Cumulus Working Papers

Kyoto

20/08

UNIVERSITY OF ART AND
DESIGN HELSINKI

Contents

International Design Session

INTRODUCTION Kan Shimamoto

Towards new directions in design for the 21 century

Already half a year has passed since International Design Conference Cumulus Kyoto 2008 was held. It was very significant for Kyoto Seika University to have hosted the very first Cumulus International Design Conference held in the Eastern hemisphere. International Design Conference Cumulus Kyoto 2008 visualized 21st century design from the perspective of the Buddhist concept of [cu:] – "emptiness" – and I believe we were largely successful in our aims.

The Conference featured diverse programs such as the International Design Forum, Kyoto Design Declaration, International Design Sessions, and International Design Competition for Students, and so on. We have produced a report on one of these programs, the International Design Session. In vigorous discussions, ideas and opinions were exchanged on three themes:
- History, Tradition and Craft; Rethinking Modernity and Locality in Design
- Nature, Togetherness and Sustainability: Theoretical and Practical Perspective on Design
- Safety in Contemporary Design: Approaches to Issues in Social and Individual Welfare

All of these are very important when we think about future prospects for design. I hope those discussions will provide hints toward new directions in design for the 21st century. On a final note, I extend a special "thank you" once again to all Cumulus members who participated in the International Design Conference Cumulus Kyoto 2008, and all those who supported the Conference in so many ways.

Kan Shimamoto
President, Kyoto Seika University

September 2008

FOREWORD Christian Guellerin

Japan – modernity with finesse, strength and beauty of traditions

The Kyoto event is quite significant for Cumulus and testifies our will to strive towards globalization. Formerly a European association, Cumulus decided to go global in 2006.

We now have members from all continents and it is the first time the "Cumulus show" has been organized in Asia. It is even the first time the "Cumulus show" has ever been organized outside Europe.

We represent 124 universities of art, design and media and we keep on growing. We will probably count 140 institutions by the end of the year. Our initiative is a great success. Today I would like to thank the Kyoto Seika University for its warm welcome and all the members for their presence.

Japan is a very symbolic and representative in the world of creation and culture: this country has managed to combine modernity in terms of creation, innovation, technology, industry, business with the finesse, strength and beauty of its traditions, with all the values of its age-old culture. Japan has conquered the world thanks to its innovative intelligence while preserving all the strength of its ancestral culture.

More than other countries maybe, Japan combines modernity and tradition, and this is virtuous. Virtuous because, though it is a fantastic challenge offering us a great opportunity to learn from our peers, globalization threatens to end up in global mindset standardization.

Therefore, all of us need to remain strongly tied to our roots, to remain singular, original and to assert our identity, our specific culture, our specific way of thinking, our specific self. Think global, of course, but only insofar as we keep asserting our own culture, our differences, our Human nature, our own desires and our own ability to shape the world we want to live in.

The Kyoto Conference will be a landmark in the development and recognition of the still young Cumulus association. Led by Yrjö Sotamaa – former Cumulus president – the "Kyoto Declaration" project finally came to life, and we will have the honor to commit the whole Cumulus network to take future and progress into consideration.

By signing the Kyoto Design Declaration, the members of Cumulus agreed to share the responsibility for building sustainable, human-centered and creative societies.

The signature of the Kyoto Design Declaration will be the highlight of the Cumulus Conference.

This event is very important for Cumulus and for the design community as a whole because it emphasizes a way of thinking, a clear political stance to be taken by design, designers and creative professionals. Considering the world as it goes, with all the ecological, social, economical issues emerging and lying ahead of us, designers cannot but assume new roles. Global development and the awareness of ever increasing relat-

ed ecological and social problems are posing new demands. These trends offer new opportunities for design education and research. Design is challenged to redefine itself and designers to strive to come up with solutions to build a sustainable future.

Designers and creative professionals have always had the responsibility to make the world a better place. Design is a humanistic activity.
But as new ecological challenges arise on a worldwide scale, designers might soon have the responsibility to save the world.

This is the mission we are taking up today. This declaration is a move forward to save the world. Is it pretentious to say so? Of course, it is. But as education and creation professionals we have the responsibility to set very pretentious and ambitious objectives for ourselves and for the 20,000 students we represent.

We hope that this signature will spur our schools to take many initiatives likely to bring about relevant concepts for the world of tomorrow.

To finish with I would like to quote French-Lithuanian philosopher Emmanuel Levinas: "Morals make us feel sorry for those who are hungry. Ethics oblige us to feed them." This is exactly how we, designers, envision the creative process.

Christian Guellerin
General Director, President of Cumulus

FOREWORD Yrjö Sotamaa

The Kyoto Design Declaration

– Building a sustainable future

The time of the birth of Cumulus was marked by the fall of the Berlin Wall, a great euphoria of freedom and the birth of a "New Europe". Cumulus was born to promote the ideals of democracy, equality and freedom of movement. The Cumulus Association has grown in eighteen years to the become most important international organization of Universities and Colleges of Art, Design and Media representing 140 first class institutions from all continents

The history of Cumulus and its various activities tells of a strong mission to make societies and industry aware of the importance of culture, art and design in building sustainable societies, creative economies, innovative regions and a better everyday life for all people. Cumulus has built a powerful global network of dynamic institutions to develop and promote the talent of youth and its creativity.

Proposing new values and new ways of thinking

A landmark for Cumulus was the signing of the Kyoto Design Declaration on March 28th, 2008 in the same venue where the Kyoto Protocol to the United Nations Framework Convention on Climate Change was signed. Through the Design Declaration the members of Cumulus, representing the global community of design educators and researchers, made a commitment to sharing a global responsibility for building sustainable, human centred, creative societies. The full text of the Declaration is printed in this publication and the following includes some of the key thoughts of the full Declaration.

The Declaration stresses, that all the people of the world now live in global and interdependent systems for living. Design is a means of creating social, cultural, industrial and economic values by merging humanities, science, technology and the arts. **It is a human-centred process of innovation that contributes to our development by proposing new values, new ways**

of thinking, of living, and adapting to change. This human centerdness and a holistic way of looking at problems makes design unique in comaprison for example with technology.

The second key message is the beginning of a new era. The Declaration is a manifesto of a paradigm shift from technology driven development to human centred development. The focus is shifting from materialistic and visible values to those, which are mental, intellectual and, possibly, less material. An era of "cultural productivity" has commenced. The Declaration puts design thinking steadfastly at the centre of this continuum.

The signatories of the Declaration emphasize that designers have to assume new roles and redefine design itself. Global development and an awareness of the growth of related ecological and social problems are posing new demands and offering new opportunities for design, design education and design research. Human-centred design thinking, when rooted in universal and sustainable principles, has the power to fundamentally improve our world. It can deliver economic, ecological, social and cultural benefits to all people, improve our quality of life, and create optimism about the future and individual and shared happiness.

Cumulus cannot alone change the world to create a sustainable development. Therefore the members of Cumulus have agreed to seek collaboration with educational and cultural institutions, companies, governments and government agencies, design and other professional associations and NGOS to promote the ideals of, and share their knowledge about, sustainable development. So far four major international organizations, ICSID, BEDA, AIGA and EIDD have given their support to the Declaration.

Actions follow

As one of the first opportunities to demonstrate the strength and reach of design education and students in addressing global problems, Cumulus faculty and students have been invited to participate in the first of what will become one of the most prestigious annual global design events, the **Aspen Design Challenge– Designing Water's Future**.

The Aspen Design Challenge is a global call to students asking them to use their creative talent and design-driven problem solving skills to address an international problem that is not only critical in today's world, but also crucial to our survival – and critical to the future of the world those students will inhabit.

Each year the subject will change, although the process will remain the same: a call for faculty and students to work on addressing a global problem from September through December, with the opportunity to present the results to an international jury and a prestigious gathering of world leaders.

This challenge – Designing Water's Future – was developed from discussions held at the World Economic Forum in Davos, at the Aspen Ideas Festival and the Clinton Global Initiative in 2007 and 2008.

The Aspen Design Challenge is a collaboration of the Aspen Institute, AIGA, the professional association for design in the United States, Cumulus, the International Association representing the global community of design education and research, and INDEX: a non-profit network organization that focuses on Design to Improve Life worldwide. They all build on the legacy of the International Design Conference in Aspen.

You are all welcome to join us in implementing the Kyoto Design Declaration.

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President of Cumulus 2001–2007
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Kyoto Design Declaration 2008

28th March 2008, Kyoto

A statement of commitment, by the members of Cumulus to sharing the global responsibility for building sustainable, human-centred, creative societies.

Proposing new values and new ways of thinking

All the people of the world now live in global and inter-dependent systems for living. We continue to enhance the quality of our lives by creating environments, products and services utilizing design. Design is a means of creating social, cultural, industrial and economic values by merging humanities, science, technology and the arts. It is a human-centered process of innovation that contributes to our development by proposing new values, new ways of thinking, of living and adapting to change.

An era of human centered development

A paradigm shift from technology driven development to human centered development is underway. The focus is shifting from materialistic and visible values to those which are mental, intellectual and possibly, less material. An era of "cultural productivity" has commenced where the importance attributed to modes of life, values and symbols may be greater than that attributed to physical products. Design thinking stands steadfastly at the centre of this continuum. Simulta-neously, this development highlights the importance of cultural traditions and the need to extend and revitalize them.

The imperative for designers to assume new roles

Global development and an awareness of the growth of related ecological and social problems are posing new demands and offering new opportunities for design, design education and design research. Design is challenged to redefine itself and designers must assume new roles and commit themselves to developing solutions leading to a sustainable future.

Seeking collaboration in forwarding the ideals of sustainable development

The members of Cumulus, representing a global community of design educators and researchers, undertake the initiative outlined in this, 'THE KYOTO DESIGN DECLARATION', to commit themselves to the ideals of sustainable development. Furthermore, the members of Cumulus, have agreed to seek collaboration with educational and cultural institutions, companies, governments and gov-

ernment agencies, design and other professional associations and NGO s to promote the ideals of, and share their knowledge about sustainable development.

From education to global responsibility

In order to fulfil its declared mission to contribute to sustainable social, environmental, cultural and economic development for current and future generations, and to contribute to an environment and culture that makes harmonious and healthy life possible, the Cumulus members make this declaration. Members will commit themselves to accepting their part in the further education of our youth within a value system where each of us recognizes our global responsibility to build sustainable, humancentered, creative societies.

The power to make fundamental improvements to our world

Human-centered design thinking, when rooted in universal and sustainable principles, has the power to fundamentally improve our world. It can deliver economic, ecological, social and cultural benefits to all people, improve our quality of life and create optimism about the future and individual and shared happiness.

*This protocol was written by Yrjö Sotamaa, rector of the University of Art and Design Helsinki TAIK since 1986. Founder and Past President of Cumulus.

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Speeches

Keynote speaker

Hirano Takuo
Former President, Kanazawa Art University,
proposer of Japan's Good Design Award

After graduating from Tokyo National University of Fine Arts and Music (Faculty of Fine Arts), he served as a patent examiner at the Ministry of International Trade and Industry. In 1955, he was dispatched by the Japanese government to study at Art Center College of Design, California. After returning to Japan, he proposed the "G-Mark" system. Professor at Tama Art University, 1969–2001; Guest professor at Kanazawa College of Art 1970–2003; Emeritus professor at Tsinghua University, China, 2000; Emeritus professor at Tama Art University, 2001; President of Hirano & Associates, Inc., 1961–1991; CEO of Hirano & Associates, Inc., 1991–2003; Kanazawa Art University, President, 2003–2007. Council member of Good Design Award (Ministry of Economy, Trade and Industry); Committee member of Industrial Structure Council (Ministry of Economy, Trade and Industry); Committee member of Japan Society of Sports Industry (Ministry of Economy, Trade and Industry); Committee member of Export Inspection and Design Promotion Council; Adviser of Toyama Design Association; Corporate adviser of Nippon Telegraph and Telephone Corporation.

Invited speakers

Hara Kenya
Graphic designer, Professor at Musashino Art University, Representative of the Nippon Design Center

Born in 1958. Kenya Hara produces unique design projects in multiple fields that show objects in everyday life from fresh perspectives. A board member of MUJI since 2001, he is in charge of creating the company's corporate vision and developing visual strategies for marketing communications and product packaging. He created the programs for the opening and closing ceremonies at the Nagano Winter Olympics and a poster for The 2005 World Exhibition, Aichi, Japan, using key motifs from Japanese traditional art. His product and packaging designs include work for major Japanese companies such as Ajinomoto General Foods, Japan Tobacco and others in the rice and sake industries. He has planned and implemented original art exhibitions, including "Macaroni for Architects", "RE DESIGN—Daily Products of the 21st Century", and "HAPTIC—Awakening the Senses", collaborating with a number of talented creators. The RE DESIGN show traveled to 7 cities around the world and was awarded the Grand Prize for both Industrial and Graphic Design at the 17th Biennial of Industrial Design, as well as the Mainichi Design Award in Japan. He recently published an award winning book, Designing Design (Iwanami Shoten), which enjoys wide readership.

Kawasaki Kazuo
Design Director, Doctor of Medical Science

Born 1949. Expertise in a wide range of disciplines, including traditional craft, optical glasses, computer hardware, robotics, atomic energy, artificial organs, advanced medicine, space exploration equipment, research & design in multi-dimensional space based on topology space theory, development of design by media integration method and medical science, and from design of artificial organs to devices utilizing new energy engines. Special interest in theory and practice of corporate design and design strategy. Former Chairman of Japan Good Design Award Review Committee, and invited member of many Japanese government advisory committees. Recipient of numerous design awards in Japan and overseas. His works are held in permanent collections of many major overseas museums including New York MOMA.

Commemorative speaker

Sen Soushu
Mushakoji-Senke Grand Tea Master

Born in 1945 in Kyoto. Received MA from Keio University. Became Futessai Soshu, 14th Generation Head Master of Mushakoji Senke Kankyuan (Tea School) in December 1988, carrying on the Mushakoji Senke tradition and family line. Has often visited universities in the United States and European countries and has performed Tea Ceremony as a government envoy in European countries and China since the mid-1980s. Invited by the Vatican in March 1994, he dedicated Tea to the Cardinals and was received in an honorary audience by Pope John Paul II, introducing the Japanese Way of Tea. Received the 15th Kyoto Prefectural Award for culture awareness in February 1997. Received an honorary doctorate from Otemae University in 2006.

International Design Session

Session 1

History, Tradition and Craft:
Rethinking Modernity and
Locality in Design

Yasuko Suga
Re-thinking museum display: Designing
'locality' at the Japanese American National
Museum, USA

Museums are not simply an object for design history, but the producer and the designer of history, as they have always been a place to represent systems and possibilities for interpreting and contextualising objects. Design matters in museums are not restricted to displaying objects, but they include organising the visitor's experience as well. In order to realise a good, satisfactory museum experience, both should go hand in hand. Especially, as post-modernity has changed the requirements to the museums, more general appeals are called for as well as use-friendly interfaces to the objects displayed. In such circumstances, how to design the 'interpretation' of material objects is significant. In dealing with material objects, it is not only art or design museums, nor social science-based museums with literally full of objects that offers materials. Museums based on human experiences are also rich resources for design history.

In the paper I shall discuss some issues of material culture in displays in one historical museum, the Japanese American National Museum in L.A., USA, founded in 1985. This museum displays a certain human experience and its major aim is to remember the history of Japanese-Americans and their culture and identity. Culture and Identity are, on the one hand, widely represented through material objects such as photographs, letters and people's belongings. On the other, they are represented by the designed discourses by the actual Japanese-American volunteers who are trained to guide the visitors effectively and tell their first-hand experiences. How can the academic approaches taken in design history be a means to uncover the system of representation in human experiences?

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Rosane Costa Badan

The indigenous cosmology of the Amazon and the Brazilian modern project: The relationship between intuitive thought and rational thought within contemporary design

This research belongs to the fields of anthropology and design, more specifically to the scope of the autochthonous material culture and the contemporary design. Nowadays, comparing the native and the foreigner is the best starting point to understand the globalized culture. According to the approach presented, the Brazilian region of Amazonia has the conditions to respond to the questions of globalisation also present within design. There is a physical and a cultural space which allows the confront between the tradition of the native's lifestyle and its relationship with the culture of the modern project. The fundamental hypothesis of this research suggests a relationship between the indigenous cosmology and the Brazilian contemporary design based in concepts of intuitive and experimental nature.

In essence, Brazil is a multi-ethnical and multiracial country, characterized by a particular cultural status: the anthropophagy. In the past, the concept of anthropophagy has been materialised in the artistic modern movement and seen as a poetic of assimilation and "digestion" of the European culture. As it has already happened with the arts, it is probable that this same cultural cannibalism is reinventing yet another image of Brazil in design. To develop their products, Brazilian designers incorporate at the same time a magical thought that derives from sensitive intuition and a rational thought that drifts away from the human spirit. The objective of this paper is to discuss the relationship between the native thought and the logical thought within the contemporary design. While the scientific knowledge demands an integral transparency to the reality, the new-primitive knowledge pretends that in this reality is incorporated a certain human density. In this sense, autochthonous cultures can contribute with the creation of a new modernity in a globalized world, a modernity that is hybrid, strategic and rich of irrational energy.

KEYWORDS
Cannibalism, contemporary design, Brazilian indigenous culture.

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Gerald Cipriani

The wrong form of emptiness in global design

What does it mean for the world to become global? This phenomenon obviously takes different shapes depending not only on what parts of the planet we are looking at it, but also on what historical backgrounds we are considering. To develop a sense of 'global being' is obviously not the same in today's East Asia, in postcolonial Africa, or in the postmodern West.

However, if the historicity of the sense of global being varies depending on the locality and time, there is no doubt that such a cultural phenomenon is universally characterised by a form of 'unavailability' exacerbated by a human invention in the name of technology. As German philosopher Martin Heidegger mentioned, technology gives us a false sense of nearness. It enables us to move faster, to access different worlds in no time, to be more productive, or to build more quickly. But this comes at a heavy price. We have less and less time and space to make ourselves available to other people, other worlds, and, as we are discovering with great concerns, to nature. To put it differently, we are less and less well disposed to 'empty' ourselves with care and consideration in the light of the place where we live, or the 'basho' to which we relate, as Japanese philosopher Nishida Kitarô would have it.

What shall be called 'global design' is a world where the wrong forms of 'emptiness' have developed, in other words where unethical nihility has spread at the cost of the localities where the human species lives, including the earth. This is what this paper will highlight with particular references to the built environment, while acknowledging at the same time the vital need for economic growth.

Gerald Cipriani Prof. Dr
Tama University
Japan

Juthamas Tangsantikul and Nigel Power
Cooking rice, re-discovering design

We explore the relationship between design and everyday life by considering stories about the electronic rice cooker. Since its invention in Japan in the 1950s, the electronic rice cooker has changed the way the majority of Thai people cook rice. With the arrival of the new generation of computerized rice cookers, the onward march of technology seems inexorable. Seen in this way, technological histories appear linear and unproblematic. However, seen from the perspective of everyday life a different set of questions, issues and problems arise. What do people really think about electronic rice cookers? What do they see when they look at their rice cookers or those of others'? What will become of the electronic rice cooker now that digital ones are available? What has happened to traditional methods and skills? All these lead us to a bigger question: what changes did the electronic rice cooker really bring to our lives?

Fifty-five Thais told us stories about their rice cookers; stories about love, loss, friendships, remembering and bereavement. Listened to carefully, their stories disclose meanings and voices about design and social practices that happen in everyday life but are rarely heard or attended to; voices and stories that may, otherwise, be lost forever.

The rice cooker is a mundane object, but precisely because of that, it might throw light upon the complex inter-relations between design and people in the ordinary everyday. The electronic rice cooker did not simply replace traditional methods and displace traditional artefacts; it became part of the fabric of our lives and wove itself into our personal narratives. For designers and design educators alike, is there a better point at which to consider how best to reset design?

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David Cabianca
The rhetorics of rejection: Why is modernity such a burden for graphic design?

Between 1859 and 1860, Charles Baudelaire penned "The Painter of Modern Life." His essay is an extended series of observations on the emergence of modernity in what was at the time contemporary society for Baudelaire. Nearly 150 years later, Baudelaire's focus on the baser aspects of modern society—prostitutes, fashion, carriages, cosmetics—is still a worthy measuring stick to evaluate the state of modernity in graphic design today. This essay will look at a number of "degenerate" and "delinquent" design practices—designers whose production is among the most original, if not provocative, design work being made today.

Modernity is often lamented for its degradation in quality, the loss of tradition, and its dehumanizing concern for the quality of life. But such a criticism assumes that tradition and the quality provided by locality are "fixed" and inviolate conditions. The critique of modernity as the root cause of the debasement and loss of quality in life should be reexamined towards and understanding that in fact, traditions are evolving and new qualities are emerging. Modernity provides each successive generation with the opportunity to see itself in its own practice: it acts as a mirror to the passing of history. Rather than interpret emergent forms as "radical" and a symptom of the debasement of contemporary society, we can look to modernity as an opportunity to appreciate how each successive generation chooses to interpret its own visual culture and the relative icons it chooses to incorporate and elevate as part of its visual vocabulary. Design practices as diverse as Elliott Earls, Vier5, Cornell Windlin, Michael Amzalag & Mathias Augustyniak of M/M Paris, Antoine and Michel and Lorraine Wild, provide us with extreme examples of individuals whose work erases the artificial barriers between classic and populist, learned and ignorant, professional and hack.

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Angela D. Norwood
Situating the role of design in Ladakh,
India through cognitive mapping

The Ladakh region of northwestern India has been open for tourism and trade only thirty years. The traditional ways of life are threatened as the new cash-based economy forces Ladakhis to become consumers. This shift in prevailing socio-economic structures is manifested within the region's forms of visual communication, nearly all of which are aimed at foreign tourists upon whom the local economy increasingly depends. As artifacts of visual communication continue to inundate the environment, one questions the cumulative effects they have on the local peoples' perception of the region and their place within it. This paper discusses cognitive maps sketched by local Ladakhis that reveal priorities in their personal relationships to the region.

It presents a content analysis of cognitive maps sketched by local Ladakhis that reveal priorities in their personal relationships to the region. Childlike drawings, distorted proportions and similarity of iconography representing landscape, agricultural systems and built structures are evidence of inexperience with abstract representation. However, that naiveté is juxtaposed with a sophisticated form of literacy for reading the landscape in photographs. This dichotomy excludes these people from interacting with abstract communicative forms – the basis of an international style of graphic communication – and leaves them susceptible to the effects of idealized photorealistic advertising imagery. In effort to avoid the influence of advertising, the study participants seemed to deny knowledge of all forms of graphic communication – and in so doing claimed, "Design is for the foreigners. We do not need design." It is an attitude that challenges this researcher to identify a role for design that benefits, not undermines the people of the region.

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Session 2

Nature, togetherness and
Sustainability: Theoretical and
Practical Perspective on Design

Sally Stewart

Establishing
a green practice:

Sustainability in architectural education

Abstract

Over the past ten years we have noted the embracing
of sustainability as a core precept in both the architec-
tural profession and in schools. Where before energy
issues, sustainable materials and development, the
energy cycle and lifetime cost of a building was seen
as specialist territory, these issues, and the knowl-
edge and practical skills needed to integrate them to
any design problem, are now embedded in all architec-
tural practices no matter how small, how remote. This
has been due to a whole series of factors - a growing
understanding of the impact of development on the
environment, UK and EU legislation, crisis in the con-
struction industries, and not least rooting the concept
of 'greenness' in the public's imagination.

   Thus students entering any design course are like-
ly to have encountered the concepts of energy con-
sciousness, sustainable resources and the global envi-
ronment particularly from primary school where much
project work and creative play will be involved in bring-
ing the subject to life and making it relevant to their
own circumstances.

   How then are these ideas becoming manifest in
the output of students? What are the possible vehicles
for fostering and demonstrating good practice in this
area? This paper examines the teaching of sustaina-
ble design within one school of architecture in the UK.
In examining the range of teaching practices in the
Mackintosh School of Architecture it explores the ex-
perience in recent years in realigning sustainability to
a core position within the syllabus, and asks how we
support and nurture sustainable design practice with-
in architectural education in the UK.

Introduction

In 2001 the opportunity arose to consider how best to articulate the technical requirements of our degree with the creative studio-led work which accounted for the greater part of the programme, and to do so in a way that provoked a stronger dialogue between studio and technical staff, and required students to demonstrate their understanding of 'environmental sciences' and structural design, not in the abstract but within their own design solutions. As the studio team we had overall responsibility to define and deliver a programme of studio projects to a cohort of architectural students at a key stage in their education - within their junior honours year and at the threshold of the first year of formal work experience. However we were aware the designing of these studio vehicles might benefit from a more effective consideration of the environmental drivers during their planning and subsequent execution. The process also provoked an examination of our own teaching practice to establish good practice and to discover the barriers students were encountering which hindered a more holistic view of the built form and environmental considerations. This paper describes how studio practice has since developed, set within the context of the ongoing debate on sustainability in architectural education in the UK.

II. The external context

Designing for the environment, being 'green', is taken as read in both student's work and in practice. What was until relatively recently seen as a specialist activity, has now entered the mainstream. The 'Environmental' agenda is now a constant presence within the media and a growing preoccupation in our daily lives. A growing awakening to the precarious environmental balance and fundamental and dramatic shifts in climatic conditions have lead to a demand for architecture that is responsive, responsible and beneficial. Changes in legislation and the general drive to make our buildings more energy efficient, mean that good design in the studio – whether in a practice or in a school of architecture – now has to embrace sustainable principles and practice. Indeed the ARB (Architects Registration Board - the body responsible for prescribing the qualifications and practical training experience required for entry to the UK Register of Architects) has embedded throughout its criteria describing the key thresholds of experience and knowledge needed by students of architecture, the notions of "humans well-being, the welfare of future generations, consideration of a sustainable environment", (ARB 2002: 5) 1.

The Royal Institute of British Architects further amplifies this in its publication 'Tomorrow's Architect', which sets the scene for any student of architecture in the UK and defines not only the levels of expertise and knowledge required to join the profession, but describes the ethos underpinning prevailing attitudes and accepted thinking. "The architect needs to understand the processes of the construction of buildings. The knowledge required is extensive, ranging from the nature and properties of the available materials and established construction techniques to the possibilities raised by new technologies. This knowledge may be gained in a number of ways.... But it must be demonstrated in design project work", (RIBA 2003: 23) 2.

Key to this is the stipulation that students are able to apply their knowledge, to put it into practice strategies, theories and principles during their academic training, in order to appreciate the complex nature of practice itself. In many respects this was nothing new, but merely a restating of a position which been held widely for the past decade. What was new was directness of the statement and the expectations that it held for those studying and teaching today.

Within this context the profession read simultaneously in 'Building Design' magazine of the findings of a report prepared for the government funded Centre for Education in the Built Environment. The article stated, "Architecture schools are failing to teach the importance of sustainability in building design, according to new survey of the UK's 36 architecture schools." The report finds that sustainability is rarely considered in the design curriculum and, when it is the subject is treated as a one-off project or tagged on to an existing brief. Also a majority of schools have 'only one or two lone individuals' who teach students to use sustainable design features such as energy efficiency and materials that cause minimum harm to the environment. It also criticizes the validation bodies for architecture qualifications, the RIBA and ARB, saying that the validation criteria should be rewritten to encourage schools to put sustainability in the mainstream of architectural learning. An RIBA spokesman said "these comments are a shock to us. The RIBA introduced sustainability into the core curriculum of RIBA recognized courses three years ago", (Building Design 2003:7) 3. The only schools the report commended for their approach to sustainability are Cardiff, the Mackintosh in Glasgow, Oxford Brookes, Portsmouth, Sheffield and Westminster (CEBE 2003) 4.

Of the schools mentioned one consistent factor was a strong studio culture, along with a sizable number of staff interested or research active in the field. The lack of representation of engineering-based courses and those located within departments of the built environment was notable. The report used a series of methodologies including formal studies, discussion groups and events to quantify and describe the range of sustainable teaching going on within the educational community. It also goes some way to describe the circumstances that foster a sustainable architectural education.

'Teaching sustainable design demands that we think outside the architectural 'box'. Sustainable design is an interdisciplinary activity that demands a systematic approach to the design process. This approach recognizes that a building is a time-bound process where space is created through materiality, rather than a timeless artifact where materiality encloses space as a product. What happens when the making of space is dictated by the material resources? Ecological design demands that we engage with materiality as a living, evolving entity.', (CEBE 2003: 19) 5.

III. Practice at the mac

Teaching architecture at the Mackintosh School remains in many ways a 'traditional' studio-based system, the studio being the focus of and location for the majority of a student's education. Over the past two decades there has been a gradual shift to integrate wherever possible elements of theory courses delivered as allied subjects into studio projects, with a view to making more explicit the connections between these subjects and the studio design process.

One area where this has been adopted across undergraduate teaching is in Architectural Technology, where elements of the lecture-based course are embedded and tested through a studio-based output. Often this is achieved through both studio and subject specialist staff being sharing the delivery of lecture courses, and in parallel specialist staff having input into the shaping of studio projects. Cited as one of two case studies by CEBE " The school addresses all aspects of sustainability including social, economic and environmental issues through lectures and studio work. Sustainability is not the central concern of the school but is seen as an essential aspect of architectural design, which should influence all students' thinking without overriding other aspects of technology and design. The strategy for teaching sustainability is twofold and includes integrating sustainable issues in the studio briefs and closely linking lectures on sustainable design to the studio work so information gained in lectures is applied to studio projects", (2003:25) 6.

Within certain years, students are tested in their knowledge and their ability to apply this in a studio setting and to a significant level of detail. This is the case in the third year of studies where embedded within the two major studio projects are technical studies each of which demands certain conditions, one environmental and tectonic, the other structural.

IV. Evolving third year practice

Wishing to build on the existing practice in the third year, the main opportunity to explore a student's ability to provide a sustainable solution to a brief was also the vehicle to explain a coherent environmental strategy. With an interest in devising projects that had quantifiable and testing environmental conditions the studio and architectural science team looked for scenarios where a close narrative thread linked the brief with a sustainable approach. This came from a conviction born of experience that, where particular environmental conditions were merely overlaid, a clear understanding of the holistic benefits a sustainable approach can make are often lost or at least underappreciated. Having initially settled on the generic type of a sophisticated shed – a medium sized building of moderate complexity but one with a responsive envelope that demands a keen understanding of the use of materials. The shed or factory has a further key factor that lends itself to a sustainable solution, that of an efficient and effective use of a limited budget.

"Factories demand a fundamental and unique approach to design. It's obvious that they have to be cheap: this requires a knowledge of materials and construction techniques. But they also depend on the manipulation of infrastructure, the capability for change, the understanding of different scales and an almost ritualised regulation of the interplay between people, goods, waste and information. In short, factories are the closest phenomena to urban life to be packed into a single

Running in parallel with these aspirational conditions ran a set of environmental imperatives. The building should be passively heated, cooled, ventilated and responsive to the seasonal changes and the workforce. Teamed with the hygiene issues this required an early grasp of certain strategies which harnessed the use of materials, siting and built form.

CEBE echoed it thus "All materiality begins in a specific place. This forces an act of 'creative realism' upon the designer who must solve the problem through the resolution of the conditions that are always specific. Even a generic solution must find its 'place' through a contextual understanding of the naturals forces arising in a specific site", (2003) 7.

V. Developing appropriate studio vehicles

Developing suitable studio programmes from the basic starting point has involved some lateral thinking. It has also required us to mute certain elements of the design mix, namely the complexity of context so students can concentrate on the dynamic between programme and technology.

An early project, a Cheese Factory, was set within the context of an existing auction market site, becoming both a production space and a sales outlet. Although modest in size its aim was to raise the profile of the product it produced as it presented faces to both town and public. Through its form and use of materials, the building aimed to demonstrate an understand-

ing of low impact, energy efficiency, as well as providing an effective and responsive place to work in. Set in the social context of a series of well-documented food scares, the project required that students examine the arguments and circumstances in which our food is produced. The building offered an opportunity for the interplay between the senses and the rational mind, a sound business decision as well as a manifesto of their belief in a sustainable future.

The Orchid house offered a different set of challenges and conditions to be met in a building of similar size and scale. While hygiene no longer was an issue, the building requires an understanding of ambient light versus sunshine, maximising day length in a northern climate and the ability to harness the sun's potential as a heat source in the winter while guarding against overheating in the summer. An understanding of the needs of a specific collection of orchids defined and focused the argument on biodiversity, as well as highlighting the variable and potentially contradictory needs of differing species.

More recently, with a growing understanding of the key constituent parts that make for an interesting and challenging brief, and of the most effective combination of studio and technical staff input, we have developed a series of more complex building types. In these the aim is not to increase the complexity of the planning or functionality of the building but rather to offer a more loaded environmental context. In some ways this move away from the shed has meant that the buildings required are more one offs rather than easily recognised generic building types. However it has allowed us to explore a more diverse range of situations, and perhaps more importantly required the student to interrogate more thoroughly.

In The Kelvin Archive, a home was proposed for a collection of rare books and manuscripts of the key Glaswegian academic, providing evidence of the emergence of modern science in the 19thC. Embedded within the subject matter was the transition of scientific activity from a philosophical activity to the experimental, empiric science we recognise today. Students were encouraged to demonstrate an understanding of the required environmental conditions while exploring the haptic experience of the building, essentially a synthesis of scientific rationale and building poetics. The paradox of the contradictory environmental conditions required for conservation and research were also considerations.

In 2006 a Reptile House, a geographically displaced environment dedicated to animal required a setting for conservation through observational and breeding programmes. Classified as ectothermic (cold-bloodied), reptiles do not generate enough heat to maintain a constant body temperature, necessitating behaviour

which exploits environmental conditions for survival. Hence the building must mediate between two different climates, the equatorial rainforest habitat and Glasgow. The principal Vivarium, a 18m high equatorial habitat threw up the twin challenges of high performance envelope with the scale of space. The project also opened up much broader attitudes towards the environment and climate change, providing a critical context for the work.

Our current project has required students to design a Wreck Conservation facility in a small fishing town on the east coast of Scotland. Environmentally the main conservation hall must be able to maintain a stable temperature throughout the year whilst resisting a fluctuating level of humidity associated with the cleaning and conservation of historic boat wrecks. The project has an added impact on its location in adding to local industry and looking to sustain the viability of a small community facing up to a shrinking fishing industry.

As well as finding ways for studio projects to tie into lecture courses and bring their information to life, we have also considered how we can adapt our studio teaching to support these projects. As key elements within each project, design in detail tutorials are held involving small groups of student discussing their design proposals with a member of the studio team and another from the architectural technology team. This allows us to give clearer, more focused advice, where any contradictions can be ironed out immediately with a variety of differing strategies examined. Over the past five years this has led to an increased confidence within the studio staff to discuss sustainable approaches where before this may have been viewed as specialist territory. It has also led to areas of this knowledge then feeding into their architectural practice beyond the teaching studio.

VI. Beyond the studio: Conclusions

Our aim has been to engender a sense of the holistic nature of a sustainable practice within students, particularly before they enter professional practice for the first time. We hope that this leads to a confidence and curiosity within them, and the ability to question the design and construction norms they encounter and think creatively irrespective of the context they are operating in.

What deters them from pursuing this approach with conviction? At the Mac "The biggest barrier mentioned to increasing the integration of sustainability in the students' work is the lack of inspirational architecture that is sustainable and more importantly the lack of polemic critique and emphasis on the sustainable aspects of inspirational architecture in the architectural press, including constructional detail", (CEBE 2003: 25) 8.

Reflecting on this area of teaching we are also conscious that we need to shift our terminology if not our emphasis on to climate change rather than sustainability alone. We also need to consider the reuse of existing buildings rather than looking at new build alone, particularly when considering that a considerable percentage of work in practice relates to this type of work. Finally we also need to consider projects that students can "reflect on their own lifestyles, transport used and the impact on the environment" (Oxford Brookes 2008) 9. This opens up other potential project types including housing, communal living spaces etc.

Through discussion with our student body, over the next year we aim to gain insights from the experience of students currently in practice as to how they far they were able to apply their knowledge, to further develop the teaching strategy throughout the Mackintosh School, particularly in to Graduate Studies and so embed it across the five years of formal architectural education.

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References

ARB 2002. Prescription of Qualifications: ARB Criteria. London: Architects Registration Board

'Schools "weak on sustainable design". 2003, Building Design, issue 1581, May 2003

CEBE 2003. Report of the Sustainability Special Interest Group (Architectural Education)

Melvin J, 1999. Architect's Journal no.5 Vol.210, 29(Jul). London

RIBA 2003. Tomorrow's Architects: RIBA Outline Syllabus for the Validation of Courses,

Programmes and Examinations in Architecture. RIBA publishing: London

Scottish Executive 2001. A Policy for Architecture in Scotland. http/www.scotland.gov.uk/publications/2001/10/10129/File-l last accessed 22/02/08

Sassi, P. 2005. Strategies for sustainable architecture. Routledge: London

Oxford Brookes University, January 2008. Brief summary and Outcomes, Designs on the Planet; Studio culture and the challenge of Climate Change One day conference,

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Biodesign and human body: a new approach in wearable devices

Abstract

The research objective is to identify the role of design in the wearable devices. This kind of project need an interdisciplinary approach typical of Biodesign discipline, a nucleus of competencies in the areas of design, ergonomics, medicine and engineering.

The choice of this research subject was born by the necessity to understand if design is able to filling the gap in wearable system project, caused by the absence of an user-oriented approach. The research is divided into two parts. The first wants to develop tools able to give the designer instruments to define requirements, performances and project solutions, but especially the chance to address himself in a proposal way to the sector of bio-devices. The second part is developed with the methodology defined by Fryling "through (o by)", an approach done throughout the projects and lead by the experience. Two case history are used to carry out such approach. The first, "Bio-Life", is a concept of wearable sensor designed to be embedded in Bio-Suit System, a space suit concept developed by Prof. D. Newman (Massachusetts Institute of Technology) in collaboration with the nasa. The proposal is based on lines of non extension concept, an approach made by Iberall [1]. The second is a wearable device, with a system of biosensors, for physiological monitoring and training in high performance sport developed by Prof. B. Celler at the University of the New South Wales. Both this project are based on wearability. [2] This research methods is not connected to the specialization of the discipline, but to the solution of the problem in accordance with Russian scientist Vernadsky.

Introduction

The paper gives the research results developed in co-operation with different Faculties from Italy, Australia and USA. The main research objective is to identify the role of industrial design in the wearable system applications.

Nowadays there is a great inclination to modify well-being concept and health care by changing the technology in "wearable". Thanks to the rapid-changing of technology the market offers smart phones, Pc held in the hand, wearable calculators etc..

The expression "wearable device" refers to electrical or mechanical systems which are worn on the human body by means of incorporation into items of clothing, or as an additional apparatus which is fixed by straps or harnesses. Such devices can perform functions such as sensing, communications, navigation, decision making or actuation. A particularly recent class of wearable devices consists of devices which are designed to perform specialist sensory perception of the surrounding environment so as produce augmented reality.

In a wide range, a wearable system is a device with a very simple structure thanks to which it's possible to wear a technological apparatus with common clothes. This kind of device is made up of "wearable" sensors.

In the study of wearable device, the designer has to carry out a research to create an adequate core set of skill and know how in order to manage complex and multidisciplinary issues of these systems.
In this case is needed an interdisciplinary approach to project activity based on a nucleus of multidisciplinary competencies in the specific areas of industrial design, ergonomics, medicine and engineering.

In the meaning of wearable there is the core of Biodesign, a new discipline where the concepts of interdisciplinary approach and close cooperation between design and medical-biological sciences are an integral part of its very definition.

This interdisciplinary approach has a common interest for the human being and human body. In particular for wearable devices the human body get the strong and starting point of research, so is necessary to consider and estimate his physical and psychical abilities, his limits and necessities.

The development of the wearable device design needs to accomplish the requirements of comfort and adaptableness connected to the anatomy of human body.

These aspects require a study about the ergonomics and "*wear*" "*ability*".

"Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance". [3]

Therefore, the study of the anthropometric measures of the human body and of the equilibriums between the various zones of the body, becomes essential.

The other topic to develop this research is "wearability" that literally means ability to wear and concern the physical shape of wearables and their active relationship with the human form.

The hypothesis for the development of this research activity is the creation of tools and guidelines transferable, repeatable and usable for the design of wearable devices.

The objective

The objective is to provide a guide containing methodology and instrument in order to give a plus value to device studied and developed just by professionals linked to medicine or engineering.

The choice of this research topic, was caused by the following preliminary considerations:
- necessity of a project resolution that includes a lot of the design problems for wearable systems as comfort, mobility, unobtrusive placement;
- willing to insert biodesign as a distinctive element of the recent debate in the advanced technology sector;
- necessity to transform the pragmatic knowledge. It was acquired by the development of research projects conducted in collaboration with a multidisciplinary team at the Man-Vehicle Laboratory (MVL) – Massachusetts Institute of Technology MIT, and Biomedical Systems Laboratory – University of New South Wales UNSW.

The choice of this research theme has been suggested by the necessity to understand if design is able to take part in filling the gap in wearable system project, caused by the absence of user-oriented approach. The target is to direct the project action towards the resolution of wearability problems, introducing methods of analysis and ideas production.

Besides the aim is to strengthen the role of industrial design, because, in spite of the large number of project evidences, the consideration of industrial design about such research area was absent.

Until now, this products have been studied considering:

- Accuracy of sensors
- Electrochemical and chemical properties of the sensors connected to the human body
- Efficacy of circuit system

This aspects don't consider psycho-physical well-being, but only the engineering ones.

For wearables is necessary to consider:
- comfort
- adaptableness to different body size.
- study of non-obtrusive shapes

The role of a biodesigner in the design of wearable devices is to better understand:
- the right relation between the wearables and the human body
- the optimal conditions to let the sensors work well and stay stable
- the changing of material shape in relation with skin and muscles where localize and define the zones where put flexible form without interfering with fluid human movement

The methodology is developed in different phases.

The first phase is planned to study:
- Wearable device market
- Different typology of sensors
- Existing technology
- Body zones where to put sensors
- Anatomy of human body

The second phase of applied research through test in laboratory, has the objective to:
- Know electrochemical and chemical properties of the sensors connected to the human body
- Identify parameters to measure wearability.

This research is developed with the methodology defined by C. Fryling "through (o by)". This methodology is a research approach done throughout the projects and lead by the experience. Two case history are used to carry out such approach.

Case history

The research addressed to develop a guidelines for design of wearable devices was supported by two project experience:
- Bio-life developed at MIT in Boston
- Wearable device for high performance sport developed at UNSW in Sydney

The first research, called Bio-Life, is a concept project of wearable sensor platform for future exploration in space that gathers various physiological parameters, and other biomedical signals. This system is designed to
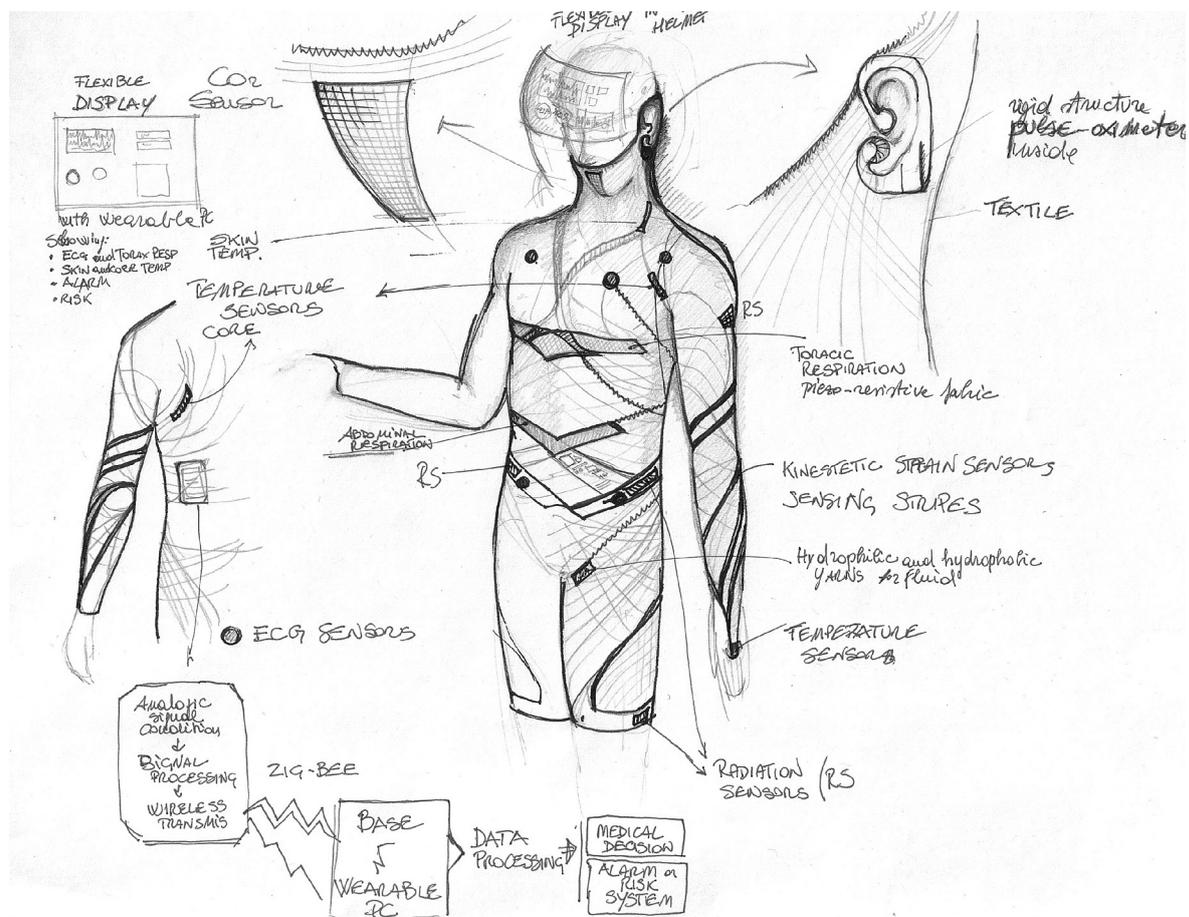
Figure 1. Concept of the wearable systems

be embedded in Bio-Suit System, an innovative space mcp-suit (Mechanical Counter Pressure suit) concept developed by Prof. Dava Newman from Man-Vehicle Laboratory (mvl) at the mit in collaboration with the nasa Institute for Advanced Concepts (niac).

The Bio-Life system incorporates a network of wearable sensors that acquire physiological data in continuously real time. The astronaut can view physiological parameters and warning in a 3d picture shown in a wearable display, sensors readings as also be shown in this display.

The wearable devices inside of Bio-Suit will be able to collect and store physiological information such as astronaut kinetic data, heart rate, heat flow, skin temperature, ambient temperature and galvanic skin response (gsr). [**FIG. 1**]

This wearable bio-instrumentation has three goals: be a comfortable and reliable astronaut health monitoring system, measure multi-parameter data, improve crew safety.

The idea is to design the bioinstrumentation using wearable sensor technology. The proposal is based on the use of lines of non extension theory in order to

provide wear-ability. This concept is a study made by Iberall [**1**] in order to ensure thickness and constant pressure of astronaut suit.

The second is a wearable device for physiological monitoring and training in high performance sport developed at the Biomedical Systems Laboratory (bsl) of the School of Electrical Engineering and Telecommunications of the University of the New South Wales, coordinated by Professor Branko Celler.

The device is a real-time information system using a wireless transmission and biosensors, imbedded in the clothing and attached to the body, able to monitor: ecg, Heart rate, Step rate, Energy consumption, Respiration, Body temperature. [**FIG. 2**]

The monitoring system for measuring of signals is made up of: silver chloride electrodes for skin bioimpedance used for both ecg signal and respiration frequency, electrodes to inject a high frequency current and to capture the voltage variation caused by thoracic impedance change, a triaxial accelerometer for the step rate and a thermistor for body temperature.

The wearable device is also able to communicate via wireless to a host computer and can set the exer-

1. Silver chloride electrodes
2. Electrodes to inject a high frequency
3. Triaxial accelerometer
4. Thermistor for body temperature
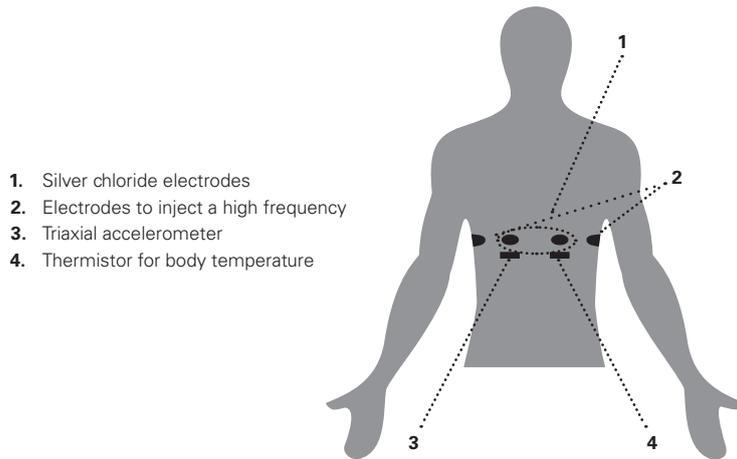
Figure 2. Scheme of device

Figure 3 – 4. Concept of device

cising rate via an auditory signal. The device will be able to implement a number of monitoring and control strategies to maximise sport performance and training. [**FIG. 3 – 4**]

Both this project have some problems in common to face, so that understand in detail the electrochemical properties of the sensors connected to the human body and to design a plataform that is safe, reliable and able to perform well even under the most adverse conditions such as microgravity in the first case and strenuous exercise in the second one. Another challenge was to design a device, easily adaptable to the different body sizes, unobtrusive, aesthetically pleasant and comfortable to wear.

Methodology for wearable devices

All the kinds of design is around the man, his physical and psychical abilities, his limits and necessities, and the type of activity he has to face. Every time, the user is the starting point of a project. In these two projects much more than in all design processes these aspects get necessary and fundamental.

The study of the anthropometric measures of the human body and of the equilibriums between the various zones of the body, becomes essential.

The target is to define the interaction between the human body and the wearable object, by trying to figure out a flexible shape without interfering with human motion.

The Institute for Complex Engineered Systems (ices) developed a study about this topic, "Design for Wearability", by outlining a design guidelines for wearable products.

In brief *wear- ability* is the physical shape of wearables and their active relationship with the human form. Besides dynamic wearability extends that definition to include the human body in motion.

The wearability parameters used in these project, are based on those developed by the ices (Institute of complex engineered system. [**2**]

The parameters set for the wearable device was:
- Attachment : the way the different forms are fixed to the body
- Size: cross section variation of human body
- Human movement: the way the form of body changes whit simple motion
- Unobtrusivity: body areas less obtrusive for wearable products
- Body motion: body areas with low movement/flexibility

Among these a lot of importance has body motion. Human skin is stretched during body motion. Iberall undertook a study about body motion and found out there are virtually no stretch along certain lines, here called "lines of non-extension". Mapping the lines of non extension it's possible to find body region to put the wearable objects whit minimal constraint for mobility.

Wearables include different factors of wear-ability do in order to better understand them and design a comfortable device the research involved a test on a mock-up.

In the development of wearable device for high performance sport thirty people were asked to wear mock-up during running thinking about the factors set for comfort dimension.

Statements representing the comfort dimension were:
- Attachment: perception of device on the body
- Harm: the level the device hurt the skin
- Movement: perception of device moving around the chest
- Respiration affection
- Skin sweating

Unobtrusivity
The general areas has been found to be the most unobtrusive for wearable objects are:

1. collar area
2. rear of the upper arm
3. forearm
4. rear side, and front ribcage
5. waist and hips
6. thigh
7. shin
8. top of the foot
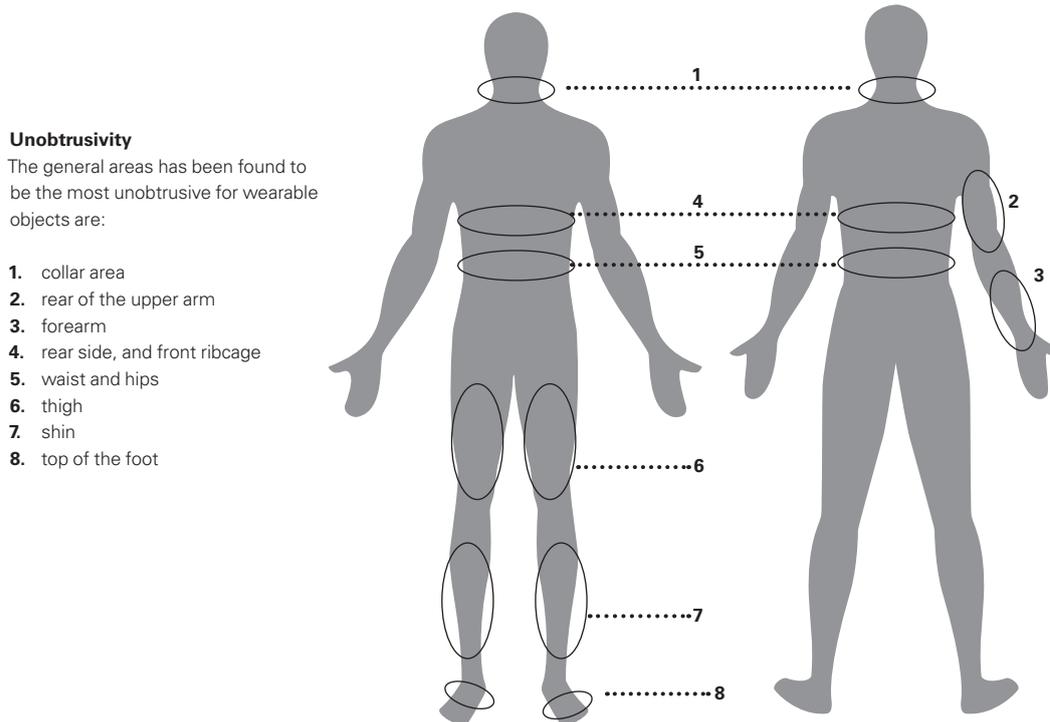
Figure 5. Realaboration of unobtrusivity areas found by ICES [**2**]

The results of the test were used in addiction with the parameters of ICES and line of non-extension, for the design of wearable device.

The shape of device was born by overlapping the unobtrusive areas (those with relatively the same size across body and larger in surface areas) and the line of non-extension, considering the requirements and the needs of users. [**FIG. 5**]

Conclusion

This research wants to show the importance of designer cooperation in wearable systems study and in their innovative applications.

This kind of devices have two classes of requirements, engineering and user-oriented one, both have the same importance. These aspects have to be considered complementary.

Designer can fill up the evident gap existing in the wearable devices, explored until now just considering the engineering qualifications.

Designer can make easier the cooperation amongst experts, co-ordinating design process among several research fields and skills.

This instruments developed by this kind of research could give the designer not only the usable instruments to analyse, evaluate and define requirements, performances and project solutions most suitable for the resolution of the single system, but also

the chance to address himself in a conscious and proposal way to the sector of bio-devices.

The studies on wearability can ensure:
• a friendly interface, flexibility
• a high degree of freedom and ability for the user to perform his/her normal activities
• easy donning process and easy electrode

At the moment the Biodesign researches in wearability is trying to find, from empirical test made for the two case history, a method to find the best wearable body areas through the optoelectronic vision.

The biodesign research wants to address some scientific problems including both engineering and use-roriented challenges:
• the choice of sensor technologies which can be used in conjunction with humans
• the minimisation of the effect of human shape changes and/or motion on device function
• the minimisation of the effect of the wearable device on human posture or motion
• the minimisation of the effect if the wearable device on human biological function.

It is clear the interest, express in the first part of the research, in the defining of research methods not connected to the specialization of the discipline, but to the solution of the problem in accordance with Vernadsky.

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References

1 Arthur S. Iberall: *The Story of Achieving Mobility in a Pressurized Space Space Suit*, 2003; Reprinted from: National Bureau of Standards, Report 6.2/3508, Bureau of Aeronautics, Department of the Navy, April 1951. WADC Technical Report 58–236, ASTIA Document No. AD 303813. Wright Air Development Center, Wright-Patterson AFB, Ohio, June 1958. Declassified January 2003 Journal of Basic Engineering, June, 1970, 251–264

2 Gemperle F., Kasabach C., Stivoric J., Bauer M., Martin R., *Design for Wearability*, Proceedings of the 2nd IEEE International Symposium on Wearable Computers, 1998.

3 http://www.iea.cc/ergonomics/

4 Marita Canina, Dava J. Newman, Guillermo L. Trotti, *Preliminary considerations for wearable sensors for astronauts in exploration scenarios*, Wearable Body Sensor Networks and E-Textile Solutions for MHealth, 3rd IEEE-EMBS International Summer School and Symposium on Medical Devices and Biosensors (ISSS-MDBS 2006), Massachusetts Institute of Technology, Cambridge, Boston, MA, USA, 4–-6 September, 2006

5 Jordan P., *Human factors in products design*, Taylor & Francis, (1999).

6 M. Canina, F. Vicentini, *Biodesign. Il corpo come luogo di progetto,* Aracne Ed., 2005.

7 Anceschi Giovanni, *Il progetto delle interface oggetti colloquiali e protesi virtuali,* Domus Accademy Edizioni, Milano 1993, pag. 19.

8 Jordan P., Weerdmester T., Mcclelland, (2000), *Usability evaluation in industry*, Taylor&Francis, Londra.

9 Lim Youn-kyung, Sato Keiichi, (2003), *Encoding Scenarios with Design Information Framework for the Generation of Multiple Aspect Models for System Implementation*, Proceedings of the 7th World Multiconferences on Systemics, Cybernetics, and Informatics, Orlando, FL.

10 Minnen D., Starner T., Ward J.A., Lukowicz P., Troester G., (2005), *Recognizing and Discovering Human Actions from On-Body Sensor Data* Proceedings of ICME.

11 Randell C., Muller H., *Context Awareness By Analysing Accelerometer Data*, Un. of Bristol, (2000).

12 Van Laerhoven Kristof, Kofi A. Aidoo Steven Lowette, (2001), *Real-time Analysis of Data from Many Sensors with Neural Networks,* IEEE press, Brussels*, Belgium*.

13 Bachmann, R., Duman, I., Usta, U. Y., McGhee, R. B., Yun, X. P., Zyda, M. J., (1999) *Orientation Tracking for Humans and Robots Using Inertial Sensors*, International Symposium on Computational Intelligence in Robotics & Automation (CIRA99).

14 Gardner Julian W., Varadan Vijay K., Awadelkarim Osama O., Microsensors, MEMS and Smart Devices, John Wiley & Sons, (2001), 1st edition.

15 Farrigdon J., Moore A.J., Tilbury N., Church J., Biemond P.D., (1999) *Wearable Sensor Badge And Sensor Jacket For Context Awareness*, IEEE Proceedings of 3rd Symposium of Wearable Computers.

16 Friedman Ken, (2000 May), *Design research in a knowl-*

edge economy: context, content and continuity, in Pizzocaro, Silvia; Arruda, Amilton; De Moraes Dijon (a cura di), Design plus Research, Proceedings of the Politecnico of Milan conference, 18/20 The PhD programme in Industrial Design, Politecnico di Milano, Milano, 2000.

17 Gallegher A., Matsuoka Y., Ang W., *An efficient Real-Time Human Posture tracking Algorithm using low-cost Inertial and Magnetic sensors*, Proceedings of 2004 IEEE/RSJ Int. Conf. on Intelligent Robots and Systems 2004.

18 Locher I., Kirstein T., Tröster G, *Routing Methods Adapted to e-Textiles*, Proc. 37th International Symposium on Microelectronics, IMAPS, 2004.

19 C. Mattmann, T. Kirstein, and G. Tröster, "A Method to Measure Elongations of Clothing," presented at 1st International Scientific Conference Ambience 05, Tampere, Finland, 2005.

20 C. Otto, A. Milenkovic, C. Sanders, and E. Jovanov, "System Architecture of a Wireless Body Area Sensor Network for Ubiquitous Health Monitoring," *Journal of Mobile Multimedia,*vol. 1, 2006, pp. 307–326.

21 J Locher I., Junker H., Kirstein T., Tröster G., *Wireless, Low-Cost Interface for Body Area Networks*, Proc. 8th IEEE International Symposium on Wearable Computers, 2004 p. 170–171.

22 R. Paradiso R., (2003), "Wearable Heath Care System", ITAB 2003, Proc. of 4th International IEEE EMBS Special Topic Conference on Information Technology Applications in Biomedicine, Birminghan, UK, April 24–26, 2003.

23 Wearable computing Lab di ETH Zurigo, http://www.wearable.ethz.ch/mac000.0.html

24 J. Berzowska, Electronic Textiles: *Wearable Computers, Reactive Fashion, and Soft Computation,* Textile, Volume 3, Issue 1, 2005, pp. 2–19

25 Jessica Charleston*, Wearables as "relationship tools",* Sprimger- Verlag London Limited 2007

26 C. Kasabach B.A, C. Pacione B.A, J. Stirovich B.A, A. Teller, D. Andre, *Why The Upper Arm? Contributing to the Design of an Accurate and Comfortable,Wearable Body Monitor,* Copyright © 2002 BodyMedia Inc. Carnegie Mellon University. http://www.wearablegroup.org/.

POSTER Joy Boutrup

Educational aspects of sustainable design in textiles and fashion

Designskolen Kolding has taught sustainable design to textile and fashion students for over 10 years and has gained some experience concerning the method, level and angle of information in this field.

The textile and fashion industries are some of the largest and most resource consuming industries; Textile production is global and most textiles have been transported over long distances before reaching the end consumer. The production is connected to several other industries such as the chemical industry, agriculture and machinery production. Certain knowledge of these connections and reciprocal influences are required in order to make sustainable design in either textiles or fashion. Fortunately sustainability is one of the driving forces behind new developments in textile technology, especially in the western industries, where water for example is expensive and cleaning of water is requested by laws and also is financially remunerating.

During the first years of teaching sustainable design we started out presenting all the negative results of the production of textiles, such as the pollution due to the growing of fibers, synthesizing dyes, fibers and finishing. The result was that the students were stunned thinking that this global industry was beyond their scope and influence.

Since then we have focused on the central role which the designer plays in the choice of materials,

Sustainable design, 3rd semester 2007, was aimed at a renewal of hospital interior design and working apparel for different groups. Studies were made of working conditions and function. Here studies of functional demands.
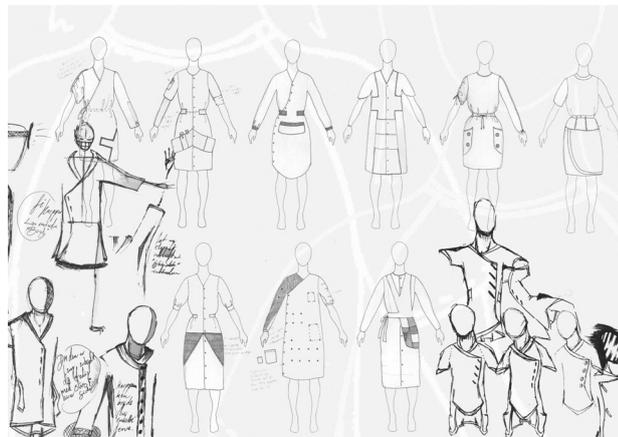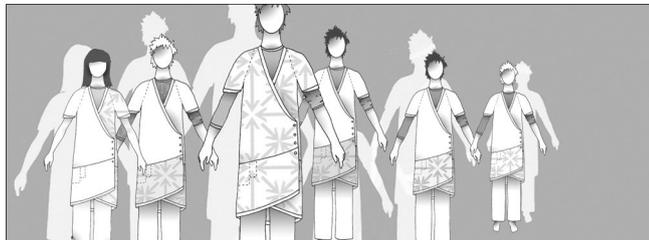
Design sketches and different solutions

colors, in setting the trend and in the response to con- sumer needs and demands. By showing a space in which to act and have an influence the creativity and fantasy were activated. The presentation of new, bet- ter, more environmentally friendly methods and ma- terials already in use or under development also con- tributes to the creativity and rethinking of products. It is also during the course pointed out that design- ers have an ethical responsibility when designing for mass consumption.

The students work together for approximately 3 weeks, mostly in groups of 3 or 4 persons each group including both textile and fashion students. The choice of design field is left entirely the choice of each group. It is however pointed out that a product which nobody wants to buy can not be sustainable. Any production however ecological consumes resources which will be wasted if the product is taken directly from production to disposal. The end consumer, cultural aspects, price etc. has to be taken into account as well as the func- tionality of the product and the fulfilling of consumer needs or demands.

During the course the students are asked to devel- op and compare several solution models for the object they are designing.

The comparison has to be done in tables giving rel- ative notes for specific properties of the models. The choice of properties is left mostly to estimation of the students but should include cradle to grave properties, functionality and how well it hits the target consumer. The tables are then used as a basis for further decisions. This holistic way of working seems to give life to the creativity and also to prevent a loss of perspective in the overwhelming mass of information and problems.

The aim of the course is to create a consciousness of the environmental aspects in all students in order to make it a natural part of the design process. The main message is that good design is sustainable and that the sustainability is not necessarily visible in the end product. The design should be so attractive that the consumer will prefer this product even without know- ing about its sustainability.

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Interior renewal in hospital rooms
Ideas for individual screenings reducing noise and light and creating a private space around the bed. Material chosen to be antiseptic and light diffusing
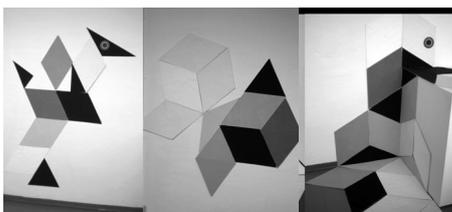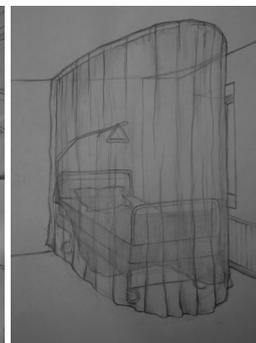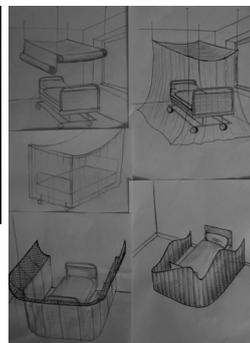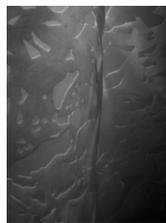
Childrens playcorner in the hospital
Modular padded, light plates atachable to floor and wall in the corner creating different patterns. Adornable with 3-D play elements. Sustainable materials, antiseptic and easily cleanable
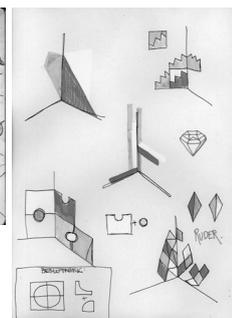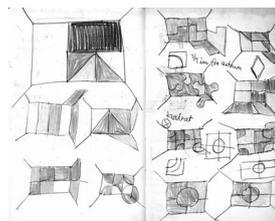
Minna Uotila

The clean and luxurious as objects of design and consumption

1. Introduction

The purpose of the article is to examine the relationship between two phenomena - *cleanliness* and *luxury*. While we would typically distinguish the two, many interesting parallels can be found between them. According to Reinmoeller [**15**], luxury is a complex phenomenon in which numerous factors and processes are in a transactional relation with each other. Luxury can be linked to new experiences and new types of products that are based on the sharing of tacit knowledge among small communities [**15**]. In recent years, the luxury markets have been moving from old luxury paradigms to what is termed "the new luxury" [**4**]; they are confronting an evolutionary change from luxury to luxuries [**2**]. Where at one time the glamour and stunning features of luxury were the basic impetus for purchasing luxury items, today it is intangible properties and goods such as silence, well-being, togetherness and peace and quiet that are often considered worth buying and owning.

C*leanliness* is also a salient issue if we regard it in light of sustainability and ethical consumption. The clean tech revolution is not on its way; it is already here [**13**]. Yet, "clean" does not mean the same thing to all of us; there exist personal, social and cultural difference in our threshold of tolerance in matters of cleanliness [**5**]. My thesis in this paper is that "cleansing conscious" [**17**] and "design conscious" [**20**] are somehow related to each other.

I will explore the phenomena of cleanliness and luxury in terms of the Popperian world-view, [**14**] a framework that has proven fruitful in earlier studies of luxury [**18**, **19**, **20**]. In his theory of three worlds, Popper distinguishes natural objects as part of world 1, subjective awareness as an aspect of world 2, and cultural products, events and social institutions as manifestations of world 3 [**14**]. Crucial to Popper's theory

are what he terms the *emergent* features of organisms. On this basis, cleanliness and luxury could be seen as products -- objects of world 1; designers' or consumers' experiences of the phenomena -- objects of world 2; and the culturally constructed understandings of the phenomena -- objects of world 3.

2. Research context and method

The present study draws on three research projects: *Future Design and Discipline,* funded by the Academy of Finland and completed 2005; *Emergence of Luxury* (grant no. 205608), completed at 2007; and the on-going project *Sustainable, Innovative Materials in High-Tech Application,* also funded by the Academy of Finland (grant no. 105775). The projects have provided either empirical material or theoretical starting points that allow us to better understand the relationship between the phenomena under study here.

2.1 DATA COLLECTION

The material making it possible to assess the immaterial and material properties of cleanliness and luxury was obtained by interviewing end-users and professional designers in Finland and France and collecting data on their feelings and experiences regarding luxury. The end-users were interviewed in focus groups [**12**], while the designers (n10) were interviewed individually. The user data in Finland were collected from informants who represent a number of different sport and leisure activities – golf (n18), sailing (n15) and hunting (n16) – and who were selected using "snow balling" techniques [**9**]. In France, the data were collected in the areas of Paris (n10) and Normandy (n7).

2.2. DATA ANALYSIS

The data analysis applied grounded theory [**7**], a procedure in which qualitative research data is conceptualised and built into an explanatory theory that sensitively integrates and represents reality. The unit of analysis was the self-contained description – a narrative told as part of the interview not an individual sentence or idea [**16**]. The first phase of the analysis consisted of open coding of the material and the determination of the categories. These categories were then studied as themes that might be relevant in understanding the focal phenomena here. The main categories that emerged from the data were *materials, packaging, whiteness, domestic cleaning* and *personal grooming.*

3. Emerging features of cleanliness and luxury
3.1 CLEAN AND LUXURIOUS PHYSICAL OBJECTS (WORLD 1)

One example of "clean and luxurious" appears to be non-allergenic *materials*: "*I have materials that don't give off dust, because that would irritate my allergies*" (female Finnish golfer). A female French informant agrees: *"Eh bien moi les matériaux que je trouve luxueux c'est les matériaux les plus naturels possible c'est à dire le lin, tout ce qui n'est pas trafiqué par l'industrie pétro-chimique." [With me, the materials I think are luxurious are those that are as natural as possible, in other words linen and everything that hasn't been produced by the petrochemical industry]*

Pre- and un-packaged goods also evoke feelings: "*You don't need to package anything, not even phones*" was one comment provided by a female Finnish informant. But the attractiveness of packaging can be the impetus for purchasing a product as something "*qui attire l'oeil, féminin, mignon" [that catches the eye, is, feminine, cute]* (female French informant). There are also luxury products that do not need glamorous packaging: *"C'est que le luxe à peut est être quelque chose qui n'a pas d'emballage, par exemple les épices, les choses très rares, très chères, de grande qualité, qui peuvent être vendues dans un petit sac tout simple." [Luxury is perhaps something that has no package, for example spices, very rare things, very expensive ones, things of high quality, which can be sold in a very simple little bag]* (female French informant). Basically, the beauty of packaging is related to personal handicraft and the desire to create something unique. As a female Finnish informant commented: "*If I wrap something myself, then I take an incredible amount of care doing it, putting a bow on it and making sure the colour suits the person I'm giving it to*".

With regard to the relationship of cleanliness and luxury to *whiteness,* we must consider that white items as objects of world 1 always symbolise something more than they are in the empirical world: "*fine clothes – white trousers and sport jackets*" (Finnish sailor). White trousers and jackets are indeed objects of world 1, but their signification lies in world 3 through world 2, which represents the subjective awareness of whiteness, cleanliness and design consciousness. *Domestic cleaning* and *personal grooming* form a diverse category as well. The informants talk about items that could be used for personal cleansing, such as jacuzzis. Even in the twenty-first century, the informants appreciate equipment that could be used for maintaining apparel such as washing machines or trouser presses.

3.2 SUBJECTIVE EXPERIENCES OF "CLEAN AND LUXURIOUS" (WORLD 2)

The subjective experiences of materials show up in the data as appreciation for the functional properties of materials: *"- cotton is easy to take care of and it retains its shape."* But the data also emphasise the tangible and expressive properties of materials: "*On réconfort quand on le touche – C'est vrai qu'on peut être rassuré par une chaussure en cuir, on sent son pied dans quelque chose naturel et un drap en lin c'est pareil, on ne se sent pas agressé." [You feel comfortable when you touch it. It's true that you can feel confident in leather shoes, you feel your feet in something natural. The same thing happens with linen sheets – you don't feel oppressed]* Packages as the objects of *subjective experience* are also multi-dimensioned. Where one female Finnish golfer loves packages: "*I – I have to say that I love packages"*, another hates them, especially the layers of extra packaging: *"I always get upset when I get those little make-up packages and have to go looking for the little jar in there."* A Finnish designer takes into account the clients' preferences: "*our customers want the product to be loose; they want to touch it. They won't buy it already wrapped – they pick it out and want to have it wrapped while they wait."*

The subjective experiences of whiteness form the interface between white products and cultural constructions of whiteness. It seems that the meaning of white products could not be articulated properly without the related cultural considerations. For instance, one Finnish informant refers to her childhood memories or dreams when talking about white products: "*as a kid it was a dream I had – the white sail out there – I thought it would have been great to be sailing with them."* When talking about the *subjective experience of luxury in domestic cleaning,* the most important consideration seems to be an opportunity to employ a cleaner: *"I consider it a tremendous luxury that I have a cleaner come in every two weeks."* (female Finnish golfer) A female French informant answered without any hesitation: "*Une femme de ménage." [A cleaning lady]* The *subjective experience of personal grooming* is linked to pampering the bodily self: "*I went and had my feet done a while ago and Wow! It seemed so luxurious, just wonderful!"* Another Finnish woman comments: "*Even though nothing really hurts, I still have a massage every week during the winter."* Quite the same are the luxury experiences of one female French informant: "*Aller au hammam et me faire masser". [To go to a Turkish bath and get a massage]*

3.3 THE CULTURAL CONSTRUCTIONS OF "CLEAN AND LUXURIOUS" (WORLD 3)

The Finnish and French cultural appreciation for *materials* differs slightly: where Finnish users stress the functional properties of materials, French users em-

phasise their tangible features. Common to both groups is a concern over the ethical background of products. According to a female Parisian informant: *"Dans les magasins biologiques j'achète donc des produits, des légumes et même la peinture. Actuellement je suis en train de peindre la chambre de mon fils et j'achète la peinture biologique – voilà."* [*I buy fruits, vegetables and even paint in the organic shops. Right now I'm painting my son's room and am buying organic paint. There you have it]* A male Finnish designer states: *"- I sort of struggle with these moral questions – how many chairs, or tables or other things I have designed for this world, and whether they're all still being used."*

The cultural constructions of *packages* have a straightforward link to international brands. A female French informant keeps all the packages when she buys luxury brands: *"Moi le dernier emballage que j'ai gardé c'est un emballage Guerlain justement, avec des laniers – un parfum. Très joli, doux et cartonné." [The last package I kept was a genuine Guerlain, with straps – a perfume. Very pretty, cute and done up in cardboard]* In contrast, a Finnish informant states: *"I have all those Burberry paper bags all over the place (laughs) – they go right in the box of plastic bags just like all the other ones from the supermarket".* A male Finnish informant presents the designer's point of view and mentions a Scandinavian brand that is not known as luxury brand: *"Ikea's product is damn well designed – cardboard, a cardboard box that has a sticker on it with the colour ticked, and you open it up and you start putting the thing together."* A male French informant has a slightly more critical attitude towards package design: *"Je n'ai jamais vu quelque chose de très creative" . [I've never seen anything very creative]*

Whiteness as the third category of the cultural construction of "clean and luxurious" traditionally symbolises pure and virgin. Nowadays, white is also a hot trend in global fashion and interior design. According to a Finnish designer, there exists *"a group of enthusiastic interior decorators – there are white homes".* Whiteness can also be linked to the other categories of cleanliness and luxury such as packaging. For example, a female Finnish informant expressed her enthusiasm for brand packaging by saying: *" when I bought the suit, I got a pure white paper bag."*

Personal grooming has a long history, but according to Smith [17] in recent decades "extreme materialism and fully secularised personal hygiene" has emerged. The cultural constructions of *domestic cleaning* and *personal grooming* seem to be interrelated: a clean domestic environment can be seen as a stage for presenting the "clean" self in everyday life [8]. The context for personal cleaning can be a cultural construction itself such as Finnish sauna: *"I would say that if there is one thing at home I don't want to give up it's the sauna."* (fe-

male Finnish informant). Thus, the sauna is not just a stage for self-presentation, but a context for holistic well-being.

4. Conclusions

It is projected that the future well-being of society will be created by the emerging sectors of consumer society that neither need nor desire to accept anything produced or marketed in an unclean and unethical manner. Diverse groups of consumers consisting of well-off and socially aware individuals are likely to form the basis of the influential new consumer elite, among whom "a new ethic of intensive grooming" [17] will arise. In particular, new innovation platforms are increasing, such as active citizens as innovators [10] who create a future that serves everyday well-being through low-tech, high-tech and clean technological solutions. As Smith [17] points out, "If love, luxury, and leisure are the key determinants of successful health and beauty care, then rising global affluence has done the most of all to promote it". These types of emerging groups – which will include marketing personnel, business managers and consumers alike – offer interesting possibilities to work towards the creative combination of *aesthetic* and *ethical* concerns. These future consumers may act either as loyal customers who are willing to pay premium prices [6], or as disloyal ones who are constantly evaluating the true value of goods – not on the basis of their needs, but rather their sensibilities [1]. While such seemingly disloyal or more questioning groups of customers may currently form relatively weak communities and be seen as representing niche groups, they can also be perceived as moral forerunners of the future economy. Approaching these consumer communities requires that we not only develop better theoretical and conceptual constructs, but also "designerly ways of thinking" [3] if we are to facilitate the creation of clean and luxurious innovations for future markets.

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References

1 Carbonaro S. (2006). Emotions that make sense. The happy end of a consumption Odyssey. Keynote speaker lecture in *Design & Emotion 2006 Conference*. Chalmers University of Technology, Göteburg, Sweden. 27.10.2006. Writers notes 2006.

2 Cautela, C., Sammicheli, M. & Zurlo, F. (2007). New Luxury Landscapes: Trajectories, Clusters and Design Directions. In Proceedings of *Designing Pleasurable Prod-*

ucts and Interfaces, 22–25 August 2007, University of Art and Design Helsinki, pp. 282–293.

3   Cross, N. (2007). *Designerly Way of Thinking*. Boston, MA: Birkhauser.

4   Danziger, P. (2005) *Let them eat cake: marketing luxury to the masses-as well as the classes.* Chicago, IL: Dearborn Trade Pub.

5   Douglas, M. (2003). *Puhtaus ja vaara. Ritualistisen rajan-vedon analyysi*. [Purity and danger: an analysis of concepts of pollution and taboo]. Tampere: Vastapaino.

6   Garrett, J. (2006). Customer Loyalty and the Elements of User Experience. *Design Management Review,* Winter 2006 17, 1; ABI/INFORM Global, pp. 35–39.

7   Glaser, B.G. & Strauss, A.L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research.* Chicago, IL: Aldine.

8   Goffman, E. (1980). *The presentation of self in everyday life.* Harmondsworth: Penguin Books.

9   Groenewald, T. (2004). A phenomenological research design illustrated. *International Journal of Qualitative Methods*, 3 (1). Article 4. available at http://www.ualberta.ca/~iiqm/bacissues/3 1/html/groebewald.html. Printed 6.10.2004.

10   Hippel, E. (2005). *Democratizing Innovation.* MIT Press

12   Kuniavsky, M. (2003). *Observing the user experience: a practitioner's quide to user research*. San Francisco, CA: Morgan Kaufmann.

13   Pernick, R. & Wilder, C. 2007. *The Clean Tech Revolution. The Next Big Growth and Investment Opportunity*. HarperCollinsPublisher.

14   Popper, K. & Eccles, J. (1977) *The Self and Its Brain. An Argument for Interactionism.* London: Routledge & Kegan Paul.

15   Reinmoeller, P. (2002). Emergence of Pleasure: Communities of Interest and New Luxury Products. In W. Green & P. Jordan (eds.) *Pleasure With Products: Beyond Usability*, 125–134.

16   Scheller, H. & Kunz, G. (1998). Toward a Grounded Theory of Apparel Product Quality. In *Clothing and Textiles Research Journal*, Vol. 16#2, p. 57–67.t

17   Smith, V. (2007). *Clean. A History of Personal Hygiene and Purity.* New York: Oxford University Press.

18   Uotila, M., Falin, P., Aula, P. & Varanka, P. (2005a). Designing Luxury: Understanding the Hidden Values and Pleasure Factors of Luxury and High-Level Design Products. In Digital Proceedings of *Fashion Forward, the International Symposium on Fashion Marketing and Management*, 2005. London College of Fashion.

19   Uotila, M., Falin, P. & Aula, P. (2005b). Experience of Luxury and Pleasure with Products. *Proceedings of the Conference on Designing Pleasurable Products and Interfaces* (DPPI05), 24th October 2005, Eindhoven, Netherlands, 91–103.

20   Uotila, M., Aula, P., Rytilahti, P. & Falin, P. (2006). The Cultural Diversity of Design Consciousness. In digital Proceedings of Design & Emotion 2006 Conference. Chalmers University of Technology, Göteburg, Sweden.

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Charles Colby, Alexandre Joyce

MetaCycling

Crowdsourcing for product longevity

Abstract

This research paper introduces the MetaCycle project which aims to optimize the creative potential of artists and designers by reuniting them within a virtual community serving the common objective of prolonging the life span of consumer products. This international virtual community would foster links between consumers wanting to renew their material goods and the creative talents that can offer them innovative solutions that lessen the damaging impacts that mass consumption causes to the environment. The goal is to develop an interactive framework through which consumers can benefit from unique and innovative updates to products that are reaching the end of their useful life. This builds on previous work by these researchers (PRéco and Metamorphose) as well as being synchronous with contemporary streams of scientific investigation, research and cultural trends. Relying heavily on the exploitation of Rapid Prototyping (RP) technologies, the pooling of a large number of creative minds also allows the generation of a new category of unique products that favour increased attachment through personalization.

Introduction

Since the late sixties, critics have been raising their voices in opposition to the western world's profligate lifestyle. Designers were among the most adamant agitators for a reassessment of our wasteful habits and the values that support them. At all scales, the message was the same : progress as measured by unending growth is an untenable paradigm, leading to both depletion of non-renewable resources and the poisoning of the planet through the increased production of toxic pollution. Jane Jacobs argued that architects were destroying the ecology of the built environment through the promotion of urban sprawl [1]. Victor Pananek criticized designers for participating in the suicidal race towards ecological disaster through their contribution to the relentless rise of consumerism [2]. At an even earlier date, Buckminster Fuller demonstrated how wasteful building methods were standing in the way of providing adequate shelter for all [3].

Half a century later, although much ground has been covered, designers are still at the forefront of those proposing changes in our ways of doing things in order to reduce the negative effects of our society's excessive consumption. It is along this axis that our research efforts have been directed, linking various digital technologies with modern social phenomena in an effort to prolong the life span of manufactured products and thus reduce the deleterious effects of over consumption.

The premise at the root of this research concerns the organic nature of manufactured objects; like living things, objects can change over time. Jonathan Chapman considers that a product's life span is determined in large part by the attachment linking it to its user and that this could be enhanced by the product's ability to evolve and change over time [4]. While this ability is often seen in the area of software design [5] where updates, patches and versioning enable programmes to evolve not only to correct errors but also to meet new needs, some researchers have made attempts at transferring this aptitude to physical objects [6, 7].

This paper describes research aimed at establishing a network of designers applying their creativity to proposing how existing objects could be enhanced and modified in order to take on a second life. Previous work called PRéco [8] established the feasibility of using digital manufacturing technologies and in particular Rapid Prototyping (RP) for repairing products. The researchers took this to a second level in

meta[morphose] by experimenting the application of rp to the up and side grading of products thus enabling them to evolve [**9**]. Metacycle configures this technique into an operational framework by creating a virtual community of designers linked by their common interest in the creation of new products from old. This process of mass canvassing, dubbed "Crowdsourcing" by Jeffry Howe, one of its earliest proponents [**10**], challenges the authority traditionally accorded to individual experts and in its place sources a wide basin of unfiltered talent in the quest to solve difficult design challenges. Used extensively by commercial enterprises such as ibm and Dell (www.DellIdeaStorm.com), virtual communities are a growing phenomena that transcend strictly economic imperatives to include political, social and even ludic activism (www.thinkcycle.org, www.facebook.com, www.secondlife.com).

Methodology

The methodology used was a form of action research. It is through this design project that it is hoped to better understand the implications of attachment between users and objects. By asking people to participate actively in the design of second lives for their everyday possessions, information will be gathered pertaining to the benefits and the limits of a community approach to eco-design and the value of the internet for fostering user participation in the design process. The Metacycle website is intended as a research project on collective sustainable initiatives. Thus, it is proposed to make "Metacycling" a verb of action.

To create this creative community focused on giving a second life to everyday objects, the first task was to design the website in such a way that it could accept and manage the creative ideas of the public.

For this, an area was developed called the Design Lab where users could actively participate in the design process. In order to get a quick overview of what this project implies, participants are first invited to the Explore Ideas section where they can browse concepts that have already been submitted.

At the same time, this section enables voting on a scale from 1 to 5. Not only is this the first possibility of active participation, it is also a means of better understanding what the crowd considers a strong Metacycle idea. Additional information can be obtained on each of the ideas presented in a full page detailed description.

After satisfying their curiosity, users move on to the Solve Challenges section of the Design Lab which presents 10 objects that are Metacycling challenges.

The Metacycle team carefully chose 10 difficult to recycle objects: toothbrushes, vhs cassettes, hockey sticks, computer mice, swimming goggles, computer screens, markers, Walkmans, cell phones and thermoses. After having chosen a challenge, additional information pertaining to the size, materials and other characteristics of the object is presented with a reminder of the Metacycle guidelines: "Revitalize Functionality, Maximize Reuse, and Reduce Waste and Energy". After having accepted the Creative Commons terms for the non commercial use of their ideas, users can submit their images, models and/or instruction manuals. This content is automatically uploaded into the Explore Ideas section for others to browse and vote upon. If ever an idea gathers a large amount of positive feedback, the Metacycle team will promote it into the third and final section of the Design Lab labelled Featured Solutions.

A MetaAward logo is apposed to the idea profile and depending on the design development required, a possible production is envisioned with Rapid Prototyping technology. In summary, the Design Lab helps participative users along the design process in going from inspiration by exploring ideas, to ideation in taking on a challenge, to production of a featured solution.

On another front, the Metacycle website documents the foundations of the research. This second part of the website presents the background information and the goals supporting the efforts invested in developing the Metacycle project. Not only is it oriented towards other researchers who wish to learn more about the Metacycle project, but more importantly, it is intended to inform the creative users who are attracted by the participatory nature of this project. In one section, information about the earlier research efforts in Préco and Metamorphose is provided as well as the background of the research team. Another section presents the lab facilities and the technologies that have been used throughout these research endeavours. The eco-design section showcases the evolution of the environmental practices. The past was characterized with the idea of the 4 R's: Reduce, Reuse, Recuperate and Recycle. Present-day strategies emphasize sustainable product development like design for disassembly and life cycle analysis. In the future, not only will the tools of the present help create more sustainable products, but also, design research is seeking ways to increase the emotional relationship between products and their users. The research aspect of the Metacycle website ends with technical, ecological and licensing guidelines to help participants optimize their design efforts. Primarily, the research section aims to inform and encourage participants so they can engage themselves into the Metacycle initiative.

Presently, a beta version of the site is online. As a pilot project, several groups of design students are being asked to upload ideas and map out future improvements. Furthermore, the nature and quality of the submitted Metacycle ideas will be analysed to evaluate the commercial potential that the Metacycle community holds and to nourish a brainstorm of potential busi-

ness models for the project. One of the goals of the Metacycle project is to create a long term, self-supporting initiative; one which is commercially, ecologically and socially viable. Once the initial results have been compiled analysed in order to improve the Metacycle website, it will be launched publicly on a large scale.

Results

One of the principal qualities sought of the ideas submitted by the Metacycle community is design integrity. Particular attention was focussed on attaining this goal both in the design of the website interface and in the identification of the initial target audience. While the site does offer some guidance for participants in terms of RP technology and the satisfaction of user requirements, the level at which this information is provided is aimed at encouraging those with at least basic design abilities and aesthetic sensibilities. A second factor mediating in favour of design quality is found in the initial Metacycling examples posted on the website. The thirty three proposals with which the site was seeded originated from design students and design professionals.

They were developed over a two year period as part of the research project prior to the launching of pilot version of the website. Betraying their origins, they all show an advanced degree of design definition which, it is hoped, will influence the quality of future content. The effectiveness of these levers in maintaining a satisfactory level of design integrity in the pilot project will be one of the factors which will be closely evaluated before opening the site to a general public. The researchers seek to attain a just equilibrium between an open access to large numbers of participants and a high degree of design integrity in the solutions proposed. A final controlling mechanism geared at promoting design quality is found in the third section of the Design Lab, labelled Featured Solutions. This area will showcase mediated solutions offering the most promising technical, aesthetic and ecological features. The Metacycle team will have full authority in the selection of solutions highlighted in this section in spite of the ratings compiled from public voting.

A second factor which will be attentively examined as a result of the pilot project is the size of the development gap to be filled in bringing the conceptual Metacycling proposals to eventual production as valid solutions. This gap is particularly important in view of the objective of assuring the Metacycle community with long term stability. It is recognized that this objective is strongly dependant on the implementation of an appropriate business model which will undoubtedly rest on the exploitation, in one form or another, of the proposals generated by the Metacycle community. Initial examination of the seed projects has led to variable results in this respect. The feasibility of some propos-

als would appear considerably uncertain while others would seem very easily put into production. The narrowness of the development gap will probably be a variable to be factored into the selection of proposals to be included in the "Featured Solutions" section.

Initially, all ideas submitted to the Metacycle website are subject to a Creative Commons intellectual property license that permits idea remixing and/or redistribution for non-commercial purposes only. The purpose of this license is to encourage the promotion and use of the open source design content available on the website while at the same time reserving commercial rights to the originator of the idea. The rights to any added value would, of course, be retained by the author. In other contexts there have been examples where well known brands have forbid the resale of their products if the original intended use has been altered. Despite presently not intending to sell Metacycled objects on the website, the Metacycle team will respond to such action, should it arise, on a case by case basis.

Any initial business model will be designed to evolve as the website and Metacycle initiative grow and develop. The principal goal of the Metacycle community is to provide an interactive framework in which designers can help each other and their fellow consumers to benefit from innovative, open source designs revitalizing their end-of-life products. Originating as an online framework, it is envisioned that Metacycle participants eventually interact outside the alternate reality of the internet and come together at Metacycle design expositions or interactive design fairs. Certain ideas may be recognized as having enormous potential if properly executed on a larger scale, possibly Metacycling thousands of otherwise useless objects. In such situations, any potential commercial value and appropriate action will be evaluated accordingly. Business models based on crowdsourcing design content are currently being tested by such sites as ponoko.com [11]. Aside from commercial exploitation, Metacycle could be supported by partnerships with companies who recognize the importance of extending the useful life of their products. Recently, Citroën sponsored a design competition that asked designers to transform 3D components from its cars into new designs of everyday objects [12]. Such companies could use the Metacycle community as a tool for reducing the environmental impacts of consumption. The Metacycle emblem, a stylized butterfly, embossed on a product, might one day remind consumers that a second life for the product in their hands is but a few clicks away at Metacycle.ca

Conclusion

The objectives of the Metacycle project are to limit the extremely negative environmental impacts caused by prematurely discarded products. In a recent study by

the Québec Provincial Government [**13**], it is noted that 59% of all electronic apparatus end up in landfills, 20 000 tons in 2004. This trend is accelerating every year as products are becoming ever cheaper and are offered in an ever wider range of styles and colours. At the same time, the life-span of electronic devices is getting shorter as new features are being introduced on a monthly basis. Once in landfills, these products contaminate soil and water with toxic chemicals including lead, cadmium and mercury.

In an increasing number of countries, governments are introducing legislative measures to force manufacturers to take back and recycle their products after their useful lives. This is good news, but those measures will take time to implement and only target electronic devices. We need an alternative to the current "throw away" model applied to all the types of products we use in our daily activities. Metacycle is a search for such an alternative, encouraging designers to look at discarded products not as waste, but as a resource for developing new useful applications and thus extend their life-span.

Although the Metacycle initiative is based on positive ecological principles, it has its limits. Over-consumption and planned obsolescence are not directly diminished. Metacycle could be perceived as attempting to find solutions once the problems have occurred, instead of addressing the issue of creating sustainable products in the first place. This type of initiative should definitely not prevent designers and manufacturers from attempting to create products with less impacts on the environment, "from cradle to cradle" as McDonough and Braungart would suggest [**14**]. In spite of these limits, Metacycle sends an implicit message, which is to underline the irresponsibility of discarding products that still have the potential of being useful, playful and ingenious. It relies on creativity and social exchange to stimulate innovative practices and positive behaviours. It can be used as a tool enabling the general public to give a second life to products and encouraging sustainable consumption.

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Bibliography

1   Jacobs, J., The death and life of great American cities. 1961, New York: RandomHouse. 458 p.
2   Papanek, V.J., Design for the real world: human ecology and social change. 2nd ed. 1984, Chicago, Ill.: Academy Chicago. xxi, 394 p.
3   Fuller, R.B. and J. Meller, The Buckminster Fuller reader; edited and introduced by James Meller. 1970, London: Cape. 383 p.
4   Chapman, J., Emotionally durable design : objects, experiences and empathy. 2005, London ; Sterling, VA: Earthscan. viii, 211 p.
5   Winograd, T., Bringing design to software. 1996, New York, N.Y. Reading, Mass.; Don Mills, Ont.: ACM Press; Addison-Wesley. xxv, 321 p.
6   Gershenfeld, N., When Things Start To Think. Owl Books 2000 ed. 1999, New York: Henry Holt and Company. 225 p.
7   Norman, D.A., Emotional Design: Why We Love (or Hate) Everyday Things. 2005, New York: Basic Books. 272 p.
8   Lalande, P. and M. Racine. PRéco. 2003 November 2007 [cited 2003 October]; Web site supporting PRéco research project]. Available from: http://www.preco.ca.
9   Lalande, P. and M. Racine, The Metamorphosis of Products: a Sustainable Design Strategy That Favours Increased Attachment, in Design and Emotion. 2006, Design and Emotion Society: Göteborg Sweden. p. 1-17.
10 Howe, J., The Rise of Crowdsourcing, in Wired Magazine. 2006.
11 "The Big Idea." Ponoko. 28 Feb. 2008 <http://www.ponoko.com/about/thebigidea>.
12 "C Design - Combine, Create, Connect." Citroën. 28 Feb. 2008 <http://www.aedo-to.com/citroen/eng/index.htm>.
13 "Fini le dépotoir pour les vieux ordis." La Presse, Montreal. 26 Feb. 2008 <http://www.cyberpresse.ca/article/20080226/CPENVIRONNEMENT/802260835/6730/CPACTUALITES>
14 McDonough, W. and M. Braungart, Cradle to Cradle : Remaking the Way We Make Things. 2002, New York: North Point Press. 208 p.

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Hybrid Ontologies

Design knowledge in bottom-up processes

ABSTRACT

All these years the proliferation of the World Wide Web and its constant growth have furthered the development of evolved and complex systems to control and manage information, systems that have been designed according to guidelines to optimize the fruition and the retrieval of the data: many paradigms were born and among the most important there are semantic web and different models to create ontologies for the definition of exhaustive and rigorous conceptual schemes within specific domain of knowledge.

Close to hierarchical structures built to catalogue information using precise semantic models (Cyc, Wordnet, SUMO) have been discovered different modalities to manage the information, through metadata classification, to make more flexible the interpretation and the automatic elaboration. The hierarchical construction of classificatory systems has guarantee the first footsteps for a formalization of the online knowledge, notwithstanding have gone growing some popular taxonomies (folksonomy) without default relationships among the elements and without a precise point of departure: these non-structures deserve to develop some spontaneous forms of classification and "bottom-up" collaboration, just to reflect the conceptual model of the users themselves.

This bottom-up process shows a trend of modernity, bringing the social aspect of the people relationships inside the net: it shows that every phenomenon is interrelated, that nothing exists self-sufficient or independent, and that is possible to manage a sustainable dimension of knowledge with a collaborative approach to the information. This paper start from these shapes of widened ethnoclassification (broad folksonomy) to explore which are the sceneries and the possibilities within design can improve on the construction of hybrid, bottom-up and collective ontologies, builded in itinere with the contribution of the users that trace definitions, associations and variations, in a kind of defective semantics, founded on the co-tagging, mash-up and syndication.

INTRODUCTION

Today we live in a society with a lot of relations between people, but too much bonds and links sometimes drive to a dimension of emptiness, instead of a shape of connectivity. This emptiness depends on a wide variety of social factors, like distance from people in communication, in cultural and behavioural elements, in information management, and many others. The aspects we want to consider about this issue are specially focused on togetherness and sustainability between people when they decide to engage a common path toward new systems for knowledge management.

The net represents today one of the most versatile, fast and economical instruments to manage and distribute information in every fields of knowledge. The Web has been transformed evolving itself from the end of the '80 when the only perspective was to operate as if the immense archives of the net had to be consulted like a large file, in order to arrive today when complexes software are available in order to render the fruition and the construction of the information more flexible and dynamic.

Overcoming the challenges of these years, the net has changed not only its technological infrastructures, but it has redefined completely its economical and ecological system, transforming itself in the first and more efficient communication system ever used.

The merit is due to its social dimension, which has carried people to use the web in order to replace and to integrate relationships and rituals that belong to culture of the civilizations in a "second orality"[1].

To create a cognitive system free of an exclusively technological-driven growth, a series of disciplines and research fields have been alternated both to promote and construct new forms of knowledge management, and to optimize those existing.

A first observation underlines how orientation abilities to surf in Internet depend on experiences of information and on evocative force of the data retrieved by users from each kind of platforms. For this reason the involvement of two different layers in the creation of every knowledge-path online is inevitable: we can observe a human layer, deriving from the directed ability, formation and participation of the implied users, and a technological layer, codified and formal, related to the architecture of the used systems.

In order to conciliate the two layers, multiple attempts of structuring data have been made, according

to different kind of criteria, logics and models. But till now, every attempt to facilitate the knowledge management has presupposed a preorganized architecture, a preordered and filtered database on which founding the successive steps of development.

SEMANTICS AND ONTOLOGIES FOR A CODIFIED KNOWLEDGE

Between the multiple perspectives of innovation and development, in order to codify in a flexible way and with great effectiveness the information of the net, at least two wide perspectives (correlated but with independent variables) have been advanced from various years. These perspectives are the semantic web and the creation of ontologies, and they have allowed to reach specific results in the field of knowledge management and in its indispensable declinations.

The semantic web represents a proposal that since the dawn of the net, for the merit of Tim Berners-Lee[2], has taken consistence, becoming then debatable and partially operating only in specific environments. The ontologies instead, that brings their name from philosophy, still today constitute one of the few framework codified for the management of the information.

Properly such structure would have to be reconsidered in order to mature a vision opened towards a future rich of elements based on togetherness and sustainability: greater possibilities for interconnection between people, high speed of feedback on the actions and choices of the users and, above all, bottom-up[3] management for the data classification, granted by communities that complete an automatic selection and a cultural analysis of the information which they manipulate and with which they come in contact.

The semantic web, moving from evaluation dynamics of information like those indicated, becomes an environment in which all the present and traceable information (pages, files, images, links…) can be associated to specified metadata[4] able to individualize the context and to construct a network of multi-pertinence for each information.

Instead the ontologies are the structures able to maintain in perfect hierarchical relation all the entities found and opportunely "tagged"[5], supplying also an exhaustive and rigorous conceptual schema with which manage specific relations, rules, dependencies, symmetries and differences. An ontology[6] is a descriptive, classificatory form, realized to open and delineate the schemes in which information will be incorporated and rearticulated.

Between the most widespread ontologies is possible to remember Cyc, a system already developed in 1985 that consists in a constitutive ontology and in various specific ontologies for each domain of pertinence; WordNet, a database designed like a seman-

tic network and based upon psycolinguistic principles; SUMO (Suggested Upper Merged Ontology), a project of constitutive ontology that reserve some terms and their meaning for all the systems based on the same standard (P1600.1) in the same way in which a general ontology (in philosophical sense) defines "what exists", implying that a hierarchy can be accepted rather than a chosen base.

If it has been the hierarchical construction of such systems to guarantee the first steps for a formalization of the knowledge in the net, we can't forget that different modalities of information management are growing: they are popular taxonomies (folksonomy[7]) without predefined relations between the elements, and without a precise structure of departure. These taxonomies have concurred to develop some spontaneous and collaborative forms of classification "bottom-up", in a position to reflecting the conceptual model of the same users.

THE DEFECTIVE SEMANTICS: UNSTABLE BONDS AND OPEN ONTOLOGIES

Starting from the definition of an innovation that based its effectiveness on the capability to foresee behaviours and on the dimension of user adaptation (semantic web), gradually begins a change of perspective that redefines the concept of knowledge management for as it has been constructed and for as it still comes formalized when it's necessary to distribute information online.

The systemic hierarchies of information today begin to transform themselves into folksonomies, starting from a bottom-up perspective of common collaboration, to define and classify by tags different kind of data.

This perspective has started from a communication necessity and not from the matter of knowledge, in order to take advantage of the more suitable prostheses, of the more versatile instruments and of the more simpler technologies, just to define with these instruments what can enter in the grid of the shareable knowledge.

If we want to trace which are the consequences, or the forerunners of this phenomenon, we have to formulate some basic consideration regarding the scenario transition of the recent years:

- The people are "inside" the information and not only "in front".
- The information do not have a relationship of pure fruition and distribution with users, but they have become active parts of the process of knowledge construction.
- Not only the messages (the contents) have been "tagged", but also the objects (the media) that deliver contents, and all the entity involved in every process of information.

- The hierarchical schemas and the univocal classifi-
  cations can't describe any kind of scenarios in con-
  stant changing.

Considering these points the user becomes not only a
passive receiver of data but an active propeller of the
information in the net, exiting from every hierarchy
and relational tie.

The information become a moment of proliferation
of indefinite groups, that aggregate and separate them-
selves according to complex and not measurable phas-
es. The ties that are constructed among statement, terms,
concepts and cluster of data born and die in the same
time in which the attention of collectives focalize them,
rearticulating the capacity, the content and the same la-
bels (tags) that can classify it. Unstable links between
the informations are developed, as a result of the "bot-
tom-up tagging", that is deriving from how online com-
munity accept and determine the attributable values.

The outcome of all these processes is a form of se-
mantics that is declined on the attractions and the po-
larity of the involved users, and that rearticulates the
same network, because no hierarchical structure can

control a process that does not coincide with its own
schemes of demarcation and classification.

We run into a sort of imperfect semantics, articu-
lated on hybrid ontologies, in which no more models of
heuristic and linguistic can be found, but it's simple to
discover processes of tag mash-up[8] and syndication[9],
that characterize the collective mass actions, projective
and unforeseeable, of the communities in the net.

From semantic web to hybrid ontology
A design challenge for togetherness
and sustainability

CHANGING PERSPECTIVE

The passage that must happen is from "learned" ontol-
ogies, founded on information hierarchies, and flexi-
ble paradigms, within the limits of specific knowledge
domains.

The change of perspective is founded properly on
the imperfect nature of these links: to work these links
must be founded constantly on the fluidity that a hier-
archical system cannot guarantee; they must base their
structure on the constantly in-definition shape of the

The web evolution
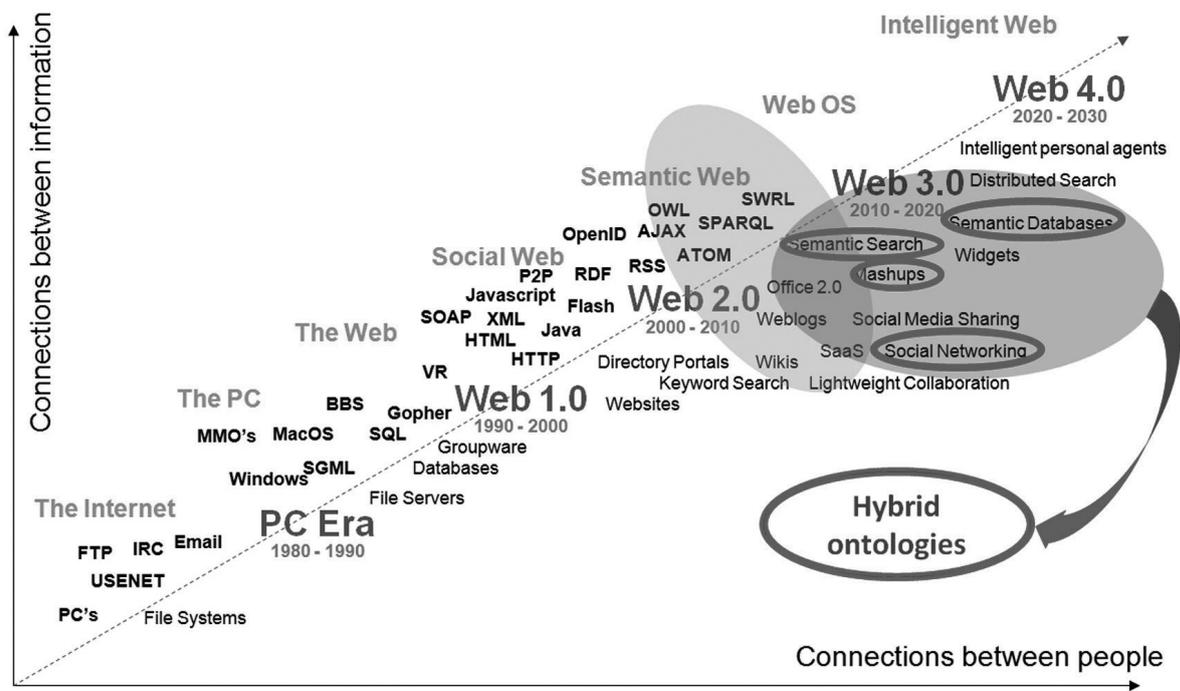
From Novak Spivack "Making Sense of the Semantic Web"

Figure 1. The intelligence is in the connections,
Radar Networks & Nova Spivack, 2007

social systems that share the information and rearticulate it into the web.

This way the knowledge management constructs itself on the connective dimension[10] of users' thought, still before on their presumable "collective intelligence"[11], and it defines a kind of open-ontology form, in continuous alteration and semantically imperfect, that is without possibility of a linguistic or structural definition, because it's impossible to determine when and where the knowledge domains could finish and how many (and which) entities could be involved before transforming all the environment in something completely different.

The point of convergence between the connectedness of the information, and the social dimension of the net's users, offers a perspective on how the knowledge is still organizing itself in the web dimension: which instruments, which challenges and which drivers are characterizing it and which forms of technology are growing in order to reach specific results on the various application fields.

As Nova Spivack[12] suggests, the actual net scenario is not characterized by the decline of the semantic web, but by perspectives still to pursue and to reach (**FIG. 1**).

The point of arrival is very difficult to localize, specially trying to following to realist path of implementation and development. But here is the challenge for design: finding a way to manage and organize the next steps of the online knowledge system, starting both from a point of view of conceptual planning and from technical implementation.

This way could coincide with the alignment of the actual hyerarchical structures with the bottom-up perspective of data classification, making changeable and classificable the same categories and relations used in traditional ontologies. This permits to arrive to an hybrid ontology, based on preconceived structure, but selforganizing and self-articulating in its constitutive schemes, constructing its recombinant structure on what online communities outline, vary, forget and reconstruct.

THE DESIGN CHALLENGE IN THE WEB KNOWLEDGE MANAGEMENT

The user is a multi-dimensional figure in the world of the web. With the advent of the online communities, with specific software for social tagging and so-


Figure 2. Some examples of different online tag-clouds

cial bookmarking (Technorati, Del.icio.us, Flickr, Facebook…) and with wiki-like systems, the topography of the net has begun to model itself in a more realistic way, comply to the dispositions of the users whom classify and filter the information.

The translation of this classification resides, for example, in the tag-cloud[13] phenomenon: aggregates of terms with different font-size dimension that indicate the "popularity" of some words rather than others (some examples are present in **FIG. 2**).

The tag-cloud permits, just at first sight, to draft a scheme of what is relevant inside a specific informative domain. If in this system we embed the semantic dimension that characterize the users' choices, and we embed also a system to manage the flow of information traced, we can propose a new dimension for the online knowledge management. It's obviously indispensable that the bottom-up modification of the hierarchical structures is allowed to accord the emerging classification forms.

Such perspective creates the vision of a scenario in which hybrid ontologies, related to specific or general domains (and therefore developed based on *narrow or broad folksonomy*[14]) articulate the shapes of the knowledge that the same users determine and classify.

It's possible to criticize the system retrieval scientificity and the approximation of the data management processes, but a system based upon hybrid and bottom-up ontologies does not risk to become less scientific or less reliable than others that have only predefined rules in order to determine thresholds of quality information. It is instead a benefit relying on a system that avoid to leave in evidence only the result that already are in evidence: for example the most common crawlers offer a list of resources ordered by relevance criteria, and users usually choose between the first series of results, enhancing this relevance. This situation, such a closed circle, does not allow some significant changes until communities themselves start focusing on specific information which will gradually obtain preeminent visibility into the classification hierarchy.

The role of design emerges in this dimension of management and development of new strategies to codify knowledge. Particularly design has to become the interpreter of all the disciplines involved in the change of the web paradigm: sociology, philosophy,
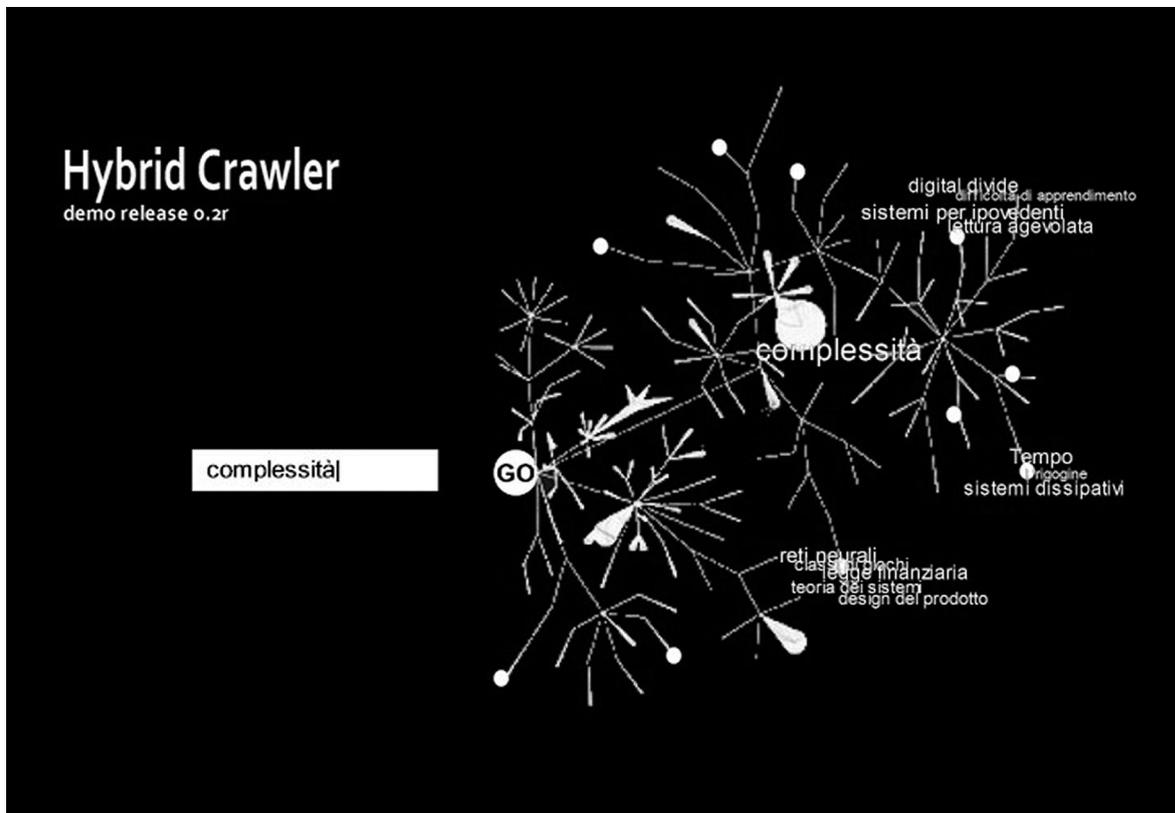

Figure 3. A prototype of interface design for hybrid ontology:
a simple bottom-up crawler for narrow folksonomies

computer science, linguistic, semiotic and so on…

This role does not want to be a position to sew together distant activities: the first change which must be operated in the communication paradigm arises from the vision of a different role of the user, who is not a passive figure, but is the particle of a uniform and fluid mass which synthetizes schemes and produces variables and labels for the information to classify.

The goal is therefore to find a point of synthesis between the vision of a scenario where the information can rearticulate itself bottom-up, contaminating the whole system (redistributing itself and remapping its own schemes in every interrogation), and a framework of the information which is starting now to grant users the right role for the social-collaborative turning point they have made.

The design has the possibility to establish a rhetoric of the project in order to create a dialogue between the social and the technical tissue, and this means not only to produce a toolkit to support new scenarios with sustainable models, but also to suggest a vision of a different cultural apparatus, to offer a new way of online interaction, and a new points of access to the knowledge.

The real challenge is how to translate a common overview based on connected platforms, social systems and information in a framework of actions. A first answer is the creation of a different system to approach and retrieve information. This way proceeding the design role is to offer users the possibility to define and share different environments of knowledge. The modality could be the implementation of learning interfaces (see example in **FIG. 3**) that are able to interconnect data, analyzing the browsing habits and the tagging classification of the users, and entrusting the new shape of knowledge management on:

- the consideration of three interconnected units: user, information and tag/labels;
- a modality to self-organize each information in a "hybrid" ontology;
- the dimension of the cooperative tagging: mash-up of the tags and selfclassification (bottom-up) and deconstruction of the semantic links.

Without enter in the merit of specific tools that design could try to develop, the hypothesis remains to plan the possible scenarios, to find out the focal points on which continue the research, without loosing the obtained progresses, and accepting the challenge to deconstruct the designing rules in order to create new project drivers, deriving from the contamination with a new system to build the knowledge.

A CONCLUSION? A BEGINNING

In conclusion the vision of a new sustainability based upon a common and collective approach to manage and develop knowledge actually could be realized with a new…. beginning, in the sense of a redefinition of the constructs and modalities to articulate the knowledge in the web. Perhaps, if this vision can scare for its too much ambitious change of paradigm, it is important to mind that paradigms change without people notice something: only after the change we can discover the differences. Like italian novelist Italo Calvino[15] suggests "we will be able to pass beside phenomena never seen without realizing anything, because our eyes and our minds are used to choose and catalogue only things just tested and classified" so, the real issue is: "if a new world would be discovered now, could we see it?"

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Bibliography:
Aa. Vv., Mind Design II. *Philosophy, Psychology, Artificial Intelligence*, mit Press, Cambridge, 1997.
Aa. Vv., *Metafora Mimesi Morfogenesi Progetto*, Guerini Studio, Milano, 1991.
Baca M., *Introduction to Metadata: Pathways to Digital Information*, Getty Trust Publications, Los Angeles, 2000.
Berners-Lee T., *L'architettura del nuovo Web*, Feltrinelli, Milano, 2002.
Boscarol M., *Ecologia dei siti Web*, Hops Libri, Milano, 2003.
Calvino I., *Collezione di sabbia*, Mondadori, Milano, 1994.
D'Alessandro P., *Critica della ragione telematica*, led, Milano, 2002.
Daconta M., *The Semantic Web*, Wiley Pub., Indianapolis, 2003.
Davies J., Studer R., Warren P., *Semantic Web Technologies. Trends and Research in Ontology-based Systems*, Wiley & Sons, Chichester, 2006.
Davies J, Dieter F., van Harmelen F., *Toward the semantic web. Ontology-driven Knowledge Management*, Wiley & Sons, Chichester, 2003.
De Kerckhove D., *L'intelligenza connettiva. L'avvento della Web Society*, Aurelio De Laurentis Multimedia, Roma, 1999.
Fiormonte D., *Scrittura e filologia nell'era digitale*, Bollati Boringhieri, Torino, 2003.
Hjelm J., *Creating the semantic Web with* rdf, Wiley, New York, 2001.
Johnson-Laird P.N., *Modelli Mentali, Il Mulino*, Bologna, 1988.
Lévy P., *L'intelligenza collettiva*, Feltrinelli, Milano, 1996.
Lolli G., *La macchina e le dimostrazioni*, Il Mulino, Bologna, 1987.
Maiocchi M., Laurent L., *Giocare con la complessità*, Francoangeli, Milano, 2002.

McLuhan M., Fiore Q., *The medium is the massage. An inventory of effects*, Bantam Books, New York, 1967.

Minsky M., *La società della mente*, Adelphi, Milano, 1989.

Nirenburg S., Raskin V., *Ontological Semantics*, MIT Press, Cambridge, 2004.

Ong W., *Oralità e scrittura*, Il Mulino, Bologna, 1986

Stamou G., Kollias S., *Multimedia Content and the Semantic Web*, Wiley and Sons, 2005.

Taniar D., Wenny Rahayu J., *Web Semantics and Ontology*, Idea Group Publishing, London, 2006.

Tapscott D., Williams A., *Wikinomics: La collaborazione di massa che sta cambiando il mondo*, ETAS, Milano, 2007

References:

1 See Ong W., *Oralità e scrittura*, Il Mulino, Bologna, 1986, pp. 119, where the author highlight the passage happened from civilization at first orality (that knows only oral and phonetic forms to sharing knowledge) to civilization at secondary orality (that have also writing forms in order to communicate).

2 See Berners Lee T., *L'architettura del nuovo* Web, Feltrinelli, Milano, 2002.

3 The word "*bottom-up*" indicates a model of production and construction of the knowledge "*from the low*", from the people; in a bottom-up construction the objectives and the organization of the contents are established from the same members of the community. This dimension is set against the "*topdown*" processes, in which the roles of the users are determined from an external authority and circumscribed from specific software mechanisms.

4 Metadata are literally data about data, of any sort in any kind of media. Metadata are used to facilitate the understanding, characteristics, use and management of information; they are required for effective data management varies with the type of data and context of use. Each item of metadata could describe an individual element, or content item, or a collection of informational objects including multiple content items. See Baca M., *Introduction to Metadata: Pathways to Digital Information*, Getty Trust Publications, Los Angeles, 2000.

5 A "tag" is literally a detailed label that can be attributed to a any element in order to characterize it: a tag describe the items and enable keyword-based classification and search of information. Tags are usually chosen informally and personally by item author/creator or by its consumer/viewers/community; they are typically used for resources such as computer files, web pages, digital images, and internet bookmarks, and for this reason, "tagging" has become associated with the Web 2.0.

6 In philosophy the term ontology (lit. "study around the nature of being") represents the study on existence and forms the basic subject matter of metaphysics. In computer science and information science, an ontology is a representation of a set of concepts within a domain and the relationships between those concepts. It is used to create the domain scheme and its properties. See Taniar D., Wenny Rahayu J., *Web Semantics and Ontology*, Idea Group Publishing, London, 2006.

7 The word folksonomy derive from the fusion of words folk (people) and taxonomy, and indicates a collaborative, popular modality (bottom-up) to classify the information in collective and collaborative ways (collaborative tagging, social classification, social indexing, social tagging). This method is a bottom-up perspective to apply tags to annotate and categorize content. See Tapscott

D., Williams A., *Wikinomics: La collaborazione di massa che sta cambiando il mondo*, ETAS, Milano, 2007.

8 The term mash-up indicates a combination of data from more than one source into a single integrated tool (or environment). Mash-up adopts a more fundamental approach to content aggregation without regard to markup: individual content may be combined in any manner, resulting in arbitrarily structured hybrid content. The term could also be used as mesh-up, as it happens in some cases, in its meaning of "connection", but it is preferable to use the most diffuse "mash-up" for the common sense it had assumed in the web.

9 The word syndication indicate a way to made available a section of a website for other sites or applications. A syndication is based on web feed: a data format used for providing users with frequently updated content.

10 On connective dimension of human thought see De Kerckhove D., *L'intelligenza connettiva*, Aurelio de Laurentis Multimedia, Roma, 1999.

11 See Lévy P., *L'intelligenza collettiva*, Feltrinelli, Milano, 1998.

12 Nova Spivack is one of the pioneers of the Web, one of the first businessman who creates a company related to Internet. Spivack currently is considered one of the maximum expert on the future technologies and evolution of Internet. For more information visit http://novaspivack.typepad.com.

13 A tag cloud is a visual weighted list of user-generated tags used typically to describe the content of a website. Each relevant topic is represented by a tag, which is shown with different font size or color.

14 A broad folksonomy is defined as a lot of people are involved and describing same objects; a narrow folksonomy is about a small group of users tag particular items.

15 See Calvino I., *Collezione di sabbia*, Mondadori, Milano, 1994, p. 131.

Session 3

Safety in Contemporary Design: Approaches to the Issues in Social and Individual Welfare

Anand Wadwekar

Mixed-use districts as key to resurrect urban life: Patchwork and new urban design approaches to urban design in Tokyo city.

Tokyo city is composed of many villages. There has been various viewpoints to look at the urban design of Tokyo. Historically Tokyo has been a large patchwork metropolis wherein 'suitable' programmatic patches are constantly added. The programs are flexible in order to accommodate customized requirements of space, area and use. This paper explores various images of Tokyo city, a product of constant learning and teaching of Japanese urban "know how". Tokyo's cultural homogeneity transcends the heterogeneity of urban spaces. These heterogeneities are mixed use programs where knowledge is shared and displayed for both active and passive consumption. Paper uses 'patch' as element to reinvent Tokyo's urbanity.

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Birgitte Geert Jensen

Design solutions for an ageing society

Global demographics will change dramatically in the coming decades. The global 60+ group will reach one billion in number by 2020. In other words: In less than two decades one in six people globally will be above the age of sixty. Acknowledging the significance of aging society and the related challenges to world wide welfare, Aarhus School of Architecture (AAA), Engineering College of Aarhus (IHA), and Designit A/S set out to investigate the lives of elderly people to provide a new understanding of old age as inspiration for new designs solutions.

In this paper we will describe, discuss and evaluate the workshop "User-driven Innovation in praxis – from observation to prototyping in 5 days". In the workshop the participants has been taken though the process of generating ideas, concepts and prototypes for elderly people.

KEY WORDS
Ageing society, User Centred Design, Collaborative Project

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Anthony Williams, Maya Guest, Leman Figen Gül

Understanding the role of visual cues on human decision making

Injuries associated with manual materials handling (MMH) have increased considerably and are currently estimated to run to several billion dollars annually in Australia (Aus$9.5 billion). The aim of the study, reported in this paper, is to measure and analyse the effectiveness of visual cue and training in manual handling. This study was undertaken through the application of protocol analysis which is novel in the Occupational Health and Safety (OH&S) field. An additional aim of this study was to assess the value of the methodology in OH&S studies relating to behavioural change. We report on work in progress involving the pilot study, lifting tasks, the outline of the experimental setting and handling behaviour coding scheme and initial phase observations.

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Cherng-Yee Leung, Po-Chan Yeh

A study on the potential risk factors for the elders using walker

Elders have unavoidable detriment of physiological function of low limbs; therefore, their body function is reduced accordingly.

Besides cane, walker is one of the most popular mobility assistive devices used by lower-limb disabled frail people. However, it is worth noting that the literature have showed elders might get injured by using mobility aids. This paper aims to discuss whether the potential risk factors causing injury exist or not and the difficulties while elders using walkers.

A survey, a total of 19 elderly people was conducted. Descriptive statistics, t-test, and ANOVA with blocking design were employed to analyze collected data. Results showed that in Taiwan, majority of elders using regular four-leg walkers. They prefer to use walker indoor, therefore, the material of ground which are tile and carpet while they are using walker. The function of stable equilibrium, weight of walker and holding gesture are the top 3 difficulties. The most injury occurred on up-limbs, and the hardest situation was climbing slope. Subjects also suggested that walker should be improved to assist in climbing slope and in climbing stairs.

This study may be of importance in explaining the condition and injury of elders using walker. In the future, findings of this study could be a good reference to design walker to facilitate elders in holding and handling.

KEYWORDS
Assistive device, Elderly, Walker

**Sandra Gabriele, M. Singh, M. Acomb,
C. Harlton-Strezov, D. Chen**

Using visual communication design as strategy in patient safety practices: Behavioural paradoxes

This paper demonstrates how visual communication design was used as a strategy to address problems in healthcare and underlines the importance of evaluating the effectiveness of a design in a specific context.

A collaborative team comprised of academic researchers and healthcare professionals at a community hospital attempted to examine how a design intervention might affect the handwashing behaviour of hospital workers and the public. The study evaluated two of four access points to the patient; the front door of the hospital and the entrance to the unit from the elevator. Observational studies were conducted to examine the rate of compliance when signage was placed in close proximity to disinfectant dispensers and when there was no signage present. Because this hospital is situated in a diverse community where many of the patients and visitors are second language English-speakers, three types of signs were evaluated, 1) with a pictogram and no text, 2) with a pictogram and minimal text and 3) with instructions and pictograms.

Contrary to what was expected, results of the study showed that overall, prompting with signage in the areas observed, made no significant difference in handwashing behaviour. Also surprising were the differences in behaviour of the two test groups: the public was more handwashing compliant than healthcare workers. This result indicated heightened public awareness of the importance of handwashing to prevent the spread of infection. Further study would be required to identify differences in hand hygiene at the point of care and the impact of signage plus other methods of prompting compliance. Barriers to handwashing compliance may be a consequence of many interrelated systemic and human factors. In our pursuit to find ways to decrease the spread of infection in hospital settings, we propose that a combination of site-specific strategies might be necessary to positively affect handwashing behaviour.

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Teresa Franqueira
Service design and urban communities:
The role of design in the diffusion of creative communities services and sustainable life styles

This paper presents the role of urban local communities in the creation of sustainable lifestyles, and the role of design as a strategic element to enhance, promote and replicate that creation.

These communities are radicated in specific places in the urban territory, henceforth called creative places, which are a new type of urban spaces where groups of people collaboratively promote and manage a mix of creative initiatives in the fields of art and culture, economy and production, social services and urban regeneration.

The contents of this paper are part of an on-going research of the Research Unit "Design and Innovation for Sustainability", at the Politecnico di Milano.

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Poster Presentations

History and Craft, Rethinking Modernity and Locality in Design

Thomas Daniell
Building Sociology: New Prototypes
for Japanese Residential Architecture
–Kyoto Seika University, Japan

Juliette MacDonald, Will Titley
Stop by Request
– Edinburgh College of Art, UK

Landi Raubenheimer
The Digital Sublime in Naruto:
a Fictional Japan as Metaphor for
the Terror and Attraction of Digital
Technologies
– Greenside Design Center College
of Design, South Africa

Malene Leerberg, Thomas Leerberg
Design in the Expanded Field:
Rethinking the Concept of Design
after Modernism
– Kolding School of Desing, Denmark

Murat Gül, Trevor Howells
Designing New in Old Settings
– University of Sydney, Australia

Nature, Togetherness and Sustainability: Theoretical and Practical Perspective on Design

Gary Paige
The Flesh of Emptiness
– Southern California Institute
of Architecture, USA

Jon Keenan, Brent Skidmore
The Greening Studio: a Model
for Creativity, Sustainability and
Community
– University of North Carolina
at Asheville, USA

Joy Boutrup
Educational Aspects of Sustainable
Design in Textile and Fashion
– Kolding School of Design, Denmark

Mikyung Bak
Animism inside Japanese Animations:
Focused on Animations by Hayao
Miyazaki
– Kyoto Seika University, Japan

Hay Fazer
Systems to Recycle Buildings
– Napier University, UK

Safety in Contemporary Design: Approaches to the Issues in Social and Individual Welfare

Moussa Doumbia
What kind of Architecture for Mali?:
a Dilemma of Continuity of Tradition
and the Influence of Modernity
– National School of Engineering,
Mali

Lena T. H. Berglin
Designing for Extreme Conditions:
a Creative Tool in Design and
Research Process
– University College of Borås, Sweden

Erika Marlene Cortés Lopez
Third World Cities Insights:
Urban Dynamics, Composition
and Practice Initiatives
– National Autonomous University
of Mexico, Mexico

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