Beyond Boundaries

CACA

011

3rd ICACA 2011 Proceeding
International Conference on Applied & Creative Arts:
BEYOND BOUNDARIES

Faculty of Applied and Creative Arts
Universiti Malaysia Sarawak
94300 Kota Samarahan
Sarawak
MALAYSIA
T. +6082- 581438 F. +6082 - 581354
http://www.faca.unimas.my

ISBN 978-967-5224-75-1

Disclaimer
The validity and authenticity of content in every article is the sole responsibility of respective author/s. Any copyright violations are entirely the responsibility of the author/s.

3rd International Conference on Applied and Creative Arts

6 - 7 July 2011, Faculty of Applied and Creative Arts UNIMAS

Beyond Boundaries

proceedings

Beyond Boundaries

The major theme of ICACA 2011 is 'Beyond Boundaries'.

'Boundaries' suggest both barriers and closeness, they can be sites for fear, hesitation, uncertainty and reluctance; or they can be dynamic and fluid places of discovery, change, assimilation, acculturation, convergence, transformation, development, transgression and transcendence. ICACA 2011 intends to explore the meaning, process and impact of 'beyond boundaries' in the arts in general, and primarily but not exclusively on these following sub themes:

- Methodology and theory
- Teaching and learning
- Creative process, knowledge and experience
- Preservation, revival, restoration and development
- Management, branding and/or marketing
- Community engagement and empowerment
- Intellectual Property
- Traditional knowledge and new technologies
- Creative industry
- Sustainable design

The **3rd International Conference on Applied and Creative Arts** is unique in nature as it covers all areas in the arts, namely visual and performing arts, design technology and management of the arts. It also provides discussion opportunity for individuals from the field of sciences and humanities who has project, research and idea that relate to the arts. In short, ICACA is organized to umbrella discussions, thoughts, ideas, issues, challenges and opportunity in the arts among researchers; scholars; teachers; students; designers; practitioners; enthusiasts; managers; policy makers and implementers and community leaders with a concern for arts.

OBJECTIVES

ICACA 2011

Beyond Boundaries

- To serve as a platform for educators; researchers; designers; policy makers and implementers; artists, students and community leaders to meet and discuss various issues related to the arts; arts and technology; and arts and its relations to community.

- To share views, findings, and new explorations in research, management and marketing of the arts.

- To promote FACA as a higher learning institution that champions scholarly efforts in the arts.

Minister's Message

I praise Allah Subhanawata'ala for his blessings that we are gathered here today at the International Conference of Applied and Creative Arts 2011 (ICACA 2011).

I would like to welcome you to Sarawak and thank you for your participation in ICACA 2011 conference. I hope this conference will grant a platform for you to share your latest research and findings on issues related to the arts.

This is the third ICACA conference held by the Faculty of Applied and Creative Arts, UNIMAS and co-sponsored by PETRONAS, Malaysia. The major theme of ICACA 2011 is 'Beyond Boundaries' whereby 'Boundaries' suggest both barriers and closeness, they can be sites for fear, hesitation, uncertainty and reluctance; or they can be dynamic and fluid places of discovery, change, assimilation, acculturation, convergence, transformation, development, transgression and transcendence. ICACA 2011 intends to explore the meaning, process and impact of 'beyond boundaries' in the arts. I hope this conference will be fruitful and create opportunity for more collaboration among participants.

UNIMAS's continuous strive towards academic excellence has produced first class graduates who excel not only in academic but also in the field of research, nationally and internationally. I personally would like to congratulate the Faculty of Applied and Creative Arts and UNIMAS for organizing this international conference. Your efforts have managed to promote not only UNIMAS at international level, but also Sarawak.

Once again, I would like to take this opportunity to welcome all participants to this International Conference. Welcome to Sarawak, The land of the Hornbill, *Selamat datang ke* Negeri Sarawak. I wish you have a pleasant stay in Sarawak and hope you will bring home sweet memory of your stay here.

Lastly but not least, I hope that this conference will be another mile stone towards sustainable research and development efforts, and contribute towards Malaysia's economic development.

All the best to all of you.

Thank you.

YB Datuk Amar Haji Awang Tengah Ali Hasan
Minister of Planning and Resource Management II and Minister of Public Utilitiies

Vice Cancelor's Message

First of all, my gratitude and appreciation on behalf of UNIMAS to Yang Berbahagia Datuk Amar Awang Tengah Ali Hassan for his willingness to attend and officiate the International Conference of Applied and Creative Arts or ICACA 2011.

I would also like to welcome all paper presenters and participants, from Malaysia and abroad to Universiti Malaysia Sarawak. *Selamat datang ke* UNIMAS.

Firstly, I would like to take this opportunity to congratulate the Faculty of Applied and Creative Arts, UNIMAS for having once-again successfully organized ICACA 2011. This is the third ICACA, after 2006 and 2008. As an international event of FACA, ICACA 2011 has attracted participation from within Malaysia as well as abroad. I hope this conference will once again contribute towards sharing and disseminating knowledge, especially in the field of creative arts.

I wish to express my gratitude to PETRONAS, for supporting and co sponsoring ICACA 2011, through *Krusi* P. Ramlee. PETRONAS has been a close family member of FACA since 1995. Supporting various events and activities of this faculty since then.

Universiti Malaysia Sarawak has always encouraged and supported scholarly efforts and activities among its academics. Organising and hosting an academic conference not only promotes scholarly discussions within a field of study but also enables exchange of ideas and knowledge among academics from far and near. Since the establishment of UNIMAS in Disember 1992, several local and international conferences have been hosted by various faculties, institutes and centres of excellence. These conferences have promoted scholarly network and collaboration between academicians, relevant agencies and institutions of higher learning, locally and internationally. At the same time, conference like ICACA, also assists the university to promote UNIMAS at international level.

Hence, efforts and initiatives taken by the Faculty of Applied and Creative Arts for the success of this conference is very much appreciated. Indeed, the success of this conference requires full commitment from all members of the faculty. I would like to take this opportunity to congratulate every ICACA 2011 committee member for their dedication and teamwork spirit towards realizing this conference.

I was informed that ICACA 2011 has attracted the attention of many scholars, thinkers and creative practitioners. 50 papers will be presented in this two days conference by local and international speakers. Thus, I hope this conference will contribute towards scholarly efforts in the creative arts, as well as expand research collaboration, consultation and ongoing interaction between academics, agencies and individuals.

Lastly, I hope participants will be inspired to apply new methodologies and ideas in the field of research, and further contribute towards documentary new knowledge in the arts by attending ICACA 2011.

Finally, once again I would like to thank Yang Berbahagia Datuk Amar for his willingness to be present at this event today.

Wabillahi Taufik Walhidayah, Wassalamualaikum Warah Matullahi Wabarakatuh. THANK YOU.

Professor Datuk Dr. Khairuddin Ab Hamid
Vice Chancellor
Universiti Malaysia Sarawak

Dean's Message

On behalf of the faculty, I would like to take this opportunity to welcome each and every participant to the international Conference on Applied and Creative Arts (ICACA) 2011, welcome to the Land of the Hornbill, Sarawak. Thank you for your presence and participation and we hope your brief stay will be memorable one.

'Beyond Boundaries', ICACA2011 marked its 3rd International Biennial Conference. The theme itself reflects our interest to evaluate the mobile nature of today's art and the challenges in exploring inter-disciplinary approaches concerning visual practices in the arts; as well as new technology. Through the theme, we also hope that the conference may allow us to vision and discuss issues pertaining global art practices in the arts, ranging over wider fields.
With the conference focal point between intersection of art, technology and society it is our endeavour to nurture close engagement between academicians, artists, practitioners, leaders and policy makers.

In the future, creativity are not solely a matter of computer as an artistic medium but, above all, looking it beyond our common practice and may influence the way we look at things.
I would like to take this opportunity to thank PETRONAS, for its support in assisting FACA to realize ICACA 2011 through PETRONAS-P Ramlee chair.

Dr. Hasnizam Abdul Wahid
Dean
Faculty of Applied and Creative Arts
Universiti Malaysia Sarawak

Chairperson's Message

As the ICACA 2011 Chairperson, it gives me a great pleasure indeed to have participation from our homeland and from abroad, namely Taiwan, Korea, Indonesia and Canada at this conference, organized by the Faculty of Applied and Creative Arts (FACA) and co-sponsored by Petroliam Nasional Berhad (PETRONAS). I am pleased to announce that the response towards the third ICACA has been very encouraging from the very beginning. The secretariat received 87 abstracts from scholars all around the globe, from which only 50 have been selected to be presented in this two days conference. I must admit that the paper selection process was the most difficult one throughout the preparation of this conference. The ICACA 2011 secretariat found all 87 abstracts to be valuable and interesting either in their topic, research methodology or finding. The conference committee wishes to thank all abstract submitters, especially paper presenters who have diligently worked very closely with us in producing their full text and in meeting all requirements.

The main aim of this conference is to make ICACA a platform for scholars, teachers, policy makers and art practitioners who have been working in the field of arts to meet and discuss topics of common interest, in the context of "Beyond boundaries". But it is also our aim to provide opportunity for art lovers, patrons and followers, especially the people of Sarawak to participate and benefit from this conference. This event not only will enlighten us on what people of our country and others are working on passionately in various subject matters of the arts, but also provide opportunity for participants in terms of networking and collaborative efforts in the near future. This by itself will enable the realization of the conference theme, especially crossing the geographical boundaries to manifest hopes, ideas and aspirations among participants.

I would also like to take this opportunity to thank each and every ICACA 2011 participant and hope that this conference stands as a medium for you to establish your knowledge and contacts. ICACA 2011 committee hopes that you meet your personal and institutional objectives by attending our conference. It is also our wish that the outcome of our meeting at ICACA 2011 will be passed on to your affiliations and we continue to receive your support for the fourth ICACA which will be held sometime in 2013.

Lastly but not least I would also like to take this opportunity to thank each and every staff member, support and academic of FACA, especially the committee members of ICACA 2011, who had given their undivided support in realizing this conference. I would also like to give my appreciation to PETRONAS for co-sponsoring this event and enabling FACA to bring together scholars, teachers and policy makers of the arts from near and a far. I personally hope that the realization of ICACA 2011, significantly contributes to the future advancement of arts of all genres, not only in Malaysia but also elsewhere in the globe.

Dr. Nur Afifah Vanitha binti Abdullah,
ICACA 2011 Chairperson
Faculty of Applied and Creative Arts
Universiti Malaysia Sarawak

KEYNOTE SPEAKERS

by **Tracy Bhamra**

SUSTAINABLE DESIGN: NEW OPPORTUNITIES BEYOND THE BOUNDARIES

CONTACT INFORMATION
Tracy Bhamra
Loughborough Design School,
Loughborough University,
Loughborough, LE11 3TU,
skinner@uleth.ca

Abstract
Sustainable Design whilst a relatively new research area within design, has traditionally focussed on improving existing products and services with respect to their environmental impact. However it has been widely recognised that this incremental approach is unlikely to result in the significant changes needed if we are to have a more sustainable society. This paper outlines existing approaches to Sustainable Design and explores the way in which designers need to consider users in more detail if they are going to design more sustainable solutions. Finally it presents some new opportunities for designers beyond their traditional boundaries.

Introduction

For a number of years it has been widely recognised by governments and industry that current human activities degrade the environment and cause serious negative consequences for human populations (Brundtland, 1987) and as such we need to identify more sustainable patterns of development. A reduction of the environmental impact of human activities by of factor 10 is now recognised as a key target (Simon, 1997). Considerable research (Bhamra & Lofthouse, 2008) has been carried out to understand how socially and environmentally responsible considerations can be integrated into the product development process to enable more sustainable design.

Designers shape the development of products and services which directly impact upon society and the environment. Sustainable Design as a subject has developed considerably over the last fifteen years with the increase in awareness of environmental and social issues in industry (Von Weiszacker, Lovins & Lovins, 1997, Hawkens, 1993, Wackernagel & Rees, 1996). Until recently, the usual response to environmental problems was to reduce pollution and waste after it had been produced. Attention then moved away from these 'end-of-pipe' approaches to 'cleaner' manufacturing which results in less waste and pollution being generated. There was then the realisation that major environmental impacts arise from the material choices and from the use and disposal of products (Roy, 2000). The most advanced companies are now moving beyond the compliance mentality and being proactive in shaping future markets, consumer needs and influencing legislative developments. They see sustainable development as an opportunity rather than a threat, recognise that 'prevention is better than cure' and are attempting to 'design out' rather than simply manage the problems. Sustainable Design now goes beyond the consideration of environmental issues and also recognises the importance of social and ethical issues in design. The application of sustainable design can greatly reduce the environmental and social impacts of products and services.

The dominant conversation on how design can address sustainable development initially grew out of the lifecycle thinking of ecodesign (Bhamra & Lofthouse, 2008). To this has now been added a consideration of the social aspects of production and consumption such as considerations of how we consume and live as well as corporate and public sector initiatives that address social responsibility issues, such as the use of child labour, poor working conditions and unfair wages. Initiatives such as Fair Trade direct efforts at ensuring a fairer distribution of revenues among the producers in the developing world and are connecting with design decision making.

Background to Sustainable Design

The concept and practice of sustainable design is the response from the design community to increasing environmental and social pressures, limits and awareness. The last two decades have seen a proliferation of terminology relating to the incorporation of environmental considerations into design but generally this falls into three different approaches, green design; ecodesign; and sustainable design:

• Green design: has a single-issue focus, perhaps incorporating the use of some new material, such as recycled or recyclable plastic, or consider energy consumption.
• Ecodesign: adopts the lifecycle approach, exploring and tackling all or the greatest im pacts across the products lifecycle.
• Sustainable design: takes a more broad and holistic approach, including: questioning/ addressing needs; concern for ethics and equity, services and leasing.

The life cycle of a product, service or system has many stages starting with the extraction of the raw material required to produce it, moving on to the processing of those materials, through to manufacture, purchasing by the consumer, use by the consumer and then disposal, followed by any reuse or recycling which may occur.

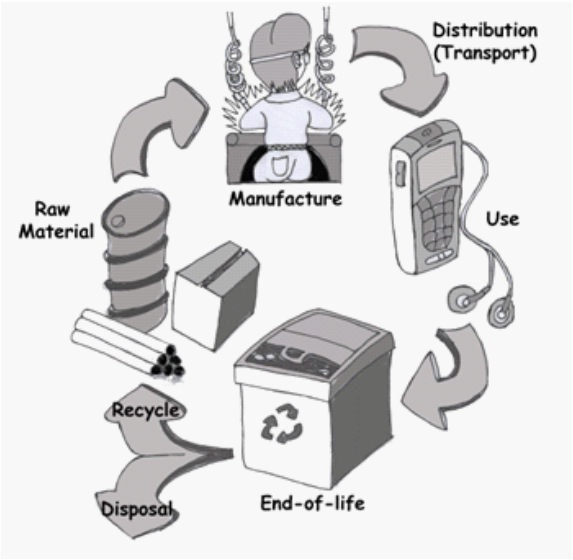

Figure 1 Product Life Cycle

Life cycle thinking in design aims to identify possible improvement in the form of lower environmental impacts and reduced resource use across all life cycle stages. While doing this it is important to ensure that these burdens are not shifted from one lifecycle stage to another. Overall the whole life cycle should be improved. This should mean the project is working across the boundaries of an organization to make sustainability marketable, tractable and profitable. Life cycle thinking provides a broader perspective in design. As well as considering the environmental impacts that are within the direct control of the organisation, attention is also given to all raw materials use, supply chains, product use, the effects of disposal and the opportunities for reuse and recycling.

Models are used to explain sustainable design in more detail and one by Brezet (1997) provides a clear outline of the key design criteria and consideration. This model proposes a four-step model of sustainable design innovation and is illustrated in figure 1 below. These steps are described as:

• *Product improvement:* The improvement of existing products with regards to pollution prevention and environmental care. Products are made compliant.
• *Product redesign:* The product concept stays the same, but parts of the product are developed further or replaced by others. Typical aims are increased reuse of spare parts and raw materials, or minimising the energy use at several stages in the product life cycle.

• *Function innovation:* Involves changing the way the function is fulfilled. Examples include a move from paper-based information exchange to e-mail, or private cars to 'call-a- car' systems.
• *System innovation:* New products and services arise requiring changes in the related infrastructure and organisations. A changeover in agriculture to industry-based food production, or changes in organisation, transportation and labour based on information technology.

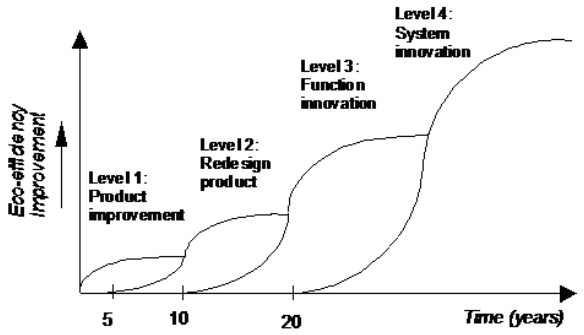

Figure 2 Four Stage model of sustainable design innovation (Brezet, 1997)

To move from level 1 to level 4, increasing amounts of time and complexity are required, which leads to higher levels of improvements towards sustainability. This model suggests that these more complex sustainable design innovations can only be achieved over a significant time period, say 10-20 years and by approaching sustainable design in new ways.

At level 1, product improvement, the focus is on partial changes and improvements to the existing design outcomes. This is often at the level of focussing on pollution prevention measures such as materials substitution or making the design outcome energy efficient as well as complying with legislation. Whilst this will not, by itself, lead to big innovative opportunities it may help meet some aspects of legislation, improve the organization's public image and help the organization to begin to learn about sustainable design.

Product redesign, level 2, involves taking a lifecycle perspective during design, which means considering the intended and unintended environmental and social impacts across the whole of the lifecycle. The design concept remains the same but some elements are developed further or replaced. Resource efficiency is often a good starting point when thinking about redesigning products, services or systems. Designers should look for opportunities to reduce material and energy used throughout the lifecycle of a design concept. By doing so, it is possible to not only reduce the environmental impact of products, packaging or services or visual communications but at the same time reduce costs. This evolutionary approach integrates environmental and social justice considerations into existing design practice. The key words are product modification and pragmatism. Here environmental and social issues should be incorporated.

Moving to level 4, function innovation, requires a more holistic approach whereby the designer should look for opportunities to change the way the function of the design outcome is fulfilled. Sustainability considerations should be used as the driver for new and more radical concept developments. This uses a more revolutionary approach because many consider that existing products and services, as well as patterns of production and consumption, can never lead to sustainability. New concepts tend to deal with the following factors:

- effectiveness;
- innovation and creativity;
- mimicking natural principles and ecological models; and
- engaging cultural and lifestyle factors.

It is multi-disciplinary, extending beyond single or traditional design outcomes and organization boundaries. This route on the journey requires a different approach to developing products, services and systems. When taking this route designers and organizations should consider the wider opportunities that sustainable design can provide. By looking for more radical innovative solutions new business opportunities can emerge along with more sustainable design outcomes.

Finally achieving level 5, system innovation, requires the designer to move outside of the traditional boundaries of design to consider how a new system can deliver significantly better performance from a sustainability perspective. It may also involve the replacement of an entire technological system by a new system. These changes are likely to require changes in the related infrastructure and organization and as such may be impossible for designers to influence without significant business buy-in. System innovation is a strategic approach which companies may choose in order to remove the traditional link between resource consumption and profit and improvement in standards of living. This can result is new profit centres that compete and generate value and social justice while decreasing (directly or indirectly) total resource consumption. This level requires a different approach to developing products, services and systems. At this stage designers and organizations should consider the opportunities more widely that sustainable design can provide. Systems embody the potential for sustainable innovative ideas for organizations in different socio-economical contexts, because they link sustainability with existing and emerging dynamics of economic and cultural change.

Opportunities for Change

As Brezet's model shows there are many different approaches to tackling sustainable design with many different types of design outcomes and with different levels of environmental and social benefits. If as designers we are going to help move towards a more sustainable society then we need to start looking at adopting the more radical approaches to sustainable design, ie Function Innovation and System Innovation.

These more radical approaches to design where it does not begin with the idea of a product solution in mind but starts with consideration of what the product satisfies (such as the need for warmth) and considers if that need could be met in another more sustainable way. The best sustainable design outcome may not be a new product, but a new system or mode of product use. For example, car share systems reconfigure the perception that we as consumers need a new car; what we really need as citizens is access to transport. This requires designers to work in a new way that is more interdisciplinary and even across different professions. It also requires a more participatory way of working, which involves both target users and anyone else who is influenced, either directly or indirectly, by the design decisions made.

If design has this as its starting point for sustainable design then many more sustainable solutions will emerge. Rather than just making small incremental improvements to existing products we can ensure that future innovative solutions not only deliver high levels of customer satisfaction but also radically reduced environmental and social impacts. As designers we need to look beyond our traditional boundaries of designing products and explore how developing services and systems can better meet the needs of customers whilst having a radically reduced impact on the environment

and society. In developed nations this progress to 'sustainable product-service systems' (Mont, 2002) means exploring new ways of living. The next, inevitable, step is to ask how design interventions can direct us as citizens (not just consumers) onto a more sustainable path.

Services in the context of sustainability can generally be divided into three categories (Hockerts, 1999) product-orientated services; use-orientated services; and results-orientated services. These definitions all apply to services that are a substitution for products.

Product oriented services are characterized by customer ownership of the physical good, and represent only a minimal departure from a traditional sell-buy arrangement. These services enhance the utility ownership of the product delivery to the customer, through warranties and maintenance agreements for example.. The environmental motivation for manufacturers to adopt product services is that they increase the lifetime of the product to which they are attached, e.g. a maintenance service for a washing machine. As a result, over time less machines are needed and materials and energy are saved.

In the case of use oriented services, ownership of the products resides with the service provider. Customers have the use of the product, but maintenance as well as end of life disposal is the responsibility of the service provider. Thus, the consumer gains the function of the product without ownership. Traditional rental or leasing arrangements fall into this category. With rental systems, consumers can use products for some time without the need to purchase and to own them. The expected increased eco-efficiency rating for use services is closely related to the high use intensity of products, which brings about a reduction in the number of products needed.

Finally, in the case of result oriented services the product is owned and run by the supplier, who therefore has an incentive to intensify and optimize the product's operation, and to increase its service life. How the customer's need is satisfied is irrelevant, as long as it is satisfied. An additional aspect of result services is that by developing and offering a result instead of a pre-specified product or service, sustainability can be incorporated from the start. Consequently, significant reductions in the material and energy consumption per unit of service are likely.

The interesting challenge for designers is that current products are unlikely to be entirely suitable to be used as part of a sustainable product-service system and therefore this presents them with an interesting design opportunity. For designers it is important to recognise that services as compared to products are intangible and therefore often difficult to display, communicate and price. They are also heterogeneous, i.e. they can contain a diverse range of different components, which could make it difficult to ensure quality and customer satisfaction. Services also differ from products in that production and consumption are simultaneous rather than separate and therefore mass production (and the economies of scale that go along with it) may be difficult to achieve.

Moving to Design for Sustainable Behaviour

As illustrated earlier, in simple terms the lifecycle of a product, service or system consists of raw material acquisition, manufacturing, use and disposal. Until recently the main focus for the incremental approaches to sustainable design has been the first, second and last stage of the life cycle. However, the use phase has been identified as having significant environmental and social impacts, which are largely determined by the consumers' behaviour (Environmental Change Unit, 1997; Sherwin & Bhamra, 1998). To reduce the impact of the use, technological innovation alone is not sufficient, a fundamental shift in behaviour is required a shift which could be initiated by innovative product, service or system design.

This new field of enquiry is exploring how design can influence user behaviour to reduce negative social or environmental use impacts. Previous investigations (Lilley, 2007; Tang, 2010) identified seven strategies which can be applied within design. This work provided an understanding of the psychological and behavioural factors of behavioural change and identified ways in which they could be applied within a design context (Tang & Bhamra, 2008).

Figure 3 below illustrates these approaches and shows how the power in decision-making, relating to the behaviour, shifts from the user to the product, service or system.

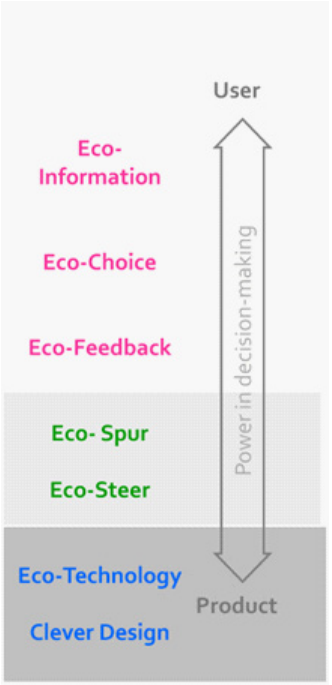

Figure 3 Seven Design for Sustainable Behaviour Approaches (Tang & Bhamra, 2008)

Eco-Information can be considered as design oriented education, making consumption visible, understandable and accessible to the consumer to enable them to reflect upon their use of resources. Eco-choice moves towards design oriented empowerment by encouraging consumer to think about their use behaviour and take responsibility for their action, it does this by providing consumer with options. Eco-feedback provides design oriented links to environmentally and/or socially responsible action by clearly informing users about what they are doing and facilitating responsible decision-making. Eco-spur moves to a design oriented incentive or penalty system by prompting good behaviour and punishing unsustainable use. Eco-steer provides design oriented affordances and constraints enabling users to adopt sustainable use habits through prescriptions or constraints of use embedded in the design. Eco-technical interventions aim to restrain existing use habits and to persuade or control user behaviour atomically through the use of advanced technology in the design. Finally clever design automatically acts in a sustainable way without raising awareness or changing user behaviour, this is achieved by the way in which the product, service or system is designed.

Despite this recent research design for sustainable behaviour remains a relatively unexplored field by designers and has yet to result in radical new products, services and systems. How-

ever by again moving beyond the traditional boundaries of design we can enable users to be more sustainable either consciously or unconsciously by providing solutions that have considered real user behaviour.

Conclusions

Until recently sustainable design techniques only tended to focus on increasing energy efficiency, using recycled materials, reducing toxicity or extending product life. This paper has illustrated the new ways that designers need to work to ensure that their designs really contribute to sustainability and ensure the future for the environment and society. By moving beyond their traditional boundaries designers have the opportunity to provide solutions to real needs that are no longer confined to only products but also provide services and systems. In addition by building a detailed understanding of the user of the product service or system they are able to ensure that their intended sustainability benefits can be achieved no matter who the user is or the context in which use occurs.

References

Bhamra, T. A. and V. A. Lofthouse V A. 2007. Design for Sustainability: A Practical Approach, Gower Publishing, ISBN 0 566 08704 9

Brezet, H. 1997. Dynamics in ecodesign practice. UNEP Industry and Environment, 20(1-2), pp21-24.

Brundtland, G.1987. Our Common Future. The World Commission of Environment & Development. UK, Oxford University Press.

Environmental Change Unit. 1997. 2MtC - DECADE: Domestic Equipment and Carbon Dioxide Emissions. Oxford, Oxford University.

Hawken, P.1993. The Ecology of Commerce, London, Weidenfeld & Nicholson.

Roy, R . 2000. Sustainable Product-Service Systems, Futures, 32, (April), pp289-299.

Hockerts, K. 1999. Innovation of eco-efficient services: increasing the efficiency of products and services, in Greener Marketing: A Global Perspective on Greening Marketing Practice, M. Charter and M.J. Polonsky, Editors, Greenleaf Publishing: Sheffield. p. pp. 95 - 108.

Lilley, D., 2007 Designing for Behavioural Change: Reducing the Social Impacts of Product Use through Design, Doctoral Thesis, Department of Design and Technology, Loughborough University, Loughborough, UK.

Mont, O. 2002. Drivers and barriers for shifting towards more service-oriented businesses: Analysis of the pss field and contributions from Sweden. The journal of Sustainable Product Design, 2:89-103

Sherwin, C. and T. Bhamra. 1998. Ecodesign Innovation: present concepts, current practice and future directions for design and the environment, In: Design History Society Conference, University of Huddersfield, Huddersfield, UK.

Simon, M. 1997. The politics of ecodesign. EcoDesign 4(4).

Tang, T. 2010 Towards Sustainable Use: Design Behaviour Impact to Reduce Household Environmental Impact, Doctoral Thesis, Loughborough Design School, Loughborough University, Loughborough, UK

Tang, T. and Bhamra, T. 2008. Changing Energy Consumption Behaviour through Sustainable Product Design, Design2008, Dubrovnik - Croatia, May 19 - 22, 2008.

Von Weiszacker, E., L. H. Lovins, and A. B. Lovins. 1997 Factor Four: Doubling wealth, halving resource use, London, Earthscan.

Wackernagel, M. and W. Rees. 1996. Our Ecological Footprint: Reducing Human Impact on the Environment, USA, New Society Publishers.

by **Hatta Azad Khan**

CROSSING BORDERS IN THE ARTISTIC AND CREATIVE INDUSTRIES

CONTACT INFORMATION
Hatta Azad Khan
Faculty of Artistic & Creative Technology
University Technology MARA
(UiTM) Shah Alam
hattazad@yahoo.com