DIGITAL WINDOWS: ENHANCING SPATIAL EXPERIENCES WITH DIGITAL TECHNOLOGY

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Abstract

Understanding the emotional effects that images have in human behavior, this paper explores the effect of digital visualization in enhancing the comprehension and inhabitation of physical spaces. Similarly to the ephemeral character of an advertisement campaign, it is possible to continuously mutate selected surfaces of contained environments, creating digital windows. What is being digitally projected onto these surfaces can be programmed to respond to specific therapeutic, functional or aesthetic parameters. Digital windows are dynamic in nature and are free of capturing solely limited portion of a surrounding landscape. They do not, however, replace physical windows or the connection with the physical world, but rather are meant to complementing them and augment spatial experiences.

1. Introduction

The eastern sky darkens as evening approaches. The residential spaces left mostly empty since the early hours of the morning are slowly being re-occupied. The windows soon will be dark and the attention will shift to the cathode or plasma screen of the television sets. The dormant flickering lights of the televisions will be stimulated and will project sequential images animating the surrounding spaces and taking control of the early evening life. Images produce strong emotions in us and are certainly responsible for our embarking in certain actions and behaviors. Advertising has capitalized on this human phenomenon and has often produced clever and fascinating commercials whose sublime messages have not left us completely immune. Economic and commercial realities are the forces behind the continuous inventiveness of advertising. Advertisers are always in the hunt for a new, shocking, sensual, rough, or sophisticated image to simultaneously respond to the marketing need of the client and influence the emotional triggers of potential buyers.

2. Theoretical framework

This observation, parallel to a way of thinking and making architecture, has inspired us in the formulation and exploration of possible effects of digital visualization in enhancing the comprehension and habitation of physical spaces. Similarly to the ephemeral character of an advertising campaign, it is possible to continuously mutate selected surfaces of contained environments, creating *digital windows*. In our hypothesis, what is digitally projected on the surfaces can be programmed to respond to specific therapeutic, functional or aesthetic parameters. It is important to acknowledge that 85% of all human sensory perceptions are optical in origin. Optical radiation is not only involved on human vision, but has therapeutic and biological effects on the human being. The therapeutic use of *digital windows* can be applied to hospitals, mental institutions, correction institutions, or even to airplanes cabins to alleviate passengers from jetlag fatigue. The recent world events, such as the explosion of bombs in the London's subway system, or the early August accident that happened to a Russian mini-submarine off the coast of the Kamchatka

peninsula, suggests that the idea of *digital windows* could be applied to extreme and tense confined environments to redirect focus and minimize collateral casualties.

As architects, we are obsessed in opening our walls to the external world, allowing it to intermingle with our inner spaces. Contemporary architecture blurs the distinction between inside and outside, creating almost seamless visual connections between the shelter and its surroundings. We are also well aware of the physical and psychological effects of placing openings within or between planes. We can, therefore, orchestrate and control solar penetration, shape the ambient quality, direct the movement of users, and even influence the living of a space by indirectly suggest the placement of furniture and art.

In the early 80', Roger S. Ulrich, at present director of the Center for Health Systems and Design at Texas A&M in College Station, Texas, published a paper which suggested that a view through a window could influence recovery from surgery. In a period spanning nine years, from 1972 to 1981, Ulrich examined the recovery time for surgical patients of a suburban Pennsylvania hospital who where placed randomly in rooms with windows which looked out on either to a small growth of deciduous trees or to a brown brick wall. All of the patients had undergone cholecystectomy, a common type of gall bladder surgery. The records showed that patients with window views of the trees recovered faster and spent considerably less time in the hospital than those patients assigned to a room with a window facing the brick wall (Ulrich 1984).

In more recent studies, Ulrich and other researchers have found that the anxiety level and need for pain medication in heart surgery patients drastically decreased when the intensity care units were adorned simply with pictures depicting trees and water (Clay 2001). In addition, studies at NASA have also suggested that long distance views – even surrogate views in photos and posters, induce a sense of tranquility. These studies also established that the perception of a sense of openness achieved either by real or virtual views played an important role in achieving a mindful rest.

Often the value attributed to a desired object vanishes when the object is eventually owned. The emotional reactions of viewing an automobile on the road that we wish to acquire, for instance, disappears or strongly alters and diminishes only after a few days post purchase. It becomes a daily commodity, an object of constant presence and therefore of known sentimental responses. These simple observations of our behavior venture us to suspect that the presence in hospital rooms of windows with natural views or with static images depicting nature adorning the walls may have no or limited influence in the recovery of patients when they are confined in these environments for long periods of time. Furthermore, in existing health facilities, not all windows necessarily look out to nature or are placed in ideal position for patient viewing. In multiple occupancy rooms, not all patients may have equal access to viewing. Rooms may even lack any visual connection to the outside world.

Advances in digital technologies have created new modes of "seeing" giving us the opportunities to expand its meanings and definitions. By transforming a physical window from a mere portal to a screen we can create the freedom of choosing what we see and, most importantly, the way we see. In fact it is possible to manipulate the view angles, scale, contrast or color of a virtual image altering the perceived sense of space or even the perceived temperature of the space.

The dynamic character of *digital windows* can overcome the limitation of certain physical spaces. The use of *digital windows* in hospital rooms can have multiple applications. It will be possible, in fact, to customize a room based on the chromatic taste of patients to reflect ethnic or religious backgrounds, and to augment a sense of familiar place for the recovering patient. The chosen color will be simply projected or diffuse via LED or fiber optics technologies strategically located on the white walls that enclose the room.

Alternatively, the projected or diffused color in the room could respond to strictly therapeutic needs drawn from recent studies on color psychology. It is known, for instance, that under the influence of blue the human pulse beats more slowly and the passage of time is

under-estimate (Panton 1997). Similarly, green has a restorative effect on humans mainly because of its direct association with nature. It is interesting to point out that green is the color of balance and it happens to be in the middle of the visible light spectrum with a longitudinal wavelength of 510 nm. The photobiological effects of light, especially in the ultraviolet and blue (400 to 500nm) spectral regions, are already used on medical curative treatment. Among dermatologist, for example, the use of phototherapy (light therapy) has become an increasingly popular and effective treatment for psoriasis, vitiligo, eczema, and other skin conditions. Blue light is used to treat neonatal hyperbilirubinemia, which is a yellowish of the skin and eyes caused by an elevated level of bilirubin on the blood that may lead to brain damage, hearing loss and mental retardation. The blue light is delivered using fiber optics wrapped on blankets or bands and placed near the baby's skin. The light interacts with the bilirubin found on the blood and it converts it to a chemical substance that balances the high level of the bilirubin bringing it to a normal level.

In other therapeutic applications, *digital windows* can projects digital stories whose aim is to improve the mental state, physical strength, and healing power of those patients whose illness require extended period of confinement.

A characteristic of these digital stories or sequentially projected images is that they do not have any innate way of being seen. The observer of these images can begin at any point and glance in any direction he/she wishes without loosing any vital information. These images do not need any formal teaching to be understood, but rather act on the sensual and emotional perceptions (Engeli 1999) of the patient, alienating the mental obsession with the illness and pain and helping the physical and mental recovery (Rauterberg 2004).

The images projected, therefore, are not solely a reproduction of a digital model, but aspire to a much greater duty. They will transmit selected information to the soul and the body of the reader (Engeli 1999), and may contribute to a faster recovery. The subjects of the images, which create these digital stories, need to be strongly related to both the nature and medical condition of the individual patient. However, even though *digital windows* in medical applications will temporarily alter the reading and experience of a patient's room, they do not draw attention to themselves nor do they overwhelm the patient's senses. The visual environments created may not be dissimilar in principle to Brian Eno's Ambient Music productions, that is the creation of original scores whose intention were to "brighten" the environment by adding stimulus to it, yet accommodating many levels of listening without enforcing one in particular [Eno 1978].

3. Conclusion

Digital windows have dynamic characteristics and are free of capturing solely a limited portion of the surrounding landscape. They are set "to face new challenges, to explore new possibilities and to make a step ahead on what is currently thinkable and acceptable in the architecture profession" (Engeli 1999). They do not, however, replace our connection with the physical world, but rather add a new dimension to our space experience, to our existence, to our own healing power, and to our intellectual curiosity.

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2004

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