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Ecological Aspects of Visual Urban Environment Design

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Abstract

The city is an aggregate of anthropogenic, natural-anthropogenic and natural objects that are interrelated and interdependent. Environmental problems in cities are associated with consumerism and an irresponsible attitude to nature in society. We need to find additional approaches to solving environmental problem using, in particular, the means of art and design. The article analyzes the potentialities of a material urban environment for the formation of ecological culture in society. Ecological culture is a system of social relations, moral standards, views and values relating to the relationship between man and nature. The author highlights the qualities and functions of design objects that make them ecofriendly. The ecological approach to design has become the successor and development of systemic and environmental approaches. It is characterized by an awareness of the moral and ethical responsibility of the designer and the search for professional tools to solve environmental problems. The role of art-design and its educational potential is emphasized, and the ways in which art objects produce a psychological impact on the viewer are identified.

Keywords: ecological culture, communicative practices, design, art-design, eco-design, sustainable development, urban environment

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1. Introduction

The city as a spatial complex and a system provides comfort, amenities and self-realization opportunities for its residents. Since ancient times, people have been creating complex urban settlements in order to improve living conditions and overcome dependence on the elements. Lewis Mumford, well-known American city-planning and urban theorist, emulated Jean-Jacques Rousseau underlining that «Houses make a town, but citizens make a city» [1]. But does the city make citizens? What mechanisms are responsible for the impact on their environmental consciousness? Doesn't the artificial environment provoke separation from the natural context and disturb the natural ecosystems?

The city is an aggregate of anthropogenic, natural-anthropogenic and natural objects, which are interrelated and interdependent. The city is a dependent ecosystem since it receives energy, water, nutrition and materials from the outside while hoarding masses

of waste within and around itself. Unlike the natural system, the city cannot be self-regulated: all life processes, from consumption to waste disposal, are to be regulated by society [2].

The catalyst of modern-day environmental problems is the human factor, particularly consumerism and irresponsible human behavior. Urbanization problems and the urban environment leave a mark on human consciousness and people's attitudes towards the natural environment. An individual is exposed to a huge stream of well-thought-out visual and audio information and continually renewed material environment with the new displacing the old, causing consumption dependence. In this context, design turns into a tool for catering to society's wants and wishes.

In Russia, urban population constitutes more than 70 %, reaching 92 % in the northern and eastern regions with a severe climate. The cities account for 80 % of all atmospheric emissions and for three quarters of total pollution. All cities of the world annually produce up to three billion tons of solid waste and over 500 billion cubic meters of industrial and household effluents. The polluting and warming impact of a big city extends over a radius of about 50 km, forming an anthropogenic landscape instead of the natural one. The negative impact of a city is further aggravated by the fact most of the people spend up to 20 to 23 hours a day indoors, being exposed to pollution levels 1.5-3 times higher than out-of-doors without any contact with natural objects [3].

For years, environmental projects have been dealing with current problems trying to eliminate the consequences of negative impacts on the nature rather than preventing them. However, technical, social, political, economic or legal methods alone are not enough to be able to harmonize relationships with the nature. Solutions which external in relation to the individual do not resolve the problems; nor can they change the mindsets. It is essential to realign the thinking towards giving up the consumerist attitude to the nature and develop other models of behavior and interaction with it.

The ecological crisis is primarily that of the world outlook, which implies the need to develop an ecological culture. This will require a combined effort of experts from various sciences, manufacturing industries, arts, and education. It is essential to shape a new mentality and a new system of values to ensure that the planet is preserved in livable form for future generations. Only if the outlook of people is radically transformed can the priorities in material and intellectual culture be changed and an ecological culture and ecological consciousness formed.

The **purpose** of this paper is to identify the potential of urban environment design in the ecological context. Design is a project-based problem-solving technique applicable

to problems of any scale including global ones, among which environmental problems are the most urgent since they bring about many others.

The **methodology** involves methods of cultural, art-historical and historical-genetic analysis. These enable one to retrace trends in design allowing for cultural contexts and societal outlooks, identify socio-cultural issues in design of urban environment. The theoretical framework of the study is provided by articles and monographs written by cultural study scholars, philosophers, and design theorists and practitioners on problems in design and urban studies.

2. Design As an Element of the Urban Environment

Design, along with architecture and engineering, has become a way for human individuals to utilize and adapt the nature so that it could meet their needs, and a means of harmonizing the coexistence of man and environment [4]. Buildings and engineering structures ``live'' long in comparison with the human lifespan: they are restored, repaired, reconstructed, or replaced. They are exploited as long as possible since they are economically very expensive and technically complex and labor-consuming. Design is more dynamic and targeted in terms of the number and variety of proposed concepts and forms compared with architecture. Design objects are replaced sooner, being intended to meet the needs of business, city administration, and city residents. Design acts a binder between city space, architecture, nature and man. City furniture, small architectural forms, lamps, entrance groups, show-windows and signage, advertisements, landscaping elements and art objects create the "human" scale, highlight semantic accents, organize the space and, in general, form a comfortable living environment.

Design is an inter-disciplinary, integrative and communicative activity. Its mission is to solve current problems in human life and meet utilitarian, esthetic and intellectual needs, and ensure the functionality, ergonomics and esthetics of the material environment. The environment, in turn, influences the physiological and psychological condition, socio-cultural communication, behaviors, tastes, preferences, consumer demand, and economic processes. Christopher J. Jones emphasized that designers sometimes have to reformulate the problem itself in order to find a solution to it; in a design project, the designers seeks to understand its meaning rather than just embodying knowledge about the subject. Science explores the real, and design predicts what must be [5].

3. Ecological Culture of Urban Residents and Design

Ecological culture is a system of social relations, moral standards, views and values concerning relationships between man and nature.

Ecological culture includes the following components:

- knowledge of natural laws and relations between man and nature;

- attitude towards nature as a `subject' and a value, and a system of values defining the goals of interaction, environmental ethics, eco-thinking and culture of behavior, responsibility and conscious adherence to rules and standards;

- motivation to act for the preservation of the natural environment, the need to understand and appreciate natural objects;

- action (care of natural objects, the need to engage with the nature and understand and appreciate it, commitment to spending time and effort on wildlife preservation, ability to interact with nature, nature respecting behavior, personal proactive position, promotion of environmental ideas).

Ecological culture is a measure of human freedom in relation to nature. Its main function is prevention considering that organizational, administrative, economic and legal mechanisms of wildlife management regulate the consequences of what may have already happened.

The environmentally proactive position could and should be promoted not only through legislative acts but also by shaping a mindset that seeks harmonious coexistence with the environment. Ecological consciousness is a cognitive-axiological form of social reflection of the interaction between man and nature; it is proactive. Responsibility for what one's does and awareness of its outcomes and consequences for the nature should be inherent in the individual.

In the urban environment, we often encounter explicit cases of consumerism and vandalism in relation to the nature. At the same time, the visual environment produces an indirect effect on residents' minds educating better than any moralizing or prohibitions and shapes models of behavior. Interaction between man and environment influences social relations. In our societies, we observe depersonalization when people absorb patterns of behavior imposed on them by mass communications. Negative effects are brought about by migration, accelerated pace of life, etc., which provoke social, psychological and physical tensions. As a result, urban populations are characterized by increasingly ill health and deterioration of social wellbeing.

The contemporary understanding of design includes interaction between man person and nature; optimization of the environment; and attenuation of the contradiction between the uniqueness of man and human communities and the artificial technocratic living environment. The sphere of design encompasses a wide range of design disciplines covering all walks of human life and its cultural, moral and social domains but, first of all, design is defined as an activity harmonizing the environment, as a way towards a holistic outlook, perception of the world and awareness of one's place in it [6].

4. Ecological Design

The ecological approach to design has become the successor and development of systemic and environmental approaches. It is characterized by an awareness of the designer's moral and ethical responsibility and search for professional tools to solve environmental problems.

In addition to the main requirements (use, convenience, esthetics, cost-effectiveness), the ecological approach to designing gives particular attention to issues of resource efficiency, material eco-friendliness, safe disposal, product durability, reuse and creation of favorable conditions for maintaining good physical and mental human health [7].

The author of this paper regards ecological design as a direction and paradigm of designing. It is a project-based practice that should be based on world outlook values, philosophical recognition of the degree of influence produced by creative human activities on the environment and consequences of interaction between man and nature, and on an understanding of the need to purposefully shape human values, thinking and attitude to the surrounding world [8].

The **purpose** of ecological design is harmonization of interactions between society and natural environment. Its objectives are optimization of consumer and esthetic human needs in accordance with the nature's potential, its conservation and minimization of damage at all phases throughout the design object's lifetime: creation, use and disposal. The criteria of designing should be the conformity of objects of design to nature and to culture.

In the integrative model of ecological design, we distinguish three leading components, each of which contains a number of constituents:

- the substantive component includes: world outlook, axiological, philosophical, ethical, ontological, semantic, historical-genetic, motivated goal-setting, psychological, sociological, economic and methodological constituents;

- the technological component includes: manufacturing, natural-scientific, engineering, normative, pedagogical, and performance components;

- the aesthetic component includes: formal, stylistic and image constituents. It is only the presence of all three components of design -- substantive, technological and aesthetic -- that can ensure its eco-friendliness [8].

5. The Visual Environment and Ecology

The visual environment is affecting us continually regardless of whether we want it or not. The material and spatial environment of the city including objects of architecture, engineering, fine arts and design, and natural objects is the envelope in which all public processes take place. It is a creation and reflection of social being and consciousness, an illustration of close relationships between the material and intellectual sides of society's life and changes in philosophical, scientific and cultural views, and their visualization in spatial structures.

Man is part of the nature and a living organism capable of articulate speech, endowed with well-developed abstract and creative thinking ability, characterized by socialization, material and intellectual culture, high intellect, and spiritual needs. His comfortable existence requires not only favorable climatic and hygienic environmental factors. As a social being, he needs an environment with comfortable psycho-physiological and spatial anthropometric parameters, which are determined by design standards. As a spiritual being with esthetic needs, the individual needs an environment that ensures visual comfort and gives esthetically pleasing experiences.

Some requirements concerning the visual image of objects in the material and spatial environment from the ecological point of view are defined by coloristic, an ecological approach to visual perception [9], and by video ecology, a new scientific direction [10]. This young science analyzes the impact of visual information on human visual organs, and the visual environment is considered as an ecological factor. However, there are still no guidelines developed for visual environment design; nor are there requirements for admissible deviations and, in particular, admissible sizes of homogeneous and aggressive visual fields.

Following the ecological approach, we can list the desirable attributes of an object: universal, multifunctional, with interchangeable components; modular, variable, transformable; mobile; rational and simple in form. Many of these qualities are actually principles of industrial design; they can help shape a culture of rational and economical consumption. These qualities, however, do not guarantee a pleasant impression from

an object's appearance; nor do they suggest a thought of nature's value, harmony of interaction with it, and care of it. It would be difficult to judge about the esthetic perception of a design object executed in accordance with the above attributes.

The humans have evolved in the natural environment, and genetically they feel comfortable in a visual environment that is as diverse in forms as the nature and that features harmonious proportions (the most harmonious of which, the golden section, is present in natural objects), soft plastic forms, and natural colors and textures. This cue can be considered sufficiently objective.

Visual connection with the natural environment in an artificial environment can be found in many artifacts of the material culture: vegetative ornaments in the detailing and decor of household items, furniture and architectural parts with smooth outlines or stylized as natural objects.

There are various techniques for developing a nature-conformable and psychologically and socially adequate environment. Connection with the natural environment is achieved not only by giving biomorphic forms to objects but also through the use of materials, textures, colors, natural ornaments, and through actual visual connection with the natural landscape through big windows and open terraces [11]. The semantics of an object of ecological design implies a harmonious, plastic, nature-conforming image, simplicity, and regional esthetics as demonstrated by various ethnic styles.

6. Ecological Design in an Urban Environment

Let us consider the potentialities of urban environment design for cultivating ecological culture, values and world outlook. These are, first of all, opportunities for "meeting" the nature: the availability of recreation areas, inclusion of objects of landscape design, and preservation of natural objects. They improve the microclimate, maintain the air clean, allow walking comfortably in «green corridors», and walk a dog. However, it is difficult to increase the area of natural landscapes and `green' spots. Those who created ancient cities integrated architectural structures into natural environments whereas now, on the contrary, natural objects are included into architectural landscapes. Le Corbusier's ``The Five Points of a Modern Architecture'' [12] are becoming increasingly important. `Green' skyscrapers have appeared in Italy, Switzerland, and China. Vertical landscaping, such as the gardens of Patrick Blanc (France), decorates many cities around the world. Parks in former dumping sites are now available in China, the USA, Spain, Germany, Israel and other countries [13]. There are even examples of mobile landscaping, which, unfortunately, often look like acts of violence against nature.

Urban space landscaping enables residents to use bicycles (paths, grounds, parking lots). Small forms, art objects and natural objects impart harmony to the space ensuring comfortable perception, competent proportioning and relevant scale, and become compositional accents and artistic, image-bearing and emotional elements of the environment.

There is a plethora of design objects in public spaces in various cities around the world which solve or draw attention to environmental problems. These are multifunctional, transformable, biomimetic forms of urban furniture and equipment including advertising or information panels, chargers, and lighting equipment. They are also exemplified by city lamps with solar batteries reminding natural forms (for example, city lights by Ross Lovegrove, UK).

In creating small architectural forms, art objects, city furniture and lamps, designers use advanced materials, including recycled ones. Visually attractive information containers for refuse collection help guide urban residents. Ecological advertising shows organic products and goods, informs customers, calls to action and participation in problem solving.

The use of biomorphic structures, natural colors, materials, textures and traditional regional motifs in images render objects psychologically comfortable and reveal esthetic values. Images of natural objects are often present in murals and supergraphics, while lifeless natural objects (stones, driftwood, etc.) are used in the decor. It should be noted that in treating a spatial environment, designers are paying increasing attention to artist function and imagery of design and engage the means and methods of art design and contemporary art. This is not about artist's self-expression; it is an aspiration to convey ecological ideas to people in images and through emotional objects. The image carries an ecological function.

Art-design works feature a particularly expressive imagery, artistry, attractiveness, agenda, and meaning. Their aim is to produce an artistic impression and project the emotions that the viewer is supposed to experience. Art-objects form the *genius loci*, shape residents' personal attitude to places in their city, reflect important events and problems; they can be interactive, make people think and look at what seems ordinary from a new perspective. The forms of art-objects in an urban environment carry images and signs; they present ideas which are easy to perceive, stay in memory for a long time, bring up various associations, and trigger a chain of thoughts.

The perception of an object, contemplation, recognition, comparison, suggestion, dialogue, emotional response -- these are the processes that can ultimately result in an active process of reflection, comprehension and activity [9]. Any psychological impact

is intended to produce, fixate or change attitudes, ideas, views, relations, opinions, estimates, feelings, and actions. Similarly, the art object created by a designer can indirectly, via its image, produce an impact on the conscious and the subconscious. The information, meaning, image and artistic and emotional components of an art object can help convey the ecological paradigms to the viewer. Esthetic experience is important for shaping the intellectual reference points and values of the personality; it includes perception, emotional response and reaction as idea and experience, transition from esthetic attitude through aesthetic event to aesthetic effect and action.

7. Ecologically Oriented Objects of Art-design

Designers in various countries draw the attention of urban residents to environmental problems and harmonious interaction with the nature by creating art objects. For example, the art object "Clothespin" in Chaudfontaine Park, Belgium, by Uysal Mehmet ali explicitly tells us how disrespectfully people treat the nature causing it pain. The Guerilla gardens by Edina Tokodi in New York represent natural images of moss on walls and columns rendering rough anthropogenic forms milder. The art object «The Caring Hand» in the park of Glarus, Switzerland, represents a tree carefully supported by a huge human hand half buried in the ground. The installation-illusion «Qui Croire?» by the designer Francois Abelanet in Paris represents, if viewed at the proper angle, a spatial model of the globe with trees and lawn. In this way, the designer wants to focus the attention of the residents on the green planet.

Russia is already seeing art-objects emerging around the country and touching upon the problems of human coexistence with nature. They help cultivate ecological culture and the image of a city in which the residents are taking care to keep it clean and attractive. The art object «Protect the Forest» in Tula was erected at the entrance to the city in 2015. This is a call in capital letters on city residents and visitors visible from afar. In front of it is a full-scale realistic wooden figure of elk, the symbol of the forests on general and of this locality in particular. The object has acquired the character of a sign: it is simple and expressive, reflecting the regional character. M.Narymbetova's art object "Scarab" in Perm was set up in 2011 when the city proclaimed itself a cultural capital actively developing art design and street art. The huge beetle made from old car tires rolls a sphere 3.5 m in diameter in front of itself. It is an image of labor and creativity, as well as of environmental awareness -- «the new out of the old». It is a symbol of the contemporary civilization, which is reprocessing centuries-old cultural values rather than creating new ones.

In Moscow, the art object ``Look into Yourself'' (Tretyakovsky proyezd) represents a frontal composition of motley silhouettes of people walking in different directions. The screen behind it shows images of trees and city symbols (buildings, cars). One's perception changes depending on the color of the plastic material, and the picture depends on what is happening at the moment here, in this megacity, and symbolizes the differing attitudes of residents to the nature: conspicuous consumption or awareness of the need to treat the nature carefully. In Moscow, one can also see an interactive composition from cubes with images of the city, trees, the sky and slogans in the Muzeon Park of Arts on Krymskiy Val, and an information shelter/labyrinth at 7 Tverskaya Street, whose transparent columns are filled up with rubbish. ``Green Lantern'', ``Divide and Use'', ``Active Citizen'' are resonant and effective (including thanks to design support) eco-events, which have been held in Moscow for a number of years now.

Environmentally oriented art-objects are concerned with problems of environmental pollution, adverse human impacts on the nature, and extinction of animal and plant species. They raise issues of reasonable and caring attitude to the world around. These art-objects seek to change the anthropocentric attitude of man as the center of the universe towards a perception of oneself as part of the living organism of Planet Earth.

Thus, we can distinguish the following capabilities of objects of design in urban environment in cultivating ecological consciousness in urban residents:

- esthetic (softening and decoration of anthropogenic aggressive forms, improvement of urban environment's esthetic qualities, minimization of visual "rubbish", exposure to the beautiful, cultivation of esthetic tastes and a system of values);

- informational (dissemination of information, attraction of attention, ecological literacy, promotion of eco-ideas, educating to shape a responsible attitude to nature);

- motivational (formation of a model of rational consumption, ecologically responsible behavior, healthy lifestyle promotion, organization of activities (waste collection and sorting, protection of natural objects, events and actions);

- problem-stating (problem actualization, psychological impact, emotional response to the image of an object, appeal to help, proactive position, and action).

8. Conclusion

The design object of any type and scale should always and certainly be eco-friendly, both technologically and in terms of contents, use, meaning and esthetic image. Such components of designing as the system of values, world outlook and ethics should be its determinants. Awareness of design's potential for cultivating ecological consciousness

and ecological culture in people should be among the professional qualities of a designer.

Design can act as a binder of city spaces, architecture, and nature. Taking into account the goals and objectives of sustainable development, when developing artificial living environments designers can ensure the satisfaction of people's reasonable needs; they can set a trend and vogue for rational consumption and ecological lifestyle, promote harmonious coexistence with nature and help cultivate ecological culture.

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