MetaboliCity: How can metadesign support the cultivation of place in the city?

Hannah Jones and Rachel Wingfield

Goldsmiths, University of London

Author note

Hannah Jones is the associate academic on the MetaboliCity research project and is currently programme leader of MA Design Futures, Goldsmiths University of London.

Rachel Wingfield set up the MetaboliCity project and is co-founder of the design consultancy loop.pH and a research fellow at Central St. Martins, London.

Goldsmiths, University of London, have supported this conference paper.

The first phase of the MetaboliCity research project (2008-2009) was sponsored by the Audi Design Foundation and supported by Central St. Martins and Loop.pH

Correspondence concerning this article should be addressed to Hannah Jones, Dept. of Design, Lockwood Building, Goldsmiths, University of London. SE146NW. Email: dts01hj@gold.ac.uk

Abstract

The sustainability agenda has inspired a growing interest and re-valuing of localized food production in cities such as London. This paper presents the findings from a one-year (October 2008 – October 2009) participatory design research project entitled 'MetaboliCity' (www.metabolicity.com). The project explored how designers can intervene sensitively within local urban food growing communities by providing a design thinking and crafting to help to sustain these initiatives and catalyse larger positive changes in the surrounding environment. The project was based at Central St. Martins in London, UK, facilitated by the design research group Loop.pH and funded by the Audi Design Foundation.

The aim of the project was to create, test and adapt tools and services for collaborative food growing in challenging city spaces. These included community workshops, urban grow-kits and an online collaborative network. A team of designers guided local participants through a set of envisioning, crafting, planting and documenting processes. This paper will introduce the project's socio-ecological approach to revaluing 'awkward spaces' (Jones, 2007) in the city to create places that are at the heart of local communities.

Metabolicity is the first applied design research project to test and adapt collaborative tools and processes that were developed as a part of the 'Benchmarking Synergy Levels within Metadesign' project. This project was funded by the Arts and Humanities Research Council (AHRC) and the Engineering and Physical Sciences Research Council (EPSRC) and based at Goldsmiths, University of London (2005-2008). Metadesign is a systemic, inter-disciplinary and emergent design process aimed at transcending existing specialist boundaries to create more joined-up solutions for the benefit of society and nature.

Keywords: Metadesign, 'knowledge ecology', localized food production, urban grow- kit, participatory design research, urban resilience

MetaboliCity: How can metadesign support the cultivation of place in the city?

Living in the city

This research was driven by the need to radically and creatively re-envision how we use and experience space in the built environment. It is predicted that by the year 2050, 75% of the world's population will be living in cities (Burnett and Sudjii, 2007). The MetaboliCity project takes place in London, at a time when the population of the city is approximately 7,500,000 (http://www.london.gov.uk, 2010). As our cities continue to grow, there is an increasing demand on infrastructures, resources and public and private space. We also face a new found uncertainty as to how we will be living in cities in light of emerging global issues such as climate change and economic instability. At a time when we are beginning to witness a collective change in the public's awareness of issues such as food production, energy providers and transport, how can design think ahead and think inventively about how we want our 'creative cities' (Landry, 2000) of the future to be?

The metabolic city

This project approached the city as a complex and emergent living system where growth patterns and life cycles are an important part. One of the key figures of the 1960's Metabolism movement in utopian architecture, Kisho Kurokawa, described the city as a living organism, an evolving system that is being produced from the bottom up, rather than from the top down. Each part of the city has its functions and sense of locality, and it integrates the whole in its own terms (Kurokawa, 1992). MetaboliCity is the name for a vision of a city that metabolizes its resources and waste to supply its inhabitants with all the nourishment they need and more. The Metabolists worked with the idea of the 'city as process', stating that

'We regard human society as a vital process – a continuous development from nebula. The reason why we use such a biological word, the metabolism, is that we believe design and technology should be denotation of human vitality.' (Lin, 2007)

These architects rejected the modernist view of the city as a mechanical object viewing it instead as an organic process. This challenged the traditional notion of the master plan as a fixed and predetermined construct. In a recent article in 'Seed Magazine' exploring the notion of 'urban resilience', the metabolic flows of the city is made more tangible

'A city's lifeblood is a continuous flow of stuff—fuel, consumer products, people, and services that enter it either actively, through human effort, or passively through natural processes like solar radiation, atmospheric currents, and precipitation.' (Montenegro, 2010. p2)

Design is often planned, predetermined and fixed, whereas biology is evolutionary, adaptive and emergent. MetaboliCity was the outcome of a two-year (2007-2009) design and science collaboration between Loop.pH and the Nobel-winning molecular biologist Sir John Walker. Sir John Walker is responsible for the discovery of the rotary mechanism of ATP (adenosine triphosphate) that powers all biological processes, and is fundamental to all life. (See Fig. 1) Energy from the sun captured by plants through photosynthesis becomes the fuel for our metabolism. The MetaboliCity design team questioned whether a more synergistic relationship between structure and energy could be applied to urban design to create a connectivity and bio-integration between the built environment and the surrounding ecosystems.

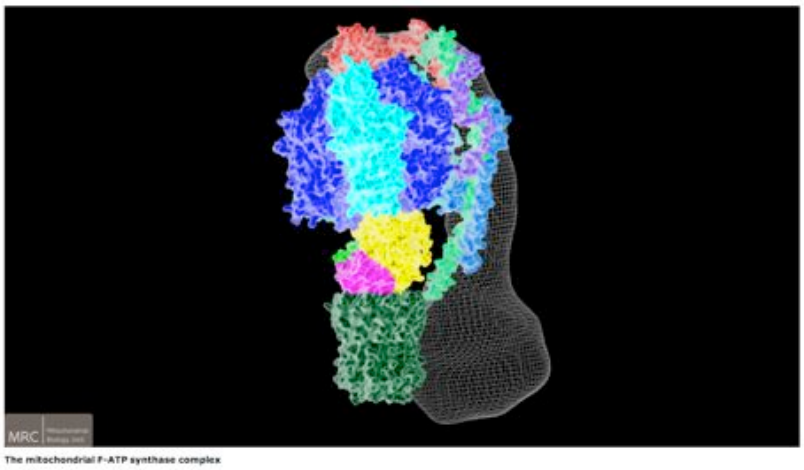

Figure 1. An image of ATP (adenosine triphosphate)

A socio-ecological approach to place-making

The MetaboliCity project advocates a joined-up approach to mapping the social activities that take place in the city and the ecological cycles that are inherent in the urban environment. This approach is guided by underlying principles from resilience theory that highlights the inter-relationship between people and their environment. These principles state that 'humans and nature are strongly coupled and co-evolving, and should therefore be conceived of as one "social-ecological" system.' (Holling cited in Montenegro, 2010, p1). Rather than researching the social context and the environmental context as separate entities, the project focused on the relationships between the collaborative aspect of the food growing activities and these small pockets of urban ecology as one whole. Could there be a direct relationship between urban community collaboration and the cultivation of green places? Ecologists have discovered that 'Shanghai…had just 900 hectares of green space in 1975. By 2005 it had 27,000. So despite the city's tremendous growth, its proportion of urban nature is actually increasing.' (Montenegro, 2010). For this city, this indicates a positive relationship between a growing urban population and the growth of urban ecological habitats.

The city and an emergent role for design

The co-design process was intended to encourage people to take ownership and pride in their local environment. We are beginning to experience a change in the way we regard the spaces of our everyday environment. 'MetaboliCity' explored the potential use of challenging spaces in the city for localised food production. There are various other examples of public and private space in the city being used to seed local, bottom-up, social activities. In the book 'Architecture and Participation', the architect and theorist Doina Petrescu refers to these activities as 'discrete spatial interventions' that 'open up unexpected possibilities of thinking and acting in the public realm.' (Petrescu, 2002, p85). This highlights a potential new role for design in the city.

Designers as urban interventionists

The design critic John Thackara notes how 'Too much of the world is just too designed. Too much control over networks is detrimental to the social innovation upon which our future fortunes depend.' (Thackara, 2005, p94) In each of our cases, the amateur cultures of food production are self-initiated, emerging in between that which is designed and functional. Thackara discusses the importance of protecting design-free zones in the city where these bottom-up initiatives may flourish.

'design-free situations, or free zones, in which planning and other top-down, outside-in improvements will be kept at bay to make space for the kinds of experimentation that can emerge, unplanned and unexpected, from wild, design-free ground.' (Thackara, 2005, p94)

The role of the designer is to become a guardian of sorts within an urban context and to nurture spaces that are relatively design-free. Design as a final product is replaced by design as an ongoing forming process with emergent and partially unpredictable outcomes. These design-free spaces in turn welcome 'informal teams, self-managed organizations, small institutions, alternative spaces and individuals themselves' to take part in new creative practices. (Petrescu,

2005, p.88) How can designers and developers become more supportive of these attempts at reclaiming place?

Each of the project sites acts as an urban catalyst, stirring up interest within the local area that in turn creates a positive ripple effect in environment beyond the site. For example, the allotment scheme that is taking place at St.Luke's community centre, one of our participating sites, has attracted amateur growers from housing estates in the nearby area as well as companies who send their employees for a voluntary day growing food and tidying the space. (See Fig. 2).

Figure 2. The participants at St. Luke's community centre

Cultivating place - the importance of urban agricultural

The role of design in the context of MetaboliCity was one of cultivation. Cities have a high metabolic rate and can be experienced as unbalanced sites of vast consumption as opposed to

sites of production. Our current global food system is highly volatile and methods of agriculture are dependent on energy intensive processes that can no longer support the increasing population. The importance of localised food production is now widely acknowledged and urban areas can play a significant role in contributing to the production of its resources.

Urban agriculture can increase food self-reliance and security in cities, be environmentally sustainable and increase the democratic control of the urban poor in meeting their basic needs. It represents a practice that can be connected with 'resource recycling and conservation, therapy and recreation, education and safe food provision, community development, green agriculture, and open space management' (Mourgeot, 2006, p. xiv). This study focused on the transformative power of design to reinvigorate and inspire urban communities to take ownership of under utilised space for small-scale food production.

Methodological approach

Using qualitative research methods such as semi-structured interviews and informal, on-site design workshops, the social, spatial, ecological and technological potential for producing food at each site was assessed. This process was guided by four key research questions

1. How can we grow food sustainability in urban spaces with limited resources, and how can design thinking facilitate such a production?
2. What is the role of the designer in agricultural initiatives? How can design be used to generate local participation and engagement with urban spaces?
3. How can a communication platform for experts and non-experts be created to share best practice, disseminate information and network with a wider community engaged with urban agriculture?
4. How do people experience the role of technology and innovation in the context of ecology and agriculture?

A systemic approach to researching the city

The research questions were intended to cover a broad scope of issues. The research aimed to develop a deeper understanding of systems thinking to help map transitory urban environments and the bottom-up activities that take place there. To investigate the research questions, four case study sites were identified in the city. We aimed to build a holistic picture of each of the sites. This included for example, the politics of the spaces in terms of ownership and land-use and the use of social networking technology by each of the communities. We approached this research project with the ambition to create a large-scale positive transformation in the city by supporting small, bottom-up interventions. This transformation can only be achieved with a strong collaborative effort and a holistic appreciation of the environmental context. Montenegro, is his article about urban resilience notes how

'From a systems standpoint, what cities are doing is creating a network—which in itself could strengthen resilience. Knowledge generated in one place could be used in another, and experiences and best practices could be shared.' (Montenegro, 2010, p4)

To achieve a positive systemic transformation in the built environment MetaboliCity harnessed the knowledge of a resilient design network.

A diverse group of researchers and designers

The project aimed to create a flat platform for amateur food growers and experts in the field of agriculture and urban design to share knowledge and contribute new insights into the use of challenging city spaces for local food production. A design and research team facilitated this interdisciplinary and participatory process. The project harnessed specialist knowledge from a range of advisors from the fields of plant science, permaculture, cooking, farming, wildlife and eco-architecture. The open and action-orientated nature of the research was informed by the

notion of 'co-operative inquiry' (Heron and Reason, 2006). Co-operative inquiry is defined by the action research experts Heron and Reason as

'a way of working with other people who have similar concerns and interests to yourself, in order to: (1) understand your world, make sense of your life and develop new and creative ways of looking at things; and (2) learn how to act to change things you may want to change and find out how to do things better.' (Heron and Reason, 2006, p144)

The design and research team facilitated a group of 'co-researchers' at each of the case study sites and became 'co-subjects' in the research themselves. They found themselves taking an external, strategic and facilitation role in the design process as well as an internal, collaborative role within each of the project workshops, sharing the same platform as the other participants. The design theorist Ezio Manzini defines this dual role for design as 'design *in* the designing networks' where designers are engaged in peer-to-peer participation and 'design *for* the designing networks', where designers become 'system enablers'. (Ezio Manzini, 2007, http://sustainable-everyday.net/manzini/?p=17)

The research framework and project methods

The project context, structure, outcomes and methods and processes have been holistically mapped using a tetrahedral structure (See Fig. 3). This is a non-hierarchical and relational concept model developed by Professor John Wood at Goldsmiths, University of London to help designers to structure written proposals. Wood describes how 'The tetrahedron affords parallel, self-reflexive, relational representations. It provides an almost ideal basic format for representing a manageable set of relations.' (Wood, 2005) The tetrahedron helps to define each of the four key areas of the research project which are the role of design, the environment, the participants and the grow kit and guidelines. The tetrahedron also enables the relationships in between these four areas to be explored, analysed and evaluated in a methodical fashion.

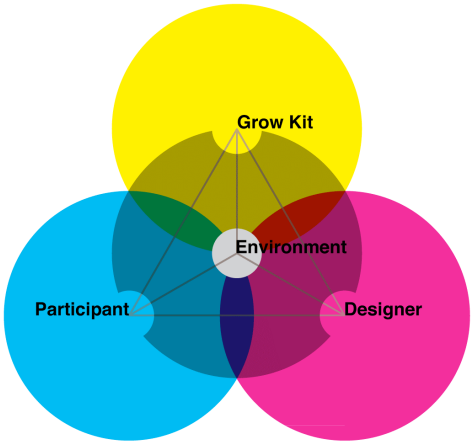

Figure 3. Tetrahedral project structure

The project employed ecological metaphors to describe the design and research process, moving away from the mechanistic and static metaphors that are usually assigned to the industrial design process. The structure of the research was defined by an ecomimetic 'grow framework' that both charted the progress throughout the project whilst reflecting the lifecycle of growth that occurred over the twelve months. We began the project with a seeding process, carrying out semi-structured interviews with each site that encouraged the participants to plan what they needed and dream about the best outcomes for their environments. At the mid-phase of the project or the nurturing stage the design team facilitated grow-kit workshops, where participants co-crafted with the design team their plant growing installations and the plants themselves were introduced to the sites. Feedback from the mid-phase participant interviews helped to adapt the design of the grow-kits for each site, attending to any problems that emerged. Towards the end of the research process there was a knowledge ecology workshop with all of the participating sites. At this workshop we harvested ideas and food from each of the sites. The final phase of the research was a last round of evaluative interviews with the participants and the design team before each of the sites entered a winter, reflective period.


fifteen Restaurant
Hydroponic window farm


St Lukes Community centre
Community built Green wall


nfpSynergy Office
Vegetative Screen

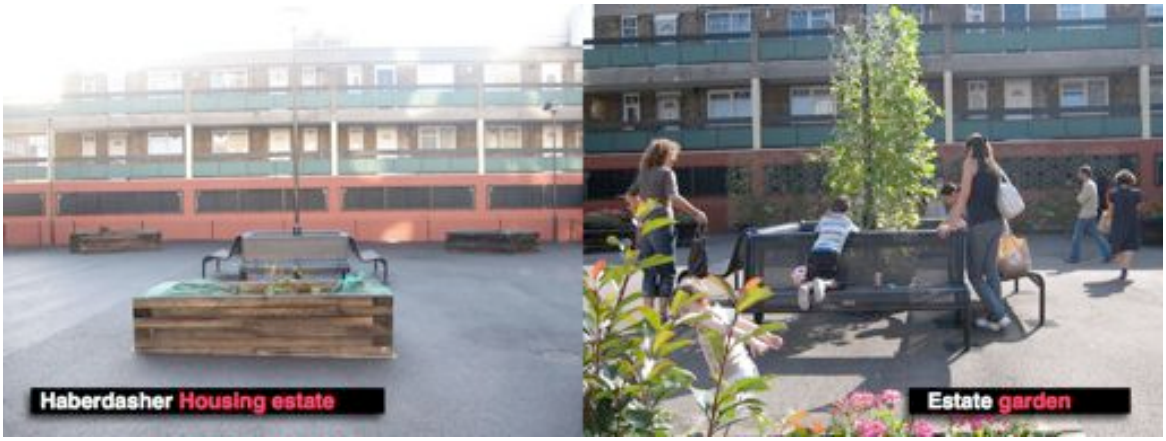

Figure 4. Case study sites

An overview of the four case studies

The design team identified four case study sites in the city of London. The case studies tested the feasibility of urban food production at a variety of locations. (See Fig. 4) These were a

- Restaurant
- Community/ public space
- Workplaces/ Office
- Housing

A diverse sample of sites were chosen to recognise that a diverse and adaptive portfolio of grow-kit solutions were needed to reflect the unique social, physical, ecological and climatic conditions at play in the city. (See Fig. 5)

The example of a workspace that was chosen was NFP Synergy, a research office based in Spitalfields, East London. They had already started to experiment with growing herbs in their kitchen and tomatoes in their front window. Jamie Oliver's restaurant Fifteen took part which is coupled with the Fifteen Foundation that co-ordinates the young chef apprentice scheme. The restaurant has fine dining downstairs and an Italian restaurant upstairs. There are also two floors of offices above the restaurant. The community space that volunteered was St.Luke's community centre. They had a collection of small allotments in their car park and some leftover space behind

the building. Finally, as an example of housing, the Haberdasher Housing Estate in East London took part, where there is a strong tenancy residency association (TRA) and gardening group.

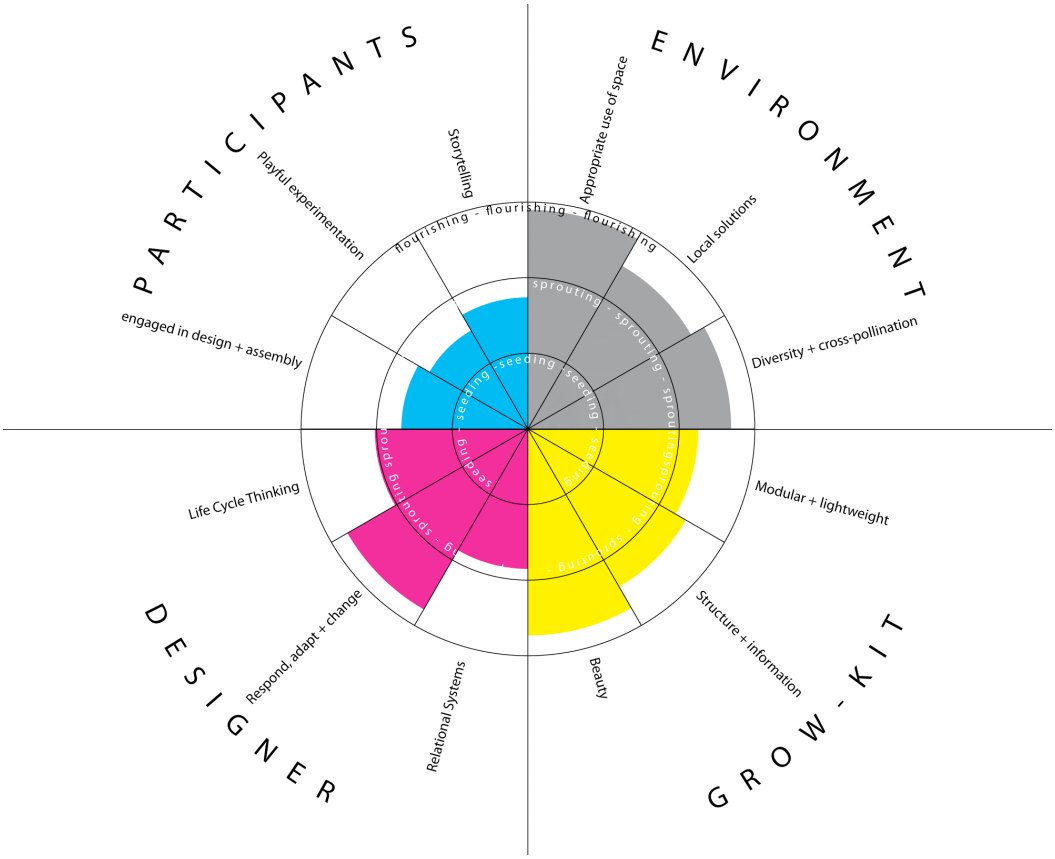

Figure 5. St.Lukes - Site diagnostics

MetaboliCity Project Criteria and values

The design team developed the following criteria to guide the interventions made at each of the sites.

1. ENVIRONMENT

Appropriate use of space and least intervention at each site (appropriate technology)

Local solutions wherever possible (seeds, skills and resources)

Design for diversity and cross-pollination in all aspects of the intervention.

2. GROW-KIT

- Modular & Lightweight - to allow for flexible configurable space that's easily disassembled.
- Grow-Kit Resources:
- No waste - cyclical systems (energy, water & materials - reuse, recycle or degrade safely)
- De-Materialise - Less and fewer combinations of materials sourced ethically and environmentally.
- Low energy or renewable energy
- Low toxicity and pollutants
- Understanding of Life Cycle Thinking for all aspects of design, manufacture, distribution, use and take back.
- Transparency - in practice, method and dissemination. Allow for an inclusive open platform. (Open Source, Creative Commons)

3. DESIGN TEAM

- Relational Systems Thinking: Look for on-site and cross-site connections and synergies (recognising patterns of tending, resources)
- Regularly reflect and evaluate the system to allow for adaptability and resilience that nurtures ability to respond and change.
- Optimised design through an understanding of structure and geometry on every scale. (from material composition to social structures)

4. PARTICIPANTS

- Participants actively engaged in the design, assembly and monitoring of the grow-kits.

- Playful experimentation to cultivate spaces of wilderness and delight.

Storytelling at each phase of the project to create a unique urban mythology around each intervention.

Design process

Using metadesign tools and principles

Designing at an urban scale calls for designers to move beyond specialist boundaries (i.e. product design, interior design etc…) to work across disciplines, often forming unlikely partnerships (i.e. textile designers working with biologists). Metadesign, the design of design, offers a framework to work beyond the constraints of conventional design practice. Some key attributes of Metadesign are that it is in nature 'participatory', 'emergence aware', 'self-creative' and 'flexible' (Wood, 2008). (See Fig. 6)

Metadesign is a self-reflexive mode of design where designers need to become 'specialist-generalists', moving inside and outside of the process to gain multiple perspectives of the task at hand. It can be described as 'a shared design endeavour aimed at sustaining emergence, evolution and adaptation', and 'open-ended and infinite interactivity capable of accommodating always-new variables' (Giaccardi, 2005). The metadesign theorist Professor John Wood coined ten principles for metadesign (http://en.wikipedia.org/wiki/Metadesign). Four key principles were chosen to guide the MetaboliCity research.

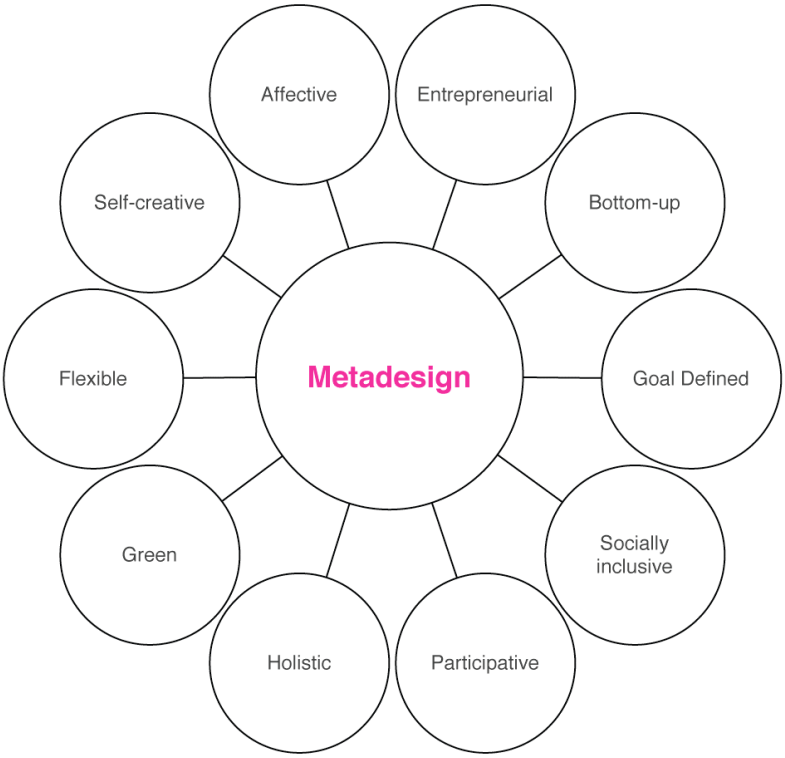

Figure 6. A diagram mapping the qualities of metadesign

1. DESIGN AS LANGUAGING

The Metabolicity project explored the notion of 'designing as languaging'. Our use of the verb 'languaging' originates from the work of Maturana and Varela and defines how we collectively create and negotiate value and meaning in everyday life, a kind of sense-making process (Maturana, and Varela, c1987, c1992). On the Haberdasher housing estate, a hostile and neglected space that was originally introduced by the people who lived in the area as the 'den' went on to become the 'courtyard' and is now known as the 'garden' (See Fig. 7)). The process of renaming signified a process of revaluing the awkward space as a green and celebrated place in the community.

2. NUTURING SYNERGIES

The designer and design theorist Buckminster Fuller defined synergy as ‘the whole is greater than the sum of its parts’ (Fuller, 1970). The notion of synergy was used to assess the connectivity of the participatory design network and to facilitating flows between the grow sites.

3. TEAM KNOWLEDGE

No one person involved in the Metabolicity project can tell the whole story. The knowledge that has been generated through this collaboration is held within the whole group. Therefore the design service that we have developed is a team-orientated service rather than a service aimed at an individual consumer.

4. MULTIPLE-INNOVATIONS

The project aspired towards creating design solutions that maximized the use of resources on each of the sites and across the sites. The waste earth from one site could provide much needed top-soil for another site. At Fifteen restaurant the old crockery was re-used to create a hydroponic growing solutions.

Figure 7. The garden at the Haberdasher estate

The urban grow kit is part of a bespoke design-led ecosystem service that shape-shifts for different city contexts. The approach to the grow kit celebrates divergent and plentiful solutions, inspired by scientific innovations in botany, where plants are grown and studied in soil-free

laboratory conditions and long practiced land management systems such as forest gardening and permaculture. The pioneer of biomimicry (nature inspired design), Janine Benyus, observes how

'As a biologist, the question for me is not whether our technology is natural, but how well adapted it is to life on earth over the long term. And as designers, I think we are realising that perhaps our designs are not that well adapted yet.' (Benyus, J, 2002)

MetaboliCity embraced science and new technologies in the design process, exploring a mixture of clean environmental technologies (ET) with information (IT) and communication technologies (CT). In a paper discussing 'Smart metabolism for a green urbanism' the author Bogunovich proposes that 'eco-tech design' will set us free from the binary of the Natural verses the Artificial (Bogunovich, 2002). The components of the grow kit consist of a lightweight archilace construction kit, an irrigation system, a rainwater collector, nutrients, water pumps, various growing mediums and local seeds.

The use of technologies

The approach to growing at each of the sites was highly experimental, utilizing both high and low tech solutions allowing communities to develop and adapt their own growing methodology. Both traditional and hi-tech agricultural techniques were integrated into the fabric of the built environment, with hydroponic, solar powered window farms, vertical green cladding that clings to facades to organically grown vegetables climbing up street lamps. Growing in under privileged urban spaces required an innovative approach and new agricultural solutions for these environments. (See Fig. 8)

Figure 8. Hydroponics design solution

Hydroponics is the term used to describe a number of techniques for growing plants outside soil, supplying the nutrients to the plants via water. Some of the advantages for growing hydroponically in the city are that it allows for the growth of plants in limited spaces, optimising vertical and spatial potential.

The grow-kit provides ‘agri-tecture solutions’ that embed living organic matter into the fabric of our built environment (Diller Scofidio + Renfro, 2004) to address some of the most challenging urban spatial conditions. The grow-kit facilitates an ongoing process whereby the city is in a state of constant repair. The core component of the grow-kit is a simple method to construct and intervene with space. This construction technique is particularly interesting as it breaks the rectilinear geometry of our built environment with a non-Euclidean geometry made from curved structural elements tangentially joined. The technique, which is defined as ‘archilace’, allows for configurable space, flexibility, adaptability and repair-ability.

The unique combination of geometry and technique is a new point of enquiry in the field of design and textile architecture and offers numerous urban applications from lightweight vertical

farming systems to emergency shelter relief and temporary green architecture. One of the core advantages of this building technique is the ability to construct any imaginable surface from a small number of lightweight parts. Recently discovered structures that were previously unbuildable can now become fabricated by hand using a modular, curvilinear approach. (See Fig. 9)

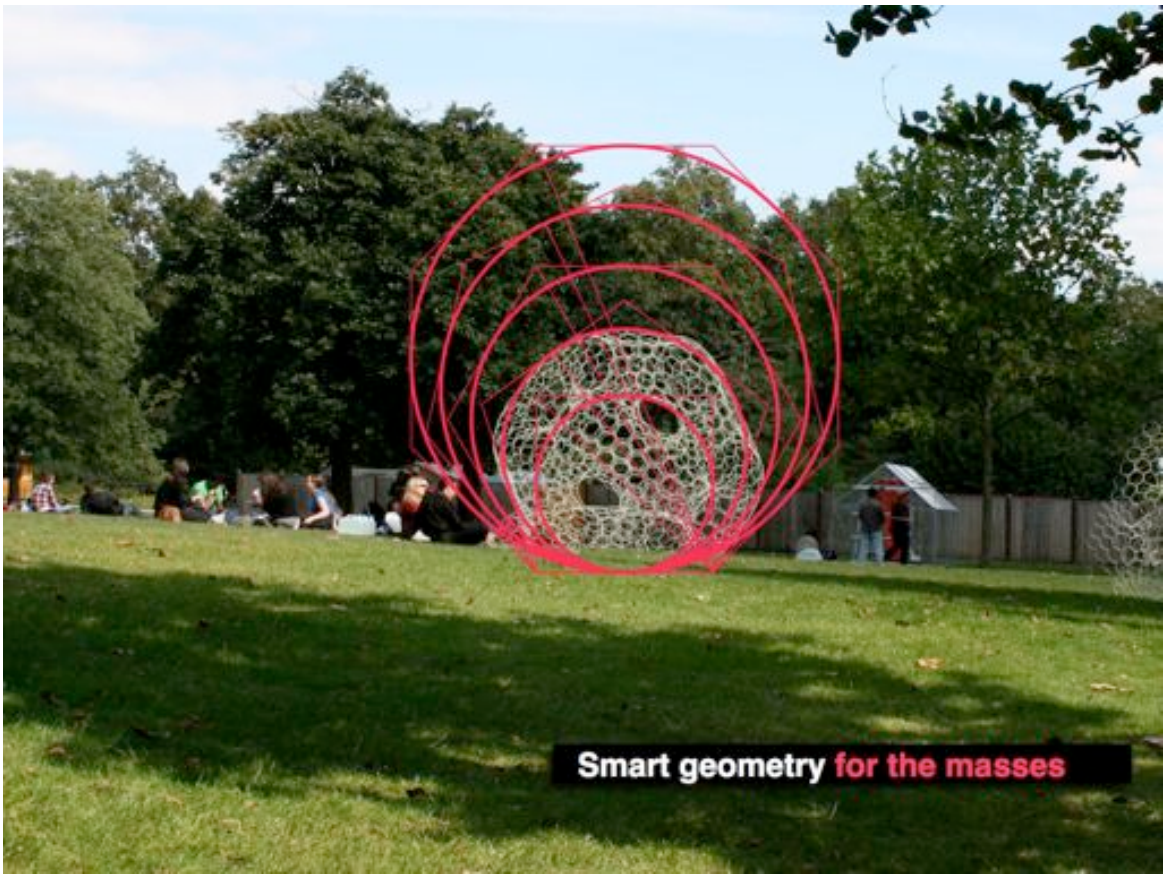

Figure 9. Smart geometries for growing

The archilace provides a framework for community members to construct growing spaces according to their needs and reflects the thinking of architect and pioneer of the Megastructure movement Yona Friedman who believes that

'Architecture should only provide a framework, in which the inhabitants might construct their homes according to their needs and ideas, free from any paternalism by a master builder.' (Friedman, http://www.megastructure-reloaded.org/yona-friedman/)

MetaboliCity has developed design solutions to craft urban space. The act of coming together and engaging in 'making' allows participation in a place to happen on many levels.

Role of social networking

The project catalyses an online social network, linking up the sites and providing a dynamic space to document the activities taking place at each site. The website also provides a library of resources for participants, a store of information on the grow-kits and guidelines and supporting discussions. This is intended to encourage a 'knowledge ecology' to evolve between the sites. (See Fig. 10)

Creating smart places

Alex Steffan of World Changing talks about the need to create smart places for sustainable cities. Online digital tools are turning once solely consumers into producers and publishers. A unique 'qrcode' (a mobile tagging image code) was assigned to each growing site linking the online knowledge ecology with a physical place. This allowed people with smart phones to access different layers of information about the site. This included what food was being grown, when it had been planted and by who and when the produce was ready. This is part of an ongoing body of work looking at the role of technology in creating sustainable cities.

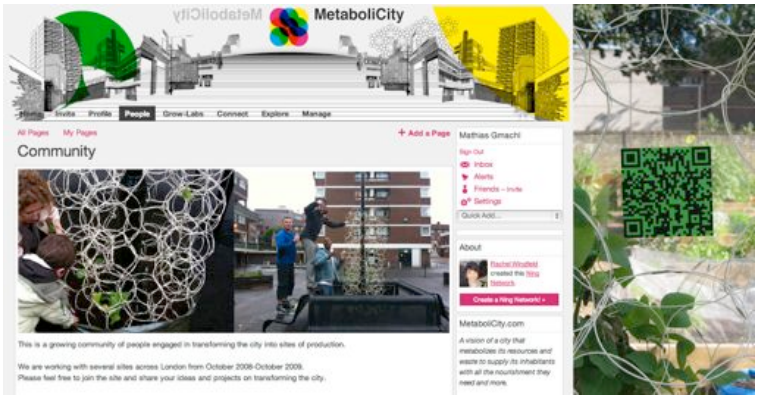

Figure 10. The role of social networking

Project outcomes and case study findings

Knowledge ecology workshop

A knowledge ecology workshop was designed to explore the project findings, celebrate the process and create a shared platform for the participants to exchange experiences and identify future opportunities. This workshop was held as a part of the London Design Festival. The workshop took place in September 2009 at the Waterhouse Eco-conferencing centre in Shoreditch, London.

The workshop process took the participants through a series of evaluative, future focused and experiential exercises to reveal the opportunities available on each site and generate a shared vision for the network. (See Fig. 11) The workshop began with a 'potential mapping' exercise where participants presented each grow site to a small team of designers and special advisors. The purpose of this exercise was to elicit grounded knowledge about the sites and enable the participants to present their experiences. This was followed by a walk and talk around the sites, where each group of participants were able to experience each of the food producing grow-kits. After visiting the sites we conducted a 'collective story telling' exercise where each group made an account of their experience from the walk, collectively mapping their experience at a sensual, factual, relational and future focused level. The participants where then encouraged to create wild

future scenarios for food production in the city. Finally we ended by mapping a time cycle and creating practical next steps for the project.

Figure 11. The Knowledge ecology workshop

Grow-Labs – distributed community-based knowledge hubs and places for experimentation

The principal outcome of the research project was the blueprint for a network of community-led Grow-Labs. Grow-Labs are proposed as de-centralised, design-facilitated laboratories for the urban environment, with the aim to build tools for replicable, open source, resilient communities. The aim is to localise research and experimentation into communities, celebrating embedded experts and providing the tools to find expertise outside of the community. They are temporary places for experimentation and training with the potential to act as a platform for the creation of sustainable social enterprises. Grow-Labs can enable citizens to engage with a scientific discourse. The labs could be equipped with observational capabilities through distributed IT, sensors, and networking technology, allowing communities to participate in mass crowd science, collecting data that is fed back to a specialist scientific community.

The focus of the Grow-Lab is catalysing near-future visions, locating stories and visions within place and providing practical solutions for sustainable urban living. Grow-labs enable communities and individuals to observe, learn and engage with their local ecologies and may take

on many forms, from underground mushroom farms to high-rise hyperbolic greenhouses and vertical farms. The final form and function of the Grow-Lab would emerge from a community-facilitated workshop. At the Haberdasher Housing Estate one of the ideas from the knowledge ecology workshop was to use the underground sheds for composting organic waste and cultivating high-value mushrooms. These near-future visions need piloting on-site before being up-scaled. (See Fig. 12) It is this kind of place-based experimentation that is needed to transform the city bottom up.

MetaboliCity has seeded a diverse network of community led Grow-Labs, providing a place for people to come together to imagine, dream and experiment within a well designed and facilitated agenda.

Figure 12. Mapping the Haberdasher estate

Grow kits and guidelines

This project has explored a new role for design that focuses on social innovation and offers tools for thinking beyond the possible (Wood, 2003) combined with practical solutions that empower and re-skill local communities. The outcome of the project is a detailed map of stages for cultivating urban transformation presented as a blueprint for other community groups. One of the design outputs and components of the grow-kit is a set of method cards and web based facilitation seeds to trigger and guide urban transformation.

Stages of the grow framework:

1. Cultivating & Organising
2. Visioning & Dreaming
3. Design Seeding (Germinating)
4. Planting Intervention
5. Tending & Propagation
6. Harvesting & Digesting

Facilitation seeds allow community groups to assess their site and put together a team of people. (See Fig. 13)

Towards new social interest business models

What are the new enterprise opportunities for designers wanting to engage in transforming the city, leaving behind the old consumerist client model? There are cost benefits of locally produced food from reduced transport costs to growing-your-own, not only could this type of industry reduce associated costs but also create jobs and employment. MetaboliCity is now developing a new model to harness the potential of businesses and landowners to support the growth of healthy urban habitats, through partnering business with strong corporate responsibility with local community driven growing sites.

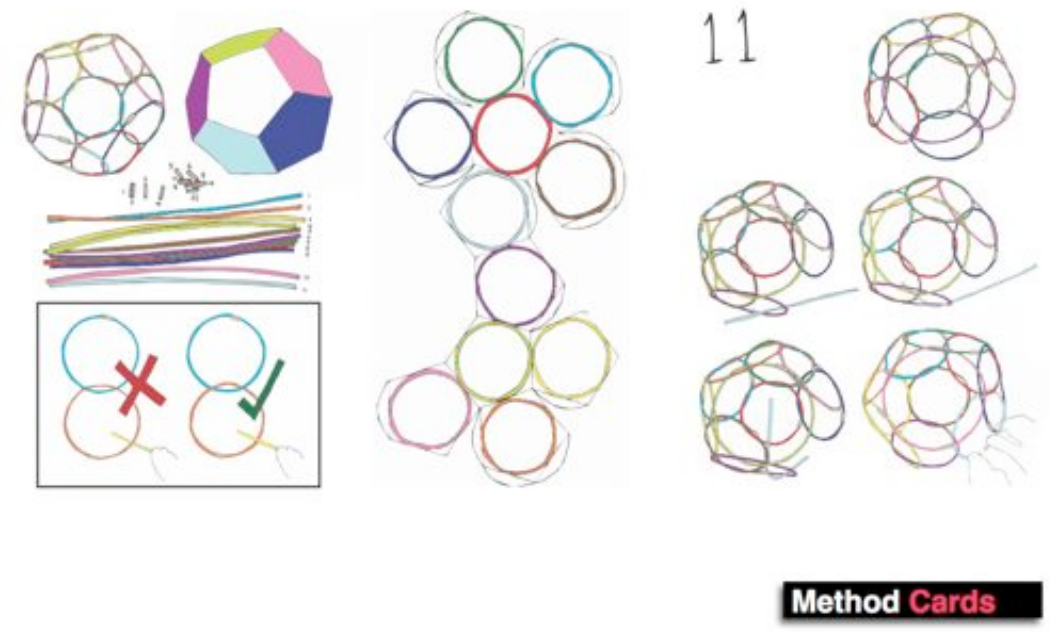

Figure 13. Grow kit method cards

There are a few good examples of social enterprises and new businesses being born from community-led initiatives such as the Able Project in Wakefield, UK whose business tagline is 'from cardboard to caviar'. They are paid to collect cardboard waste from restaurants to feed an ecosystem that produces caviar sold back to the restaurants. There is also Aquaponics UK and Growing Communities in East London, UK providing training, services and urban grown food as box schemes. In London, UK, Local boroughs are funding allotment schemes and new enterprises are emerging such as the 'Capital Growth' (http://www.capitalgrowth.org/) scheme, which aims to support 2,012 food growing spaces for London by 2012. The MetaboliCity design team have partnered with Capital Growth to cultivate relationships with landowners in London developing unused, undeveloped sites or with building complexes with space left over after planning (SLOAP).

Conclusion

Throughout MetaboliCity we have witnessed the role of urban agriculture in transforming communities into social, collaborative, sharing-spaces. Urban food production offers a solution for everyday citizens to activate a self (community) reliance. It also brings a diversity of life forms into the city and creates places of beauty. For too long now our cities have been designed to exclude and 'override' life.

The MetaboliCity design team continues to explore how designers can nurture bottom-up, social activities that revalue leftover spaces of the city as inspiring and useful places. We are just at the beginning of our second phase of research where we are looking into setting up MetaboliCity as a socio-ecological community enterprise. We are intending to continue to use metadesign as a framework for practice-based urban design research.

It is a future ambition of the MetaboliCity design team to develop tools that can guide decision-makers in the built environment to work towards creative, social, economic, and ecological resilience. To do this will almost certainly require a collaborative, team-based effort including local inhabitants in the city in a metadesign process.

Image References

Bibliography

Barr, R., (2002). Sustainable urban food production in the City of Vancouver: An analytical and strategy framework for planners and decision makers. *City Farmer*. Retrieved February 12, 2009 from: http://www.cityfarmer.org/barrsUAvanc.html#1.3

'Benchmarking Synergy Levels within Metadesign', AHRC / EPSRC funded research project, at Goldsmiths, University of London (2005-2008). Principle Investigator Prof. John Wood. www.attainable-utopias.com/tiki/m21 (last accessed on 13th June 2010)

Benyus, J., (2002). Biomimicry: Innovation inspired by nature. USA, Perennial.

Bogunovich, D. (2002). Eco tech cities: Smart metabolism for a green urbanism. In C. A. Brebbia, J. F. Martin-Dvque, & L. C. Wadhwa (Eds.), The sustainable city II - Urban regeneration and sustainability (pp. 75-84). Southampton, United Kingdom: Wit Press, 3-5 July, Segovia, Spain.

Buckminster Fuller, R., (c1970). Utopia or Oblivion. London, Vigo Street, Penguin Press

Editors Burnett, R., and Sudjic, D., (2007). The Endless City: The Urban Age Project by the London School of Economics and the Deutsche Bank's Alfred Herrhausen Society. London, Phaidon Press Limited.

Friedman, Y., (Last accessed 14th June 2010). Megastructure Reloaded. http://www.megastructure-reloaded.org/yona-friedman/

Giaccardi, E. (2005). Metadesign as an Emergent Design Culture. *Leonardo* **38**(4): 342-349.

Hopkins, R., (2008). The Transition Handbook, from oil dependency to local resilience. Green Books Ltd.

Jones, H., 2007. Exploring the Creative Possibilities of Awkward Space in the City. *Journal of Landscape and Urban Planning*. Vol 83, Issue 1. Pages 70-76. 12th November 2007

Jones, H., and Wingfield, R., (2009). MetaboliCity: How can Design Nurture Amateur Cultures of Food Production in the City? Multiple Ways to Design Research. Research cases that reshape the design discipline. Swiss Design Network Symposium, Lugano, Switzerland, 12th and 13th November, 2009. Keynote lecture presented in conference proceedings.

Kisho Kurokawa (1992). *From Metabolism to Symbiosis*. John Wiley & Sons. ISBN 978-1854901194

Landry, C., (2000). The Creative City: A Toolkit for Urban Innovators. London, Earthscan.

Lin, (2007). Urban Structure for the Expanding Metropolis. *Journal of Architectural Planning Research*. 24:2 (Summer 2007)

Manzini, E., (2007). Metadesign. *The Sustainable Everyday*. http://sustainable-everyday.net/manzini/?p=17. (Last accessed 13th June 2010).

Maturana, H., R., and Varela, F., J., (c1987), (c1992). The Tree of Knowledge: The Biological Roots of Human Understanding. London, Shambhala Publications, Inc.

McCullough, M., (1998). Abstracting Craft: The practised Digital Hand. London, MIT Press.

Mollison, B., (1988). Permaculture: A Designer's Manual. Australia, Tagari Press.

Montenegro, (2010). Urban Resilience. *Seed Magazine*.
http://seedmagazine.com/content/article/urban_resilience/P4/
February 16, 2010. (Last Accessed June 4, 2010).

Mourgeot, L., (2006). Growing better cities: Urban agriculture for sustainable development. ISBN 1-55250-226-0

Editor Petrescu, D., (2002). Working with uncertainty towards a real public space. Architecture and participation. London, Routledge.

Reason, P. and Bradbury, H., (2006). Handbook of Action Research. London, Sage Publications Ltd.

Steffan, A., (2004). http://www.worldchanging.com/archives//000550.html

Thackara, J., (2005). In the Bubble: Designing in a complex world. Cambridge, MA: MIT Press.

Viljoen, A., (2006). CPULs - Continuous Productive Urban Landscapes: Designing Urban Agriculture for Sustainable Cities. London, Architectural Press.

Wood, J., (2005) 'The Tetrahedron Can Encourage Designers To Formalise More Responsible Strategies', *Journal of Art, Design & Communication*, Volume 3 Issue 3, Editor, Linda Drew, UK, ISSN: 1474-273X, pp. 175-192

Wood, J., Editors Jones, P., and Jones, H., (2007). Synergy City; Planning for a High Density, Super-Symbiotic Society. *Landscape and Urban Planning: An International Journal of Landscape Ecology, Planning and Design.* Editor-in-Chief: J.E. Rodiek ISSN: 0169-2046