Designing Sustainability into the Urban Context

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This paper will share the results of a study that was done in preparation for an exhibition about sustainability in the urban context for the Tel Aviv City Museum. It will discuss five prisms that evolved from this study, enabling a wide scope outlook towards potential sustainable design interventions within the urban context.

Highlighted through the five prisms, the paper will present a variety of sustainability design strategies that were found in the study as having substantial sustainable potential within the city context.

The strategies will be demonstrated through a variety of design study cases, some from the author's work as a designer, some from the work of the students at the social-environmental design study program at the Department of Industrial Design at the HIT - Holon Institute of Technology, Israel, as well as projects and study cases of designers from around the world.

Introduction

No matter how you look at it, it is clear that we are becoming an urban society. Worldwide, 62% of the population lives in cities while in Israel, for example, 92% live an urban life.

It seems that urban life has the potential to form lifestyles that can sustain a relatively moderate ecological footprint along with social and communal gains.

In my perception, one of the important tasks of sustainable design is to envision, illustrate and enable the realization of new and inviting life habits that can thoroughly reform the encounter between man, object and environment. With the focus on the city, this reformation can become even more impactful.

From this point of view, designers of today have a role of mediation – to support the rehabilitation of the developed world inhabitants from the destructive lifestyles they have embraced for only a few decades.

This mediation process includes creating fresh and creative alternatives to this lifestyle which offer not only social and environmental benefits but also illustrate appealing, sensual, experiential and inspirational concepts, products, services and systems.

This paper will share the results of a study that was done in preparation for an exhibition about sustainability in the urban context for the Tel Aviv City Museum. It will discuss five prisms that evolved from this study, enabling a wide scope outlook towards potential sustainable design interventions within the urban context.

Highlighted through the five prisms, the paper will discuss a variety of sustainability design strategies that were found in the study as having substantial sustainable potential within the city context.

The paper will be designed according to the following five prisms:
Elemental Dialogue | Projects and objects that illustrate a sustainable dialogue with the natural elements.
Every-day Activism | Projects and initiatives that promote active participation of people in the private and public context.
Closing Cycles | Projects that promote the re-design of products, services and processes into self-nourishing cyclical flows of organic or technical materials.
Preventive Consumerism | Projects and concepts that reform responsible consumption.
Open-Code Community | projects that present platforms for people to collaborate for a common goal or promote the ability of a community to address its own needs.

This paper will elaborate upon the different prisms through a variety of design examples from around the world. A *selected study cases* section will be dedicated in every prism to my own work as a designer, and some from the work of our students at the social-environmental design study program at the Department of Industrial Design at the HIT - Holon Institute of Technology, Israel.

1st Prism - Elemental Dialogue

Exploring sustainability design is about exploring a new form of communication, a new form of dialogue with the surrounding environment, with the natural elements, with animals and plants and, of course, with each other.

The way we will develop our skills in dialogue - listening and talking – will form the way humanity dwells on earth and our ability to define a much more participatory existence on this planet.

The following quote suggest one form of dialogue:
'We should go about in the manner of a bee collecting nectar from a flower: The bee harms neither the fragrance nor the beauty of the flower, but gathers nectar and turns it into sweet honey.'
(Ahranat – a buddhidt saint)

This anecdote about the bee encompasses a vision for the way humanity could dwell on earth – the bee is nourished by a flower - gathering nectar and turning it into sweet honey. In its feeding process not only does it harm neither the fragrance nor the beauty of the flower, it also supports the flower's reproduction process.

Various projects around the world have been exploring a new form of communication with the natural environment. In the field of architecture many examples can be found for buildings that are designed to function as water collectors, as wind or sun cultivators.

The work 'off the grid' by the Philips Design Probe Program illustrates beautifully a possible vision for buildings to become living membranes nourished from the natural environment by sending back into the environment nutritious outputs as a result of a well designed "digestive process".
(http://live.philips.com/index.php/nl_nl/video/off-the-grid-habitat-2020-vision/16713202001)

Who listens to the light of the moon?

If we explore work that is done around the world we can find some guidance as to what designers can do in this field:

Luner-resonant streetlight by Civil Twilight sense and respond to ambient moonlight dimming and brightening according to the cycle of the moon. It supports saving energy and emphasizes a beautiful cycle of nature. (http://www.civiltwilightcollective.com/lunar1.htm)

The Parans sunlight transport system is designed to naturally light windowless rooms. It uses rooftop light capturing panels to collect sunlight and transport it via fibre optic cables to illuminate light-deprived rooms inside buildings. (http://www.parans.com).

GROW by SMIT is a hybrid energy delivery device that provides power via the sun and wind and is able to "grow" just like ivy on a façade of a building. (http://www.s-m-i-t.com)

New collaborations with plants and animals

'Elemental Dialogue' invites us to find different ways to collaborate with the various forms of life in our surroundings.

Many traditional societies were characterized by a profound and rich understanding of fauna and flora in their habitat. Nowadays, various projects attempt to re-establish such connection and utilize different plants for purifying water like GDC Whirlpool did in its 'Biologic' washing machine (http://www.project-f.whirlpool.co.uk).

Air purifying plants have been used in various systems, one of which is Andrea living air purifier by Mathieu Lehanneur which absorbs undesirable toxic components for indoor air. (http://www.mathieulehanneur.com)

Some fascinating projects are addressing production in collaboration with other life forms. An example is 'EcoCradle' which is a packaging material that is literally grown, not manufactured. In its production process a growing organism is used to transform agricultural by-products like cotton seed hulls into packaging material using a filamentous fungi (mushroom roots) to bond this material into almost any shape. (http://www.ecovativedesign.com/ecocradle)

Addressing Sustainability Design as an exploration towards a new form of participation within the natural environment can lead to an abundance of design projects and concepts that support fresh and nourishing interaction between man, object and environment. This new form of dialogue holds, when applied wisely, valuable potential in redesigning our footprint on earth.

Selected study cases

WindyLight by Adital Ela
WindyLight is a collection of self-sufficient outdoor lights operated by wind energy. It is created from a repetitive module which integrates wind collection and a LED light source into one element.
WindyLight creates a variety of lamps for the urban environment that operate on free, clean energy and require no connection to the city's electrical grid. In WindyLight, the capacity of wind is translated into light intensity, thus creating a unique light and sensual experience that is in tune with the natural flow of wind.
WindyLight illustrates a sustainable design vision in which products become a direct link between renewable resources and basic everyday human needs.

WaterFull by Adital Ela and Oded Davidovitch
WaterFull is an effective private upper-well that can be integrated in the home environment as a multi-season water collector as well as a shading element.
In the reality of global warming and evident lack of water in many areas around the world, WaterFull creates a self-sufficient platform that enables the home-user to collect dew and rain water for Everyday needs. By doing so, one is able to make use of the natural abundance available in his surroundings.
WaterFull is 3 meters in diameter, and by using a unique dew-collecting fabric created by OPUR (International Organization for Dew Utilization), can collect up to 3.5 liters of water a day in the dry season. In the rainy season the water container allows the accumulation of up to 460 liters of water.

figure 1

figure 2

figure 3

Figure 1: WindyLight by Adital Ela
Figure 2: WindyLight ToGo by Adital Ela
Figure 3: WaterFull by Adital Ela and Oded Davidovitch

2nd Prism - Everyday Activism

While the first prism discussed our outward dialogue *'everyday activism'* questions our everyday actions and the extent to which we take an active role in our everyday life. In the modern setting passiveness became something to strive for – we got into the habit that things should be solved for us by products, machines or other people, leaving a form of activism only for special occasions such as political demonstrations or protest.

'Everyday activism' suggests that we can take back a much more active role and participate in answering our everyday needs, in designing our own environment and in nourishing our environment with our spontaneous everyday actions.

Reaping our everyday Watt production.

Around the world we can find many examples of projects that try to tune into simple everyday human actions such as walking, playing or dancing and transform this energy to various public functions. The 'Pavagen systems' (http://www.pavegensystems.com) collect the energy of by-passers in a busy pedestrian-street and convert the kinetic energy to electricity that is stored within the slab.

Other projects using the same strategy are 'Club4Climate' (http://www.club4climate.com) a dancing club operated by the energy stored from people's dancing movements. 'Play Pump' by Roundabout outdoor (http://www.roundabout.co.za/main_the_playpump.htm) uses the spinning play motion of children to pump underground water into a 2500 liter tank in sub Saharan Africa.

Growing our own fish

Design can play a central role in supporting people in answering their every day needs in a participatory way such as growing food, cultivating water or designing our own shelter to name a few.

In the last few years we can see various projects addressing the possibility of people growing their own food. 'Home Farming Unit' by Philips Design Probe Program is a self-contained farm with separate levels for growing plants and raising fish (http://designprobes.ning.com/video/home-farming-unit). Grow your own by Jochem Faudet is a greenhouse designed for urban dwellers, allowing them to grow their own food on a roof terrace. (http://www.jochemfaudet.com)

Can rain undo graffiti?

The need of people to express themselves in public space invites designers to come-up with creative solutions inviting this spontaneous expression without creating permanent marks in public domain. Projects such as mud or moss graffiti and public furniture that invite people's interaction illustrate a starting point for these possibilities.

Selected study cases

Knaan 3 by Yaniv Brafman @ HIT, Israel
Knaan 3 is a human powered earth strainer for communities building their mud homes with their bare hands. Applying the concept of pedalling makes the straining process (one of the most difficult and time consuming phases in the building process) four times more efficient than in conventional ways. Knaan 3 is designed for disassembly and can be easily shared between the targeted communities.

Girls Mud Grafitti by Liran Elbaz, Nurit Shlonsky and Daniella Kaufman
A sand and local earth graffiti kit. The kit features the tools and recipe to create graffiti figures from sand and local mud. It also includes templates of various mythological women figures.

figure 4

figure 5

figure 6

Figure 4: Knaan 3 by Yaniv Brafman | design tutor: Adital Ela
Figure 5: Knaan 3 in use
Figure 6: Girls Mud Graffiti by Liran Elbaz, Nurit Shlonsky and Daniella Kaufman

3rd Prism – Closing Cycles

The professional discourse regarding projects that promote the re-design of products, services and processes into self-nourishing cyclical flows of organic or technical materials has become common and prevalent. In the last years it has been dominant by the concept of Cradle to Cradle (McDonough, Braungart, 2002) which became a synonym to sustainability design.

The search for additional views and possibilities to close consumption and production loops can prove to be a rich platform for developing new possibilities for design to support sustainability.

Can beer grow bread?

Great inspiration can be found in various projects asking these questions in different levels:
In Kalundborg Denmark an industrial area is operated by the concept of Industrial Symbiosis. The Industrial Symbiosis network in formed from companies in the region that collaborate to use each other's by-products and otherwise share resources. (http://www.symbiosis.dk/)

The Zeri Foundation investigated this idea on a small scale in beer production as a study case. They found that 20 liters of water and spent grains are the by-product per liter of brewed beer. Exploring the possibilities for additional end products they discovered that this waste can be a great substitute for bread flower and also a valuable ingredient in the substrate for the growing mushrooms. (http://www.zeri.org/case_studies_beer.htm).

Can a homeless person produce compost?

'Closing cycles' can also manifest itself in local neighbourhoods and home settings.

The project 'FoodLoop' by Seed Foundation is a design-led social enterprise that addresses the issues of biodegradable waste and homelessness. It offers local authorities a blueprint system for localised composting of biodegradable waste on housing estates. A specially designed community composting machine is installed and managed by formerly homeless residents who handle waste collection and management and use the compost to cultivate fruit and vegetable plants on communal areas of the estate. (http://www.seedfoundation.org.uk/enterprises/foodloop/)

Encompassing a sensitive designer's eye towards *'Closing Cycles'* by wise design intervention can result in various fascinating solutions. This strategy can be applied to system-scale projects and also to the home environment where various cyclical concepts can support users in adopting more sustainable life habits.

Selected study cases

Slow Water by Adital Ela
Slow Water is a simple in-door system that can be integrated into an existing bathroom, supporting the user in collecting water from a wash basin and re-using it for toilet flushing and other needs.
Slow water illustrates the potential of design to become a mediation tool that supports people in adopting more sustainable life habits.

Compost Toilet Bucket by Dafna Noam @ HIT, Israel
Compost toilet bucket is a simple plastic bucket designed to be placed into a standard toilet enabling the home uses to collect human bodily waste for home-composting.
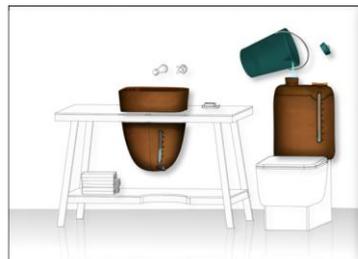

figure 7
figure 8
figure 9

Figure 7: Slow Water (phase 1) by Adital Ela
Figure 8: Slow Water (phase 2)
Figure 9: Compost Toilet Bucket by Dafna Noam | design tutor: Erez Steinberg

4th Prism - Preventive Consumerism

The choices that we make in every moment every day have a fundamental influence on the actual footprint that each of us places on earth.

Designers have an important and potentially influential role in creating solutions that enable people to adopt alternative consumption patterns through designing projects, concepts services and systems that reform responsible consumption.

Can we design a home production line?

Design can empower people to regain their capacity and participate in designing their own environment and using their unique creative skills to create the artefacts they need.

This notion can be explored by creating designs that mediate between an individual and the materials or resources he might find in his environment, thus enabling him to locate and use the existing potential.
On another level a design can create ways for the user to participate in a product's creation process by introducing creative kits that support users in producing their own daily objects.

How tall did your chair grow this year?

One of the accepted but not commonly explored strategies in our field is the notion of designing objects that change through the years to fit the changing needs of a person.

Sustainability in Design: NOW!

Architect Gary Chang managed to take this concept to new heights when he designed sliding wall units and fold-away furniture that transform a 32 square meter apartment into a versatile 24 room home. (http://www.youtube.com/watch?v=Lg9qnWg9kak)

In his project Corb 2.0 Architect Andrew Maynard applies this strategy on a community level. Using existing industrial infrastructure- shipping containers and stackers, Maynard suggests a new form of housing which is responsive and egalitarian. This dynamic structure allows people to change their view or neighbors according to the seasons, change in family dynamics or space requirements. (http://www.maynardarchitects.com/Site/houses/Pages/Corb_V2.0.html)

In the field of product design we can find examples such as 'The high chair' by Maartje Steenkamp in which the legs are shortened as the child grows, or 'Grow Bike' that changes in form to fit the changing needs of the growing child.

Selected study cases

TWO GO by Yael Livneh @ HIT, Israel
TWO GO is a DIY designed project that supports the user in creating his own 2 in 1 bicycle seat and storage.
The design is based on the re-use of a plastic milk crate. It includes an instruction form and a kit of appliances that enables the user to create his own extra bike seat using a re-used plastic crate and seven standard joints.

4 in 1 by Bonnie Manor @ HIT, Israel
The project '4 in 1' was designed with the aim of creating 4 different toys from the same kit addressing the different needs and motor capabilities of a growing child. Parents can easily create the relevant toy for their child from a set of wooden pieces and joints.

Bacbucon by Johana Kiss and Shlomi Friedman @ HIT, Israel
Bacbucon gives children free play opportunities utilizing "clean garbage" to create a personal outdoor play space. Bacbucon consists of a set of connectors that enable the re-use of empty plastic bottles to create an endless spectrum of open-ended structures.
Bacbucon was created as part of an academic project at the social-environmental program at HIT with the aim of designing play objects for nursery schools of the foreign worker's community in Israel. These facilities are characterized by very poor conditions and severe lack of educational stimulation and toys.

figure 10

figure 11

figure 12

Figure 10: TwoGo by Yael Livneh | design tutuer: Prof. Gad Charny
Figure 11: 4 in 1 by Bonnie Manor | design tutuers: Prof. Gad Charny and Tal Kamil
Figure 12: Bacbucon by Johanna Kiss and Shlomi Friedman | design tutor: Adital Ela

5th Prism - Open-Code Community

'Open code community' addresses various aspects and themes regarding the interdependent collaboration of a community to address it own needs and wishes. It strives for the strengthening of community ties and, on a larger scale, strengthening the local social fabric.

'Open code community' touches upon aspects such as Design for Social Innovation and Sustainability (www.desis-network.org), socially driven service design, projects that promote the ability of a community to address its own needs and various grass root communal initiatives.

This paper will focus only on design projects that create platforms for people to collaborate for a common goal. This area of search is explored by creating experiences that would initiate shared common moments in which people are playing or working together to address common goals that are either long term outcomes or spontaneous moments of joy.

The project 'table tennis fence' by Next Architects acts as a beautiful anecdote of this design challenge. The fence that may also be used as a Ping-Pong table is part of a study exploring new types of contacts that exceed physical boundaries (http://www.nextarchitects.com/projects).

The 'Public library for non-public' in Tel Aviv addresses this issue from a different angle.
A small group of interdisciplinary artists initiated a public library in the heart of Neve Sha'anan catered to the population of migrant workers, a growing social group which tends to live an isolated life disconnected from other social groups.

The library features two bookcases, one for adults and one for children, designed to be closed when not in use. A list of desired books was produced with the help of members of the local community, and today the library contains more than 2,500 books in Nepalese, Thai, Hindi, Mandarin Chinese, Tagalog, Arabic, French, Romanian, Spanish and Hebrew. The library's open configuration and its setting, grants it an unconcealed presence and provides unmediated access. (http://m--a--p.net/thegardenlibrary/eng.html)

How can we as designers support new interactions, contact points and sharing platforms in the city remains a vast and fascinating field to search. Exploring the way we can design into public space moments of contact and sharing can open up new ways for people to share objects, talents, materials, knowledge, skills, a smile or any other valuable resource.

Selected study cases

Nomad Urban Furniture by Omri Revesz
NOMAD presents a system of mobile urban chairs that fits into the main characteristics of the city: intensity, variety, coincidence, interests. This project underlines the urban square as a platform for human activity. The mobility allows choosing position according to social and weather conditions. The single mobile chair appears in high numbers according to the need and disappears when there is no activity in the square.

Clothing exchange platform by Gilad Mashiah @ HIT, Israel
This clothing exchange platform was designed to be located in various places in a city creating a playful and appealing platform for people to donate objects and clothes they no longer need as well as having a chance to get a new treasure that was another person's waste.

Interactive bus stop by Rony Tamir @ HIT, Israel
An interactive game board designed to be placed at bus stands and other public locations, thus encouraging dialogue and playful interaction between passers-by in public space.
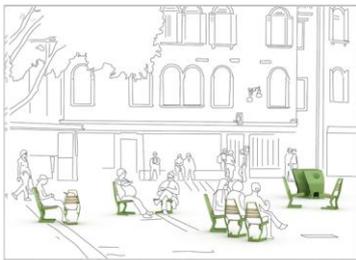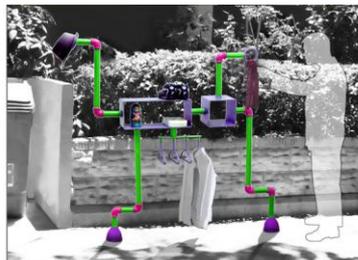

figure 13

figure 14

figure 15

Figure 13: Nomad Urban Furniture by Omri Revesz
Figure 14: Clothing exchange platform by Gilad Mashiah | design tutor: Dr. Victor Frostig
Figure 15: Interactive bus stop by Rony Tamir | design tutor: Prof. Gad Charny

Conclusion

In the field of sustainability design it is not always easy to determine what type of projects, objects, services or systems deserve the title "sustainable".
The prevalent discourse in our field often puts the focus on end results neglecting the essential question of context.
Asking wider questions such as "what would it mean to design sustainability into the urban context" invites us to deal with substantial and wider questions of lifestyles and habit, of supportive systems and services and, above all, basic questions regarding our dialogue with the natural environment, the dialogues and collaborations between people and to explore the way we participate in the world.

The city, which became the taken for granted way of life around the world, is a wonderful example of the potential of focusing on context in a way that enables the definition of applicative strategies that can enable designers to support designing sustainability into this context.

This paper, the five prisms and the various strategies were all a result of an attempt to share one study that aimed to apply this methodology. They are indeed a starting point and, at the same time, an invitation to continue and explore.

Bibliography

Balaram, S. (1996). "Product Symbolism of Gandhi and Its Connection with Indian Mythology", Margolin V. & Buchanan R. (ed.) The Idea of Design: MIT Press.

Balaram, S. (1998). Thinking Design, National Institute of Design: Ahmedabad.

Batchelor, M. & Brown, K. (eds.) (1994) Buddhism and Ecology, Motilal Banarsidass Publishers: Delhi.

Chapple, C. K. & Tucker, M. E. (ed.) (2000) Hinduism and Ecology: The intersection of earth, sky, and water, Harvard University Press: Cambridge.

Grim, J. A. (2001). Indigenous Traditions and Ecology The interbeing of cosmology and community Harvard University Press: Cambridge.

Jegou F. & Manzini E. (2007) Collaborative services – social innovation and design for sustainability. Edizioni Poli Design: Milan.

Manzini, E. (2010) "The social construction of public space" in Corier L. & Maurusic B.G. & Niksic M. Human Cities – celebrating public space. Stichting kunst boek

McDonough, W. & Braungart, M. (2002) Cradle to Cradle: Remaking the way we make things. North Point Press.

McDonough, W. & Braungart, M. (1998) The next Industrial Revolution The Atlantic Monthly Company.

Maroni A. (2008) Creative communities – people inventing sustainable ways of living. Edizioni Poli Design: Milan.

Steffen, A. (ed.) (2008) World Changing: A user's guide for the 21st Century. Harry n. Abrams, inc.: New York.

Thakara, J. (2006) In the Bubble. The MIT Press: Cambridge.

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