic situation we have little time to plan what comes later, but must act on the signals and impulses that come up. We may of course have planned ahead of the drive but the conditions change when we are “there” and on the spot adjustments and changes in directions must take place. We are rarely aware of accidents, other people traffic behavior, work along the road etc. Many contingencies can only be managed on the spot. When working in what may be metaphorically stated as an “online situation”, Hurley (1998) contends, there is usually very little time to reflect and plan forward, which may affect the conditions we are working under. In his philosophical work, Heidegger referred to this situation as “Dasein”, which has been translated into “thrownness”, Winograd and Flores (1986), meaning that we are thrown into the real world and must act without the ability to foresee what is coming. It also means that the tools that we use, for example a hammer, are seen as mere extensions of the human body. Similar, we may think of a computer or a telephone as an “extension of the mind”. As long as tools work as they are supposed to, we do not notice them. When they break down, however, we become aware of the urgency to repair them. A perfect working artifact becomes a seamless extension of the human body, and we do not have to think about its delimitation. This also concerns space when used strategically. This means that objects, artifacts, systems and services that we use in our homes ideally become natural extensions of our own faculties and we do not even reflect upon them.

However, human action also involves planning and reflection on the future and past. Clearly, decisions of housing, furniture, decoration etc. are very often planned. Architects and interior decorators are experts in performing such reflection and planning, and most people devote considerable time and effort to how they imagine their homes should be. Yet, much is decided while being in the process. We may alter our decision when we see “what it looks like” and therefore some aspects seem to be “situated”. As Andy Clark (2001) claims, there are situations where reality is its own best model. Then, the physical organization, reorganization and other trial and error are the best (cognitive) strategy. Such cognitive processes are very complex and only a very detailed description can account for such processes. Such a detailed description may, however, be very difficult in practice, Haugeland (1996).

We “offload” cognitive work on to the environment. A simple example is when we make additions by counting our fingers. Also consider how to multiply a four-digit numbers. Doing this in the head requires a time, but using paper and pencil makes it’s very simple to do it. This principle is pertinent for our analysis since it deviates from the usual assumption that naked brain is the center of cognition. In a domestic situation we often make measurements by comparing the size of objects with other objects, make juxtapositions etc. This point calls for sensory motor cognition as a dominant way of cognition. According to Clark (1997, 2001), many higher order forms of cognition are transformed into simpler forms of cognition for the brain to deal with. This, however, is still a controversial issue, but evidence is building up to support it, Jeannerod (1997), Hurley (1998). The principle may explain why it is important that we continuously redesign our environments, because we aim at improving well being by changing the situation. As we will explain more in detail below, one aspect of interior is simply variation.

From our discussion so far, the environment may become a part of the cognitive system itself. Experiences have shown, Clark (1997) that people with cognitive challenges such as Alzheimer may in fact perform very well in their own homes, but are ill suited in strange environments. This seems to suggest, that a familiar environment becomes an integral part of out cognitive apparatus. Contrary to the naked brain, the brain in the body is “embedded” in the environment, physically, virtually, and culturally and forms part of the cognition in action Haugeland (1996), Hurley, (1998). The possessions of objects, which have a symbolic or affective value, are prime
examples here. For example items that remind us of particular situations and people are urgent for bringing memories of these good situations. These things make us who we are, that is give us an identity, Csikszentmihalyi and Rochberg - Halton (1978). People also use artifacts to mirror their dreams and aspirations. That can be works of art, posters, replicas and anything else that evokes imagination of how things could be. For example, people use music for various purposes, and one of them is to induce desired, surprising or even provocative emotions.

It should be emphasized that we are speaking of “open systems” that exist within the context of the environment, and which can affect and be affected by the environmental context.

“Off-line” cognition is body based. This is the cognition that involves reflection of the past and planning for the future. When “detached” from the environment, the activity of the mind is expressed via mechanisms that call for interaction with the environment. In the literature, such mechanisms of sensory processing and motor control are frequently associated with bodily cognition. They also have encompassed memory and emotion, Kandel (1998). The key points are, however. Different forms of memory are proposed, i.e. declarative and implicit. Also various forms of emotions are suggested, e.g. implicit emotion. These issues are no doubt conceived as controversial, in particular the issues of “implicit cognition” and “implicit emotions. Damasio (1995), Underwood (1996), Kihlstrom et al (2000), LeDoux (1998, 2001) claim, that consciousness only occupy a fraction of the total brain resources and a lot we know cannot be accessed consciously. The main part of this is probably emotional, LeDoux (1999, 2002). While consciousness may only occupy a fraction of the brains resources a lot is going on that we cannot access consciously. A number of competing emotional theories exist and it is outside the scope of this article to bring anything like a review, Dalgleis and Power (2000). For our purpose it is important to note, that objects, artifacts, physical space and symbols are able to “prime” our emotions and affect sequences of emotional and cognitive events, Forgas and Bower (2000). The next section will deal more about priming. The bodily aspects of cognition and emotions contradict (at least partly) the representative view of semiotics and symbolic representation. Since much of the processes that go on in the body (brain) only occasionally surface into consciousness, we cannot explain cognitive or emotional aspect of design by referring to the symbolic nature of designs. There is no representation as is required of the symbolic and semiotic theories.

The following section deals with what we already know about the effects of physical space on emotions and well-being.

The effect of space on people

A number of studies have focused on how the physical environment affects people’s emotions (Mehrabian and Russell, 1974; Kenhove and Desrumeau, 1997; Tai and Fung, 1997). These studies attempt, as we shall see below, to explain what influences the physical context has on well being in various spatial context. Many of these studies implicitly or explicitly deal with priming. Priming is when a stimulus appears before another stimulus and enhances the memory related to the second stimulus, Squire and Kandel (1999 p. 160). Priming can take many forms, a sound, a smell, taste, vision, touch, color and form or a complex of several such as in a room. Several studies were conducted to discover how for instance shopping interiors have affected the shop’s level of attractiveness and the customers’ behavior, for example amount of money and time spent in the shop under changing conditions. Attractive and meaningful surroundings attract more customers and they spend more time in the shops. Below, we shall return to the issue of what is meant by attractive and meaningful.

This research includes, for example Forgas (1997) claiming that proximity seating arrangements. Size and flexibility could define and delimit possibilities for social episodes. People find for instance an unpleasantness when facing other people in very confined space, such as in a crowded elevator and very limited interaction take place. Davies (1984) using an organization theoretical framework inspired by symbolism to analyze the physical structures’ physical stimuli such as symbolic artifacts in offices found that people give various interpretations to artifacts and
objects in a spatial setting. He believed that the symbolic perspective should dominate empirical research. Some Scandinavian and Italian researchers, e.g. Gagliardi and Berg (1991) and Laukkanen and Sevon (1998) followed the suggestion and added some studies of the symbolic influences of space, mainly restricted to work space. Particulars of space, for instance a lecture room, a bathroom were analyzed to serve as signs showing appropriate and inappropriate behavior.

A number of empirical studies have been conducted on the use of shopping space in the marketing literature. Rather than assuming a symbolic perspective, the studies focused on a cognitive emotional and interactions. Some of the studies relate to the meaning and importance of service quality, focusing on the relative meaning of the spatial relations and interior, (Bitner 1992, Wakefield and Blodgett 1999).

Many studies suggest a one-way causal relation between environment and people's well-being. While we do not deny, that there is such a relation, we also believe humans enact deliberate to change the environment in order to improve the situation. Or as David Kirsh (1996) puts it; “adapting the environment rather than oneself.”

It is characteristic that many studies encountered methodological problems. Studies based on symbolic perspective and the cognitive perspective requires that people be asked how the environment is perceived. This requirement goes against much that is known about space today, (Lakoff and Johnson 1999). In most situations, we are not consciously aware of how space affects us. The space is simply there, we are born into it and it is there without any deliberate action or consent on our part. Our main registration may be emotional, unless the pervasiveness goes beyond a threshold value of lack of well-being and we become consciously aware. Only with efforts, we can articulate the emotions or assess space around us, because our language is limited. This issue has been raised by philosophers such as Wittgenstein and by cognitive researchers, e.g. (Hurley 1998).

There is a division of perspective between a symbolic vs. what we would label a cognitive-affective perspective. The former emphasizes a representation that has a distinctive meaning that can be deciphered and analyses, for instance in semantic terms. The latter approach needs no representation, but rather assumes that space works tacitly and needs not mean anything as such. When problems are detected, space becomes a conscious phenomenon.

The question asked in this paper is concerned with how we might analyze the user from the total design of experience situation.

**Description of space**

In this section we will deal with how we experience space. We do not intend to follow architectural convention, e.g. (Marcussen 2002), but rather to explore how our daily experiences may be seen as a conjunction of space-parameters that we find salient. The approach here is inspired by Johnson (1987), Lakoff and Johnson (2000). Spatial structures can be conceived as kinesthetic image schemata. Such schemata according to Johnson (1987) of a “non-propositional” (symbolic or formal) knowledge emerge from our experience of the physical world, and experienced through its metaphorical and metonymic entailments, p. 19 – 23. This implies, that we may have experiences with recurrent patterns of events or general orientations such as sensory and gravitational forces acting on our bodies that give the sense of “inside-outside”, “up-down”, “dark-light” etc. By entailment we understand the metaphorical entailments as we experience a (closed) space as a container. Further consequences will be for instance that we regard “up” as good and “down” as bad. Examples can be that we are restricted to a room, we hold a cup in our hand, and it is in our power to act. Such schemas are transitive. If I am in the bed and the bed is in the room I am also in the room. There is something within something else. This also means, that there
is a fixation of objects or position relative to the position of the observer. Other entailments, according to Johnson are “part – whole”, “source – path – goal” schemata.

Let us look at some ways to ascribe dimensions to a room that follows from this.

A room, then, first has a “lay-out”, a basic configuration where the walls and floor and ceiling delimit its borderline and marks what is inside and what is outside. Here we have the basic orientation of confinement. There are some activities that can take place in this 3 dimensional space. The space can be cubical, rectangular and curved shapes. The confinements allow certain activities and prevent others at a very general level. Experimental research (Fechner 1978, Eysenck 1968) suggest people have preferences for polygonal forms. The preferences are a product of order (symmetry) and secondarily complexity (number of sides and angles deviating from 90 degrees). This means that quadratic or rectangular shapes themselves are not particularly preferred and more complex forms are preferred to simpler one’s. The experiments cited lack the context dimension and can only give some weak hints about what we aim for. A room is much more than the basic polygonal shapes. For instance a room must accommodate furniture and other objects requiring size and production also may restrict the possible shapes to simpler one’s. Also, a room is a place to be and not a geometric shape to watch under laboratory conditions. Yet it seems like architects who are able to exploit this factor ceteris paribus may be more successful.

We may then add second a metric dimension, which adds particularity to the layout. When we know, that the distances between wall, ceilings, floor etc. have specified numeric values and that the same is the case with objects, we face opportunities and restrictions as to how many objects we can place and how they may be located. Quantity of space is thus a resource much cared for. In principle this also holds for immaterial artifacts because space is then defined in other measures, for instances bits.

What also follow from this is the third parameter, fixations. The general shape of for example a living room may yield space for example a large table, and when it is in place it may or may not be moved according to the specifics of the geometric distances and shapes. We also experience the complementarities of objects since the use them require certain proportions, for example there must be space between chairs for people to be able to use them effectively. Fixations can mean the static of objects in place serving the same function, for instance dining room. It may also refer to multi functionality. For instance Japanese rooms are often multi-functional. Due to necessity Japanese often use the same room to sleep, work, eat and other functions. For this reason a unique adaptability has emerged.

A fourth parameter is closure. A space may be more or less transparent. A line in the sand may be regarded as the mere symbolic representation of space, while a concrete wall effectively close for sensory and physical penetrations. Transparency can work on all senses (sound, light, touch, smell and possibly taste). Light may serve as the paradigm. If much light is allowed through the walls, they may appear as less confining and vice versa. As we shall see in the next section this connects easily with the experiences of the room. The boundaries between rooms have a dynamics of its own. I traditional Scandinavian houses there were closure between kitchen and dining room. From the late 1960 a fashion emerged where the walls more or less disappeared. In the 1990s the kitchen seem to absorb all the space turning kitchens into communal space where visitors are invited to participate in the cooking process, even making the process of preparation integrated in the meal itself.

Ornament can be a fifth parameter. According to Gombrich (1979) ornament has a distinctive way of affecting the experience of order. Optic illusions and other techniques manipulate vision in ways that may shapes and magnitudes differ from the expected image. Most ornament is found in older houses, for instance as stucco and carvings in wood. Modernism has not favored ornament; the Austrian architect Otto Wagner outright claimed that ornament was a crime. Late-or postmodern furniture may have an ornament of its own. Ornament should then be taken in a metaphorical sense. It is rarely found in the rooms per se.
Finally, and sixth, there is a matter of context or proximity with what is outside. If the wall are not transparent, this matter little, but if they are transparent and there are heavy constructions that can be viewed it may matter a lot. A room with a view to the wall of a close and dominant building may be highly affected, as this will function as another wall and maybe even more massively. The proximity will typically be a function of the architecture. For instance terraces, balconies, cantilevers and carnaps, curtains and stained glass and lightening can serve as ways to increase the proximity between a house and what is outside. Much of the effect is optical, since the real distances are not changed.

These parameters appear as rather abstract in connection with physical structure, but they are all easily operationalized and easily recognized.

In the next section we shall consider possible experiences that the spatial parameter may affect.

**An exploration of experiential dimensions of the spatial parameters**

The spatial parameters layout, metrics, fixation, closure, ornament and context may separately and in combinations give a number of experiences of cognitive and emotional kind. We may distinguish between emotions and moods. The former is an immediate evaluation of a particular situation, (Nussbaum 2001, p. 29) while the latter is a more durable inner state, which is also conducive to environmental conditioning. Yet, mood is more likely to serve as a precondition, (MacLeod 1999, p. 276) for how people will judge a particular place or space. To our purpose mood is a an independent variable that may explain how people may evaluate a place, but which then may be subject to change because the space conditions people's mood. In both emotional and mood based cases, people judge what they experience affectively rather than cognitively.

Such evaluations can happen very fast or slowly and with more or less conscious co-operation. We know that emotions vary both in intensity (arousal vs. boredom) and in kind (for instance disgust, happiness, surprise), (Ekman 1999). Also, they vary inter-subjectively. Two persons may occasionally experience similar emotions in similar situations, due to moods. Evaluations in terms of basic emotions or moods are related to evolution and fitness and therefore based on experience. The discrimination is based on learning from the past experiences. Such emotions may also become a part of the genetic make-up, Appleton 1996. Expressed in popular terms, only those of our ancestors who were able to escape from the saber-tooth cats were able to have offspring. In particular, this seems to have favored the genes of people who have a sense of “refuge” and “prospect”. Jay Appleton has studied experiences of landscape and found that what makes a landscape experience attractive is the presence of both places to hide (from presumed hostile intentions) and prospects for food and mating in the form of vistas.

Moods may reinforce for instance depressed states when for example people are reminded of sad occasions. The other way may also happen, people cheer up because a nice interior makes them feel happy. This can explain both that some emotions are private and also why some emotions are very strong for many people. It seems that only very strong emotions are common. The more these emotions are individual, learned and conscious (feelings) the less predictable are they. Therefore, for the present purpose, we may assume, that emotions are essentially a private matter and we cannot assume that there is a biological fitness involves unless we speak of designs intended for survival such as safety equipment, tools for extreme sports, etc. What people usually furnish their houses with falls outside the category of emotions related to the encompassing all people category.

It may seem impossible to identify spatial categories with emotional reactions and even futile to attempt that. Nevertheless, in a penetrating analysis of Frank Lloyd Wright’s architecture, (Hildebrand 1991) identifies some principles of architecture that Hildebrand discusses in connection with experiences. According to Hildebrand, (1991, p. 25), the principles are:
“The major spaces are elevated well above the terrain they overlook. The fireplace is withdrawn to the heart of the house and to the internal edge of the room it services. Its withdrawal is emphasized by a low ceiling edge and flanking built-in seating and cabinetwork. The ceiling forward of the fireplace zone sweeps upward into the roof, echoing its form. The distant edges of the ceiling then return to a low elevation like that near the fire. There are interior views to contiguous spaces seen beyond architectural a screening devices. Glass and glazed doors are located on walls distant from the fire. A generous elevated terrace lies beyond. The exterior consists of deep overhanging eaves, An evident central chimney, broad horizontal groupings of window bands, and conspicuous balconies or terraces. The connection from exterior to interior is by means of a long and circuitous path.”

One may now object, that experiences and emotions, even appraisal mechanism are different phenomena. This is true, but our argument is that the principles are designed in order to induce specific experiences. These experiences are at least partly emotional and as Hildebrand later demonstrates, very much related to basic emotions. Hildebrand explains both the precise description of the buildings and the assumed nature of the “prairie style” of Wright’s design. It is quite clear, that Wright did not think about the life of ancient people struggling for survival on the prairie. He rather assumes, the nature of what appeared conformable and safe like the position of the fireplace, which we believe is the case in many cultures. Even the path to the fireplace from outside may appear cumbersome, but this is really what makes it appear safe. Any “presumed” intruder would have to go a long way, with plenty of risks for detection in case his motives were hostile. Also the view from the windows and terraces gave plenty opportunity to scan the landscape for whatever might appear of opportunities. This appears to our basic emotions and experience of well being. Wright took some archetypical ideas and made some slight exaggerations of them in order to increase the emotions.

This resembles the theories espoused by e.g. Ramachandran and Hirstein (1999), Cheng and Spetch (2002) in order to explain biologically what is it that makes a piece of art (or any aesthetic artifact) appealing. By so-called stimulus generalization and “peakshift”, which we take to mean to exaggerate salient features, they claim to explain why for instance caricatures, visual puns, metaphors etc. stimulate more than the mere appearance of the stimuli. We would like to add some more examples to clarify this. The general layout was essentially what the Wright example was about. We assume other examples could also be presented, for instance that some rectangular shapes, like the one’s following the “golden section” are likely to be preferred to cubic or other rectangular shapes. Take the metric dimensions of a home. One could assume, that the metric dimensions would be preferred to be as large as possible, because large metric distances would be preferred because they might imply resources. They could also mean, that the “proxemics”, (Hall 1982), the distances between people would not make the situations crowded. On the other hand, if the number of people that are situated in a large home is very small, the home may appear evacuated, empty etc. So, there might be some “optima”, according to the number of people, cultural convention, etc.

The lack of fixtures may give the impression of freedom and mobility, and therefore a good emotion. On the other hand too much freedom could collide with the problem of deciding and the space could become messy. Symbolic meanings, we believe belong to the cultural sphere, an area that we have not written much about. Evidently, much of what we have written about here belong just as much to culture as it does to a biological aspect of nature, that is basically an echo of our past. Symbols and other cultural artifacts are, according to Swidler (1992) tools that people use to give and find meaning and sense.

In this section we have described how different space parameter values could give rise to a variety of emotional reactions. So far, this is to our knowledge mostly supported by a large number of partial experiments and theories.
If we assume that these principles are valid to some extent, they are likely to affect Total User Experiences and our next question is what user and “prosumers” do about this. In the next section we attempt to use the theory of “peak shift” in order to explore what “prosumers” are able to do and how they may act on this.

The user’s design variables

As stated above we assume people use their inclination to alter their environment in order to make it more exiting, appealing, cozy or whatever attribute they might want to attain. The purpose is ultimately to create value for themselves, whether or not the value is permanent and can be transferred to others in connection with sales or the values are there to be enjoyed on a temporary basis.

When people move into houses to make themselves at home, decoration, painting, re-design etc are likely to occur. Grønbæk (2002) explain, that even in social housing, where no permanent alterations are supposed to occur, they do, even when people have to pay “damages” when they move out. And people who own their habitat are likely to make improvement both to improve their temporary well-being and the market value in case they sell.

Using the “peakshift” theory, Ramachandran and Hirstein (1999), Cheng and Spetch (2002) we believe that the following principles can explain or at least describe the actions people do when they alter the relations between the fixed structures and the movable artifacts and objects in their homes:

Symmetry
Contrast
Problem-solving challenges
Abhorrence of vantage point
Visual pun or metaphor
Perceptual grouping.

We believe the list is longer, but that these are sufficient to illustrate the principles. Also, it is assumed that stimulus is one-dimensional. We believe this assumption may not withstand, but make the assumption to simplify our argument. Multi-dimensional stimuli will add complexity and realism to the analysis and we propose to discuss this under the perspectives.

Symmetry has been describes as a basic principle for beauty. Writers like Adam Smith and David Hume actually had symmetry as part of their definition of aesthetics. In biology, a symmetric face is seen as more attractive in a mate because symmetry means a sound set of genes to carry the heritage further. Ramachandran (2001) in an interview was asked about this and confronted with the birthmark of Cindy Crawford was able to give an interesting although possibly ad-hoc explanation of the supermodels beauty. Symmetries seem to be plentiful in most homes, both in their architecture and in the decoration. It seems if say, a table is asymmetrically decorated with candles, it seems to tip or possibly fall to the floor unless countered. People visiting are likely to remedy such installation believing there must be an error. Seeming asymmetries are often resolved in symmetries at a higher order in architecture.

Contrast is seen in many shapes. Famous is the contour of the Chanel dresses. The contour used to be the iconic identification point. Also when people paint their houses or buy furniture they often select colors that are complementary. Too much of a single color often seem monotonous and the contrast implies a balance that is actually a new kind of a symmetry. Contrast may be regarded as an example of priming. A stimulus (the primer),
that briefly pre-dates a second stimulus (the design) and activates memory and judgments, which affects the experience of design, Stapel a.o. 1998).

**Problem-solving challenges** come in many forms. Most likely, works of art or “design” represents them. People who travel will also bring objects with them for remembering and wonder. Labyrinths may serve as an example. Mazes and labyrinths serve as examples from history and still large gardens seem to keep up with such a tradition.

**Abhorrence of vantage point** is typically seen as optic phenomena and not frequently used in private homes. Many illusions like Poggendorff illusion etc. represent such phenomena. A simple trick is to use mirrors to make a room seem larger, often used in cafes. Gazebos and oriel windows are examples of how ordinary homes may use framing to extend the scope of views, to underline specific vantage points etc. try out such effects.

**Visual pun or metaphors** on the other hand appear frequently. Many people use their garden in ways that are imaginative. Images of castles, ships, Japanese gardens in Western Europe, Arabic patios, Spanish houses outside of Spain are found many places. Others have “western saloon bars” in the basement of their houses.

Finally, people use **perceptual grouping**. This phenomenon can be identified with an image of a Dalmatian dog. First you see it looks like a confusion jumble of spots. After a while, suddenly you see it, and you do not loose that image again. Perceptual grouping is grouping optic phenomena together I a way that gives a particular cohesion between them. The bridegroom often uses a flick of the wedding flower in his pocket, just to show the belonging thorough the symbolic “sameness.” Also, a simpler case is a necktie that relates to a jacket or any other matching combination of items will do. The phenomenon is a strong connection and it is found in many shapes. The connection between groups of furniture, curtains and other objects also belong to this.

What joins all these examples are that the user’s design variables i.e. variables the users alone can decide about. They may buy packages of items that have a strong resemblance, but then “their decision”. The organization of objects and artifacts is their own decision. The reason for doing it is to improve the total experience of the bundle of objects and artifacts available to people. Doing it can be a sophisticated planned activity, and it is also a matter of doing the manipulation of objects in “real time”. There seems not to be a well-defined set of criteria that people are aware of. Exploring new constellations is a never-ending process of trial and error. The satisfying criterion is how people feel about a solution. The emotional solution is a matter of cultural convention, Swidler (1997) suggests that idiosyncratic ideas about what suits the individual is important. The issue touches on a combination of culture and of individual cognition and emotion. Eventually, the issue raised deal with value. The reason for improving our environments is to create value. To create value is essentially to improve the well-being of ourselves. The next section will deal with this issue in more detail.

**Creation of value in the home**

Traditional economic thinking assumes that value is created in the value chains leading to the end user/customer who merely consumes what has been provided. This is right as far as for instant fast moving consumer goods are concerned. They are produced in the factories and consumed by households. Even then, some creation of value may take place. Take for example prepacked food. A box of soup may contain a description that suggests different ways of serving. For instance by adding some spice or cream, the quality of the product yields a higher well being that without it. For durable goods, and elements of buildings, the possibilities for value creation are much richer. Altering the structure, like lowering the ceilings, move a door or window the environments change considerably. All kinds of trying out new possibilities with objects and artifacts will count then, as ways of trying to create value. Changes as described in the previous sections, like making transparency or the relative dimensions are likely to change well-being and therefore create value.

What then do we mean by value? A much-quoted definition is presented by Rescher (1969), A value represents a slogan capable of providing for the rationalization of action by encapsulating a positive attitude toward a
purportedly beneficial state of affairs, (p. 9) This seems clear, but Rescher mainly speaks of how we may speak of values as rationalizing something. According to our view, value may also be created when we do not speak of it, but experience a state that is an improvement to a former state. The embodied view holds that we form rather “seamless alliances” with the context, Haugeland (1996) and therefore need not be able to tell exactly what transpires of cognitive and emotional kinds, as long as we experience an improvement in well-being. Ultimately, another definition of value may be more accurate. Edelman (2001) writes the following:

“I define value systems as those parts of the organism (including special portions of the nervous system) that provide a constraining basis for categorization and action within a species. I say “within a species” because it is through different value systems that evolutionary selection has provided a framework of constraints for those somatic selective events within the brain of each individual of a particular species that lead to adaptive behavior. Value systems can include many different bodily structures and functions (the so-called phenotype); perhaps the most remarkable examples in the brain are the noradrenergic, cholinergic, serotonergic, histaminergic, and dopaminergic ascending systems. During brain action, these systems are concerned with determining the salience of signals, setting thresholds, and regulating waking and sleeping states. Inasmuch as synaptic selection itself can provide no specific goal or purpose for an individual, the absence of inherited value systems would simply result in dithering, incoherent, or nonadaptive responses, Value constraints on neural dynamics are required for meaningful behavior and learning.” pp. 43-44

This somewhat long gives us in a very different conception of value. Edelman (2001) who has contributed to immunology and neuroscience moves the locus of value to the fine balances of fluids that affect brain states. This is the experiential aspect of value. According to Edelman, the noradrenaline, cholin, serotonin, histamin and dopamine, which are, known to influence our wellbeing to a ultimate degree are the real issues here. When a value of these systems is within certain “ quantities and qualities, the experience is positive or negative with reference to value. For instance, a fall in the quantity of serotonin is known to make people depressed. We know that for instance fragrances, food, drugs and drinks directly can affect such values, Changeux (2001). But these are special circumstances and ordinary ways of doing things like improving space and organization of the home also affects the value systems. Edelman claims, that through ordinary behavior as people conduct at any time of the day, these systems are affected and ultimately, behavior is adaptive when it confines activities and experiences within tolerable limits. We are able to talk and report on these things and we are also able to make measurements by psychophysical means, (Berylne 1971, Rozin 1999, Kubovy 1999). That also implies that well-being and value have both objective and subjective aspects. Professional designers deliver the building blocks that the “prosumers” select from and ultimately use to create their own value. Exemplars of good design are reflected in society and often labeled “good taste”. Taste then, is a rationalization that a particular design has found acceptance on a wider scale, it is an approval that a particular design reveals the compenence of the “prosumers”.

Conclusion

In this paper, we have argued for a cognitive – emotional approach to design of total user experiences. Since design is concerned with planning and executing the design of total user experiences, knowledge of users and their experiences seem primary. Our argument is that spatial structures, including the dimensions of people’s homes and the containments of objects, artifacts, including also services and systems where applicable affect people cognitively and emotionally.

Layout, metrics, fixations, closure, ornament and context are parameters that can describe spatial dimensions and they are values that can be re-organized and manipulated in ways that may give improved experiences. Not all of these parameters are equally easy to manipulate, e.g. metrics. But the rest are at least in principle possible to in
addition to create new orders by moving objects, like seating organization, vantage etc. To add to the quality of a house may increase the market value so there seems to be nothing really controversial in this. Clearly much “homegrown work” reduces the value, but this does not change the principle, that consumer, user or “prosumers” can create value. Values can also be created on a more temporary basis, like preparing meals and events. But also temporary alterations, even in a small scale, can improve the well being. We assume, then that the “peakshift” theory can give some indications as to what kind of changes in an existing structure can explain a higher well-being. Symmetry, contrast, problemsolving challenges, abhorrence of vantage point, variation, visual pun or metaphor and visual groupings may be strategies. In all these cases, there are insights to be obtained from a design perspective. Understanding users better is a primary concern for designers. If we assume such a total user experience perspective, the issue is not an easy one, and there are plenty of methodological challenges.

A question is whether simplistic one-dimensional models of stimulus can predict well how value can be created. Even though we know, that reality consists of multi-dimensional stimuli and that people seem well equipped to deal with it. Simple reductionist models may give simple and testable implications. The future may show if we are also able to argue in favor of complex models and even deal with imagination of physical space so that the design processes can be facilitated. So far, we believe we have only set an agenda for future research. Further research must validate our theoretical findings and we must device experiments in order to try out the empirical aspects of this.
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Notes
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4 It may sound far-fetched, but has its place in musical history. The French composer Eric Satie formulated the concept of “musique de meublement”, music as furniture using serial repetitive themes that gave a “fixed structure” or “standing sound”. 