Wayshowing Through Urban Furniture: An Ergonomic Approach to a Color Planning Methodology

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ABSTRACT

This paper subject arises from a PhD research which defined the need to create a new methodology for urban furniture color planning. The present research is a Post-Doctoral project that aims to develop a methodology which purposes to establish the importance of a pertinent and structured color application to urban furniture, which will make possible to create color plans for urban environments, allowing urban furniture to stand out from its background, contributing for their better legibility, and transforming them in identification elements that will improve the orientation within the cities. The development and implementation of the new methodology will allow the determination, with a higher scientific approach and rigor, of the color planning to be applied to urban furniture in each district or urban area, of a city. The new methodology will be developed through an active research, focused in case studies, including three Portuguese cities with different specifications. For each city will be defined samples areas which will encompass the most representative city zones and, there, the new methodology will be applied to all urban furniture elements, in order to validate the results and the new city color planning.

Keywords: Color, Urban Furniture, Methodology, City Planning, Orientation, Visibility, Disabled People, Ergonomics.

INTRODUCTION

The identification of the cities' different zones and, consequently the orientation problem is not always easy to solve. Cities are, generally, a complex mass of roads and buildings that can show an almost monotone similitude or be extremely diversified. As Juanita Dugdale (apud Berger, 2005) stated: *"Visitors and occupants were having difficulty navigating spaces on their own; they needed visual prompts to find their way around"*.

The contemporary cities development originates the emergence of a complex traffic and transport network system, which along with the profusion of multi-colored publicity, and the great diversity and complexity of their architecture, contributes to a general confusion that causes difficulties to visitors and inhabitants' orientation. These conditions aroused the necessity to create a wide urban furniture ensemble, as well as signage systems that could give support and orientation to the city users. However, these elements are not always enough to achieve thoroughly

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this function. About this subject, Charles Higenhurst (1971, apud Berger, 2005) wrote: *"today we are the strangers in our towns. We do not know and cannot see how things work. Our support systems… are remote. The information supplied in the environment is largely irrelevant to our immediate purposes or to an understanding of the world in which we live."*

In order to be used, urban furniture must be clearly seen and stand out from the environment. Therefore, along with a pertinent color application, it can act as an orientation system that will contribute to the orientation within the city and become a factor of inclusivity, especially for the visual disabled people, which constitute a large percentage of the urban population.

For this purpose, this research has sought to apply color to urban furniture in a way that originates a system which will function simultaneously as an identification factor for the different city quarters and as an orientation factor for its inhabitants and visitors. In parallel, color application to urban furniture will also become an inclusivity factor, by incrementing these elements visibility.

SUBSTANTIATION

Urban furniture isn't a simple ensemble of decorative elements to embellish the city, it must accomplish an amount of functional requirements in order to assure its functionality and fulfill the population needs, facilitating their lives and contributing to their comfort. So, when urban furniture accomplishes its functions, it contributes to protect the health and well-being of the city inhabitants; facilitates the accessibility and use to people with visual or motor difficulties; reinforces the local identity, representing a formal *family* that is coherent and values the surroundings (Águas 2003). However, while recognizing its necessity, the urban furniture functional possibilities have not been used to their fullest extent, and the choice of its color or form only rarely obeys to a logic thought.

The connotations of color with the understanding of the environment have already been considered on its applications to architecture, as it has been done in the cities of Turin and Barcelona chromatic plans, and on Jean-Philippe Lenclos, Michael Lancaster and Tom Porter projects, among others. However, these concerns rarely are extended to urban furniture plans, despite multiple warnings about their lack of visibility made by various authors:
"Color – architecture – cities – colorful cities – color on the urban scene – how does it all fit together? Is a colorful urban backdrop enough, will more color really change our living and working environment? This is the most basic question of all. To put it differently: Is it possible to raise a city's visual accessibility, the quality of experience and orientation, without merely underlining its character as a huge, conglomerate consumer object?" (Machnow & Reuss 1976:21).

Inclusive Design / Ergonomic Design

"Inclusive Design is a way of designing products and environments so that they are usable and appealing to everyone regardless of age, ability or circumstance by working with users to remove barriers in the social, technical, political and economic processes underpinning building and design". (DPTAC 2003)

This definition may be applied to Ergonomic Design, as it implies the adaptation of all urban furniture elements to the city population needs, erasing, as much as possible, the differences between disabled and undisabled people, and contributing to the amelioration of everyone's quality of life. The objective of an ergonomic design must be considered as an "interaction between the individual and the environment", and "can be described in terms of personal control that can be exerted by the individual over the environment" (Brown, Bayer & MacFarlane, 1989 apud Brown, 1998).

We must consider the impossibility to contemplate all the needs of people with high level of disabilities. However, adaptive environments should be designed in order to ensure that a higher percentage of the population can enjoy all the environment facilities, and the widest percentage of human beings must benefit from the improvement of

visibility on urban furniture and everyone, disabled or not, will feel more comfortable if the bus stop, the bench or the waste bin, they are looking for, stands out from the environment without the need of an accurate search.

Despite their limitations, elderly, and visual disabled people must be able to get out and about locally in order to age well and live independently. The desire to get out does not diminish with old age and older people can continue practicing a large variety of outdoors activities if the environment allows it. On contrary, when it isn't easy or enjoyable to get outdoors their quality of life will diminish, as well as their physical health. The difficulty to get around is often due to the environment poor design. Older and visual disabled people move about more frequently on foot and it presents big difficulties on poor design environments. Accessible open spaces, with good paths, safe crossings, plentiful seats, and visible signing will improve older people's perception of supportiveness and safety. (I'DGo 2012)

In its recent development, inclusive and ergonomic design issues are primarily focused on people with motor limitations and tend to forget visual disabled people. Though, we must consider that the city population is constituted by an extensive variety of people, with different visual acuities and limitations and, also, by a high percentage of older people. Insofar as people grow older, their ability to see small details decreases and eyes have a crescent difficulty of adaptation to sudden changes of light or a quick change in focus. Bearing in mind the visual limited population, only a small percentage is unable to see any color and the main part is able to distinguish luminosity differences (Lindemann et al 2004). Therefore, to have better visibility conditions, under an inclusive design perspective, urban furniture must present a good chromatic and luminosity contrast. Considering this, Per Mollerup (2005:161) states that "color can be seen from longer distances than other graphic elements" and that "in signage differentiation is the first and foremost role of color".

Urban Furniture and Ergonomics

The denomination — *urban furniture* — comprehend every element, placed on the public space, which offer support and orientation to the cities occupants. These elements constitute a wide range that includes, among others, benches, litter bins, street lamps, bus stops, kiosks, cabinets, telephone booths, drinking fountains, bollards, and signs. Consequently, in order to accomplish its functions, urban furniture *needs to be seen* and an appropriate color application improves considerably its visibility. Also, when the urban furniture chromatism is the same for a city area, they may be converted in effective signage and identification elements that will contribute for a better orientation within the city.

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In accord with the prescriptions of the *Royal National Institute for the Blind* (RNIB), UK, pedestrian paths must be easily identifiable and differentiate themselves from the adjacent walls. Likewise, every present objects must detach themselves from the background, in order to be recognized as obstructions. Every urban furniture element — fences, bollards, lamp posts, litter bins, benches, etc. — must present a strong chromatic and light contrast with the environment, so that they can stand out and be more easily recognized, among other, by visual disabled people (Barker et al 1995:7-51).

Ergonomic Color

On their evolution, human beings have inherited psychophysiological reactions which, even if they cannot be controlled or objectively explained, make color act as a necessary mean of information, communication and comprehension of the environment, as it was stated by Michael Lancaster (1996:8): "(…) The functions of color are to attract attention, to impart information, to aid deception and to stimulate the emotions.

"Color, inseparable from light, is an integral part of our total sensory and perceptual experience. It not only conveys information about our surroundings, but also has great impact on our psychological reactions and physiological well-being." (Durão, 2002:162)

Color on environment is not a simple element for definition and unification; it becomes a visual characteristic that stands out from the chaos and complexity of the visual field. It is, also, the easiest way to achieve the identification of the different city zones, and to promote the orientation of the population, permanent or temporary, because color is the objects characteristic which the eye first perceives, even before form or texture – that's why color and ergonomics come together. Color utilization as a mean to show the way, has been punctually employed successful in interior and exterior spaces, therefore we could assume that a sensible and general application to urban furniture, may be a way to the successful resolution of the orientation problem within the city.

Concerning the orientation within the city, and the identification of its different zones, we may consider city maps that differentiate them through the use of different colors. However, on the urban space those colors don't show up, and there is no concern in establishing the correspondence to a real use on this space. The ideal would be to identify the city different areas by specific colors which may differentiate them and, as well, stand out the different urban furniture elements. Despite a recent growing concern about color psycho-physiologic connotations and its application to the environment, color urban plans scarcely refer to color application in urban furniture and signage. In parallel, a bad use of color in urban furniture and signage systems contributes to a lack of visibility that is an impeachment to the fulfillment of their functions, as well as it is a factor of social exclusion for people with deficient and older vision.

As it was stated, in order to be used, *urban furniture must be seen* and, therefore, it must stand out from the environment. However, regardless of the fact that color is the easiest and more appropriate tool to this achievement, it is rarely used with that intention. Usually the urban furniture suppliers prone the uniformity or the color elimination in these elements, maybe as a reaction to the excessive color multiplicity present in the city, but this solution is an impeachment to the satisfactory accomplishment of its functions, and the *Royal National Institute for the Blind* (RNIB), UK, states that "Colour and tone contrasts are the most effective means of improving visibility, with tone contrast usually the more effective. A conventionally pleasing coordinated colour scheme can usually be significantly enhanced with good tonal contrast". (Barker et al 1995:32)

Signage also manifests shyness on color application, presenting a dominant concern about environment integration, and, as a result, becoming less visible and unable to accomplish its function completely, and creating barriers between inhabitants with and without vision disablements. Also, signage chromatism frequently restrains itself to the form and ground contrast, the black and white achromatic contrast, or even the chromatic road standards. Although, the traffic norms were planned to long distance vision, to be seen at the speed of road car driving, and, within the city they lose visibility and confound themselves with build environment colors. Therefore they become illegible for a pedestrian population that has different degrees of visual acuity.

So, the application of a chromatic planning to urban furniture, may originate a system which will function simultaneously as an identification factor for the different city quarters and as an orientation factor for its inhabitants and visitors. In parallel, color application to urban furniture will also become an inclusivity factor, by incrementing these elements visibility and use.

METHODOLOGY

The present research project is focused in Portuguese cities, with different characteristics, applying the methodology in development, and establishing as result color plans that can be applied whenever there is a need to design urban furniture chromatic plans.

The new methodology applies to the study cases an extensive direct observation, with the use of mechanical devices, including photographic mapping of both urban furniture and signage, in order to evaluate their visibility and legibility, as well as their color applications. For each urban area, and to facilitate the study, shall be defined a sample area, including the main streets and places and, also, some secondary ones, with the intention of encompassing the most representative zones, those with specific characteristics. Along the chosen area, an exhaustive record of all the environmental colors is made, including material samples not only from the buildings,

but also from pavements, vegetation and any additional elements present with a relative permanence in the urban environment − *the non permanent colors* − that must be taken into account for the spatial chromatic readings, which are then classified using the Natural Colour System (NCS).

Among the environmental colors we must take in account the percentage in which the sky color will interfere on the urban area color and, also perceptive factors related with color interactions, as well as the geographic and atmospheric conditions and the chromatic variations along the different climatic seasons. With this purpose, the palette is tested along the seasons' changes to judge the chromatic alterations aroused from the different colors of the vegetation as well as day light variations, sky colors according to weather changes to evaluate the chromatic plan pertinence.

These collections are completed by photographs of the environment elements and panoramic views from the different blocks, using urban plans, architectural elevations and sections of the selected paths as well, which act as elements of the environment color components. All these records are methodically indexed in forms and maps, previously designed and tested, which allows the creation of a data base guided by scientific rigor, in order to determine a chromatic palette for each quarter, or urban area and, consequently, to establish a coherent chromatic plan that may be applied to urban furniture.
In order to guarantee the scientific rigor on each quarter chromatic plan determination, we consider the dominant colors, proportionally represented, choosing colors to the urban furniture which may establish an adequate chromatic and luminosity contrast with the dominant colors and, also, respect the traditions, culture, identity and history of the quarter.

The urban furniture chromatic plan, which will be different for every quarter, must stand out from the environment, contributing for a better legibility and identification of these elements and, in the same way, will become a city's area identification element which may be used in different supports and, this way, facilitate the orientation and wayfinding within the city.

CONCLUSIONS

With this project we aim to define and underline the importance of color application to urban furniture, taking in consideration that a pertinent chromatic plan can contribute for a better visualization and, consequently, turn urban furniture into an ergonomic factor, contributing for a better utilization of its elements and, simultaneously, ameliorating the orientation within the city and identifying its different zones. We expect that this methodology, which establishes the importance of a pertinent and structured color application to urban furniture, will contribute to the enlargement of the urban chromatic plans perspective, allowing them to become more holistic and comprehensive.

This project empirical phase will focus in some case studies, where we want to implement the use of color plans to urban furniture as a strategy to achieve a better and inclusive design project, ameliorating this equipment visibility and use, contributing to city quarters identification and users' orientation.

In addition to the inclusion of all the environmental colors, being them from architecture, vegetation, skies and all other elements that constitute urban spaces this methodology takes in account perceptive factors related with color interactions, as well as the geographic and atmospheric conditions. In consequence, the urban chromatic plans will gain a higher scientific approach and rigor.

We also aim to establish a color plan which may contribute to differentiate each city quarter, respecting the local history and symbolism, and achieving a good contrast with the environment.Being a research project there is a need to evaluate the established color plans. As evaluation methodology we will constitute some focus groups composed by city inhabitants of different ages and gender, experts on color application, municipality technicians, such as architects, urban planners, equipment designers, landscape architects, managers, engineers, etc.

The focus groups will interact with an indoor and an outdoor presentation. The first evaluation will consist on an indoor presentation of the guidelines for the chromatic plans elaboration, and the focus groups will discuss and evaluate the pertinence of the urban furniture colors choice. In the outdoor presentation the focus groups will be

confronted with these color applications in predetermined city areas. Their feedback, their contribution, will be incorporated in the color plans model. We expect they'll recognize the importance of taking in account urban furniture chromatic programs in urban color plans, as a way of inclusive design implementation and city zones differentiation.

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