### CONFERENCE AT A GLANCE

#### Ground Floor
- **Location A:** Hall Registration
- **Location B:** Cantina
- **Location C:** Entrance

#### Design Research meets Industry

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday 31 October</th>
<th>Tuesday 1 November</th>
<th>Wednesday 2 November</th>
<th>Thursday 3 November</th>
<th>Friday 4 November</th>
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<tbody>
<tr>
<td>08:30</td>
<td>08:30 Registration Welcome coffee</td>
<td>08:30 Registration</td>
<td>08:30 Oral presentation</td>
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<tr>
<td>09:00</td>
<td>Opening session</td>
<td>09:00 Keynote 1</td>
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<td>Keynote 2</td>
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#### Floor 1
- **Location A:** Auditorium
- **Location B:** Foyer
- **Location C:** Location D
- **Location D:** Location E
- **Location E:** Location F
- **Location F:** Location G
- **Location G:** Location H
- **Location H:** Location I
- **Location I:** Location J

#### Floor 2
- **Location A:** Auditorium
- **Location B:** Foyer
- **Location C:** Location D
- **Location D:** Location E
- **Location E:** Location F
- **Location F:** Location G
- **Location G:** Location H
- **Location H:** Location I
- **Location I:** Location J

#### Conference Centre Floorplan

- **TU DELFT AULA CONFERENCE CENTRE FLOORPLAN**
- **Design Research meets Industry**
- **Ground floor:** Registration, cantina, entrance, elevator, stairs
- **Floor 1:** Auditorium, foyer, location A-J
- **Floor 2:** Auditorium, foyer, location A-J
- **Ground floor:** Entrance, registration, hall, restaurant, catering, toilets
- **Basement:** Toilets can be found in the basement and on floor 2

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**Additional Notes:**
Diversity and unity

4th World Conference on Design Research
October 31 - November 4, 2011
Delft, The Netherlands

Organized by the International Association of Societies of Design Research (IASDR) and Delft University of Technology, Faculty of Industrial Design Engineering

www.iasdr2011.org

Book of abstracts & programme

editors Norbert Roozenburg
Lin-Lin Chen
Pieter Jan Stappers

lay-out & design Corrie van der Lelie

ISBN 978-94-6190-719-6
ABOUT IASDR 2011

Conference chair  Norbert Roozenburg (TU Delft)

Advisory board  Lin-Lin Chen (CID)  Soon-Jong Lee (KSDS)  Fong-Gong Wu (CID)
Nigel Cross (DRS)  Udo Lindemann (DS)  Toshimasa Yamanaka (JSSD)
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Local organising committee  Jaap Daalhuizen  Norbert Roozenburg  Carlos Coimbra Cardoso
(TU Delft)  Jaap van Grinsven  Pieter Jan Stappers  Christine de Lille
Corrie van der Lelie  Angeline Westbroek

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Submissions coordinator  Yaliang Chuang (NTUST, TW)
IASDR2011 secretariat  Astrid Bijkerk
Aula Conference Centre  Els Bakker-van Benthem  Corry van der Drift  Marie-Louise Verhagen

INTERNET ACCESS

During the conference internet access is provided by connecting to the network:
TUDELFTCONGRESS - wepkey: 5h7ne

OPENING HOURS REGISTRATION DESK

<table>
<thead>
<tr>
<th>Day</th>
<th>Monday 31 October</th>
<th>Tuesday 1 November</th>
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<tbody>
<tr>
<td>07:30 - 10:00h</td>
<td>Central hall Industrial Design Engineering</td>
<td>07:30 - 17:00h</td>
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<td>17:00 - 19:00h</td>
<td>Central hall Industrial Design Engineering</td>
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<tr>
<th>Day</th>
<th>Wednesday 2 November</th>
<th>Thursday 3 November</th>
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<tbody>
<tr>
<td>08:00 - 10:00h</td>
<td>Central hall Aula Conference Centre</td>
<td>08:00 - 10:00h</td>
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<tr>
<td>12:30 - 14:00h</td>
<td>Central hall Aula Conference Centre</td>
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</tbody>
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IASDR 2011: LETTER OF WELCOME

It is my great pleasure to welcome all participants to this fourth Congress of the International Association of Societies of Design Research (IASDR).

IASDR was formally established in November 2005, at its first Congress, held in Taiwan. The Association's aim is to promote research or study into or about the activity of design in all its many fields of application, encouraging collaboration on an international level between independent societies of design research. The Association is comprised of five member societies, of which three are based in Asia:

• The Chinese Institute of Design
• The Japanese Society for the Science of Design
• The Korean Society of Design Science

and two are international but based in Europe:

• The Design Research Society
• The Design Society.

The founding of the Association was an acknowledgement of and response to the rapid growth in the numbers of design researchers, and in the amount of design research that is now in progress around the world. This growth requires more international collaboration and cooperation amongst the several societies that already exist to encourage and support design research. It also requires a level of international agreement on the standards of a robust and rigorous design discipline. The Association, with its focus on research, stands alongside, and will cooperate with, other international organisations concerned with design practice and education.

The Association promotes, amongst other activities, the organisation of a biennial International Congress of Design Research, at venues around the world. Three such Congresses have been held very successfully: in Douliou, Taiwan, November 2005, in Hong Kong, November 2007, and in Seoul, South Korea in October 2009. In reflecting on a venue for the fourth Congress, we hoped to find it in Europe. Some of our Board members, including myself, know well the Faculty of Industrial Design at Delft University of Technology, and we were delighted when we received an immediate positive response from the Faculty when we approached them. The international reputation of the Faculty of Industrial Design, and the historic location of Delft makes it a particularly appropriate and attractive venue for IASDR.

We are truly grateful to Norbert Roozenburg, who has led the organisation of this Congress, and to the Dean, Cees de Bont, and the many other colleagues at the Faculty of Industrial Design for their generous offer to host this Congress, and for all the hard work that has gone into its preparation and presentation.

Nigel Cross
President, International Association of Societies of Design Research
PREFACE BY CONFERENCE CHAIR

Welcome to IASDR2011, the 4th World Conference on Design Research, at Delft University of Technology, Netherlands. Thank you for coming; we hope you will enjoy the conference.

The first three IASDR conferences were held in Taiwan, Hong Kong and Seoul. We of the Faculty of Industrial Design Engineering are proud to have been given the chance to organize this first IASDR conference in the Western world.

IASDR’s conferences are open to all design disciplines. They aim to provide a unique global forum for the presentation and discussion of research into fundamental aspects of design activity and experience across all domains of application, including industrial design, architectural design and planning, different branches of engineering design, software, interaction and media design.

This year’s conference brings together more than 400 hundred academics, researchers and practitioners from 150 different institutions spread over 35 countries. Hence, the conference provides for a rich international, cross-discipline and multicultural platform for networking and developing new knowledge, connections and longer-term collaborations.

The conference proceedings comprise 310 papers. This represents nearly 40% percent of abstracts and full papers that were initially submitted. Over 250 reviewers and 10 advocates have actively contributed to the review process. The published papers cover a wide array of topics of which “design and emotion” and “design education” attracted the largest number of submissions.

We are fortunate to have six distinguished keynote speakers: Paul Gardien (Philips Design), Kristina Höök (Stockholm University & SICS Mobile Life Centre), Lucy Kimbell (Said Business School & Fieldstudio), Jongdeok Kim (Hongik University), Ilpo Koskinen (Aalto University) and Lin-Lin Chen (National Taiwan University of Science and Technology). Thank you very much for coming.

I would especially like to thank and acknowledge Lin-lin Chen, Yaliang Chuang and Pieter Jan Stappers for all the hard work they have done to manage the review process and to establish the program. Also I want to thank the members of the local organizing committee for making it happen: Astrid Bijkerk, Carlos Cardoso, Jaap Daalhuizen, Jaap van Grinsven, Corrie van der Lelie, Christine de Lille and Angelina Westbroek, as well as the staff of the Aula Conference Centre: Els Bakker-van Benthem, Corry van der Drift and Marie-Louise Verhagen.

Above all, thank you to all of you for coming to Delft. I wish you a very nice conference.

Delft, 6 October 2011

Norbert Roozenburg
IASDR2011 Conference chair
IN MEMORIAM KEES OVERBEEKE
(18 July 1952 - 8 October 2011)

During the final preparations for this conference we learned of the sudden death of prof.dr. C.J. Overbeeke.

Kees has been an active member of the design research community, passionate about realizing quality in design. In his work he stressed the design relevance of research, and scientific maturity of design. In Delft, as associate professor Form Theory and co-founder of the ID-StudioLab, and then as full professor Intelligent Products and Systems Design at TU/e he was active in leading design research and education groups. Kees inspired new directions and conferences such as the Design and Emotion Society and Designing Pleasurable Products and Interfaces. Only two years ago he gave a keynote at iasdr 2009.

Kees stood open to combining the personal and professional qualities of those he worked with, and especially vehement about coaching students to get the best out of themselves. In his personal way, he inspired a new generation of designers worldwide. He will be sincerely missed.

The Designing Quality in Interaction Group has setup a webpage http://dqi.id.tue.nl/kees/ on which friends and colleagues can share memories of Kees.
IASDR2011 REVIEWERS

Ahmad, Hafiz - Chiba University, (JP)
Alanchari, Narges - university, (IR)
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Anguelova, Sofia - Technical University of Sofia, (BG)
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Bruksi, Paul - Iowa State University, (US)
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Callender, Jassen - Mississippi State University, (US)
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Tu, Jui-Che - (TW)
Tung, Fang-Wu - NTUST, (NL)
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Waarde, Karel van der - Graphic Design - Research + Arans University, (BE)
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Warell, Anders - Lund University, (SE)
Westerveld, Bo - Linnaeus University, (SE)
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Wiltse, Heather - IN Institute of Technology, (US)
Worden, Suzette - Curtin University, (AU)
Wormald, Paul - National University of Singapore, (SG)
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Xu, Qianli - Institute for Infocomm Research, (SG)
Yagou, Artemis - (GR)
Yamanaka, Toshimasu - University of Tsukuba, (JP)
Yamazaki, KazuhiZo - Chiba Institute of Technology, (JP)
Yang, ming-yi - national united university, (TW)
Yee, Joyce - Northumbria University, (UK)
Yen, Ching Chiu - National University of Singapore, (SG)
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Yoon, SeKyun - Seoul Design Center, (KR)
Zafarmand, Seyed Javad - Chiba University, (JP)
Zeiler, Wim - TU Eindhoven, (NL)

On behalf of the entire community we would like to express our gratitude to the work performed by our reviewers. The reviews were used by the program committee to make informed accept/reject decisions for each submission and by authors to make the appropriate amendments to their paper.
IASDR2011 CHAIRS

Aprile, Walter Alberto - Delft University of Technology
Badke-Schaub, Petra - Delft University of Technology
Blackler, Alethea - Queensland University of Technology
Boess, Stella - Delft University of Technology
Bohemia, Erik - Northumbria University
Bouchard, Carole - Arts&Métiers ParisTech
Chen, Chun-Di - National Taipei University of Education
Chen, Kuohsiang - National Taiwan University of Science and Technology
Christiaans, Henri - Delft University of Technology
Chuang, Ming-Chuen - National Chiao Tung University
Chuang, Yaliang - National Taiwan University of Science and Technology
Dong, Hua - Brunel University, Tongji University
Dorst, Kees - University of Technology Sydney
Gero, John - Krasnow Institute for Advanced Study
Goldschmidt, Gabriela - Technion-Israel Institute of Technology
Hekkert, Paul - Delft University of Technology
Keinonen, Turkka - Aalto University
Kraal, Ben - Queensland University of Technology
Kuipers, Henk - Delft University of Technology
Lenau, Torben - Technical University of Denmark
Levy, Pierre - Eindhoven University of Technology
Lim, Youn-Kyung - KAIST
Lloyd, Peter - The Open University
Ma, Min-Yuan - National Cheng Kung University
Marjanovic, Dorian - University of Zagreb
Melles, Gavin - Swinburne University
Mulder, Ingrid - Delft University of Technology
Nagai, Yukari - University of Zagreb
Nam, Tek-Jin - KAIST
Oxman, Rivka - Technion-Israel Institute of Technology
Ozcan, Elif - Delft University of Technology
Peck, David - Delft University of Technology
Person, Oscar - Delft University of Technology
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Tomiyama, Tetsuo - Delft University of Technology
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Wu, Fong-Gong - National Cheng Kung University
Yamanaka, Toshimasa - University of Tsukuba
Zeiler, Wim - Eindhoven University of Technology
SOCIAL EVENTS

MONDAY
31 October
17:00 - 19:00 uur
Icebreaking party
Central hall of the Faculty of Industrial Design Engineering

TUESDAY
1 November
09:00 - 09:30 uur
Opening session
Auditorium - Aula Conference Centre
The conference will be opened by prof. ir. K.Ch.A.M. Luyben, Vice-president & Rector Magnificus TU Delft, and prof. Kun-Pyo Lee, Secretary-General IASDR
Immediately following the opening ceremony, Paul Gardien and Kristina Höök will deliver a keynote speech.

WEDNESDAY
2 November
18:30 - 22:30 uur
Conference dinner buffet & dance
Central hall of the Faculty of Industrial Design Engineering
18:30 Drinks, the Dinner Buffet & dance starts at 19:00h
You might consider to use the time between conference and the dinner buffet to pay a visit to one of two architectural icons: the University library and/or the Faculty of Architecture.

THURSDAY
3 November
16:00 - 17:00 uur
Closing session
Auditorium - Aula Conference Centre
Prof. Nigel Cross will wrap up the conference and announce the location of IASDR2013

FRIDAY
4 November
Design research meets industry
Dutch Design consultancies stand ready to exchange views with IASDR2011 delegates
KEYNOTES

Auditorium - Aula Conference Centre

We are proud to have the following keynote speakers presenting at IASDR2011. More elaborate information can be found on the next pages.

1  **Paul Gardien** - Head of Design Strategy & Design Innovation & Vice President Philips Design
   Tuesday 1 November - 09:30h - page 12

2  **Kristina Höök** - Professor in Human-Machine interaction at Stockholm University & founder Mobile Life Centre, SICS
   Tuesday 1 November - 10:15h - page 13

3  **Ilpo Koskinen** - Professor in Industrial Design at Aalto University School of Art and Design
   Wednesday 2 November - 10:30h - page 14

4  **Jongdeok Kim** - Dean of the Graduate School of Film & Digital Media and Dean of the Graduate School of Advertising & Public Relations, Hongik University
   Wednesday 2 November - 11:15h - page 15

5  **Lucy Kimbell** - Associate fellow Said Business School, University of Oxford & associate at both Taylor Haig and The Policy Lab
   Thursday 3 November - 10:30h - page 16

6  **Lin-Lin Chen** - Professor Department of Industrial and Commercial Design at National Taiwan University of Science and Technology
   Thursday 3 November - 11:15h - page 17
Innovation is not a linear process: there are always multiple approaches to innovation.

TODAY’S CHALLENGES FOR DESIGN RESEARCH

Over the last decennia, the discipline of design has become an accepted and integrated business tool for differentiation and branding. In fact, Bruce Nussbaum, former Business Week editor and one of design’s biggest advocates, declares that: “Companies absorbed the process of Design Thinking all too well, turning it into a linear, gated, by-the-book methodology that delivered, at best, incremental change and innovation.”

I would argue that design, and design research as a strategy tool, is not as well absorbed and understood by business as Nussbaum suggests for a number of reasons.

First, with the maturing of the discipline, the number of design services and design research topics have exploded. As these are often described from a discipline perspective it is difficult for businesses to understand where and how to apply these. As a discipline we need to get back to our roots of being ‘people-focused’, and position topics and capabilities with a view on how value for people will be changing in the future.

Second, it is not well understood how new design services and capabilities get embedded into organizations, and this hampers uptake. Design has to develop the right approaches for different maturity levels of organizations.

And last, but not least, I believe that breakaway change starts with dilemmas and disruptions. Next to developing knowledge, processes & tools, Design Research has to develop more provocations to stimulate debate. This is the only way to be a protagonist of the future.
MOVE THAT BODY! INVOLVING USERS EMOTIONALLY, BODILY AND SOCIALLY

Our actual corporeal bodies are key in how we live in the world, in creating for experiences. Our bodies are not instruments or objects through which we communicate information. Communication is embodied – it involves our whole bodies, our deeply human ways of being in the world. There are many different kinds of bodily experiences we can envision designing for. In design of interactive systems, this is still a largely untapped area.

Bodily movements may, for example, give rise to emotional experiences, by moving you get moved, and emotional processes will affect your bodily movements. In this talk, I will show a range of systems we have built where we try to involve users bodily, emotionally and socially in sustained interaction loops through movement.

Doing design research in this area may feel like a daunting task as the qualities we strive to capture are highly elusive, subjective, context- and application-specific, and relates to values such as aesthetics, fun, meaning-making or being emotionally close to others. To get at the felt experience, we have had to innovate novel evaluation methods, such as the Sensual Evaluation Instrument, and novel ways of articulating “bodily ways of knowing”.

But the most important output from our research work is, in my view, the formulation of strong concepts that can inspire design practitioners. I propose a strong concept we have named Affective Loops to capture some of our design knowledge. In the talk, I aim to discuss how we have tried to validate that Affective Loops as a strong concept able to generate more than one application.
CONSTRUCTIVE DESIGN RESEARCH: LAB, FIELD, SHOWROOM

One particularly exciting thing happening in contemporary design research puts design into the very center of research. With my colleagues, I have talked about “constructive design research.” This presentation first looks at the history of constructive research, and looks at things that make some research productive in the long run. After contextualization, the presentation turns to three methodological approaches to constructive design research, Lab, Field, and Showroom, and describes some of their key features. The third part of the presentation searches for common theoretical and philosophical threads in these methodological approaches, and looks at techniques to merge research and design. The final part of the presentation turns to the social context of typical research projects, and presents a few ideas about how universities can build successful constructive research programmes in design.
DESIGN POLICY AND DESIGN POLITICS:
HAVE WE EVER BEEN EXPOSED TO PARTISAN DESIGN ENVIRONMENT THIS MUCH BEFORE?

As the new mayor of Seoul was elected in 2006, the Seoul government initiated “Design Seoul” which is a public design project for the Seoul citizens. For the project, a designer was appointed to the deputy of mayor, and an improvement on the street environment, city landscape, views on the Han-river area, Seoul font design was actively operated. There have been discourses on “Design Seoul” for years, but they intensified along with political conflicts and even exaggerated by media.

As the diversity of media developed in Korea, each medium strengthens its own partisanship to show its political identity while competing with others. In the process, the design discourse becomes more politicized.

Many scholars/researchers suggested that different perspectives existing in a democratic society eventually maintain a democratic citizenry. However, this adaptation to the oppositional views is based on the premise that we are exposed to them. Many previous studies revealed that people selectively expose themselves to the media or to their personal relationships. In other words, they don’t like to expose themselves to the contradictory or opposing side. Through the selective exposure, people reinforce their viewpoints rather than accepting the opposing one, and the media of Korea is abusing this phenomenon according to my survey & contents analysis of Korean newspapers. Politicized design discourse inhibits the proper critique on design, and distorts all issues into the dichotomous choice.
Abstract

HOW SERVICE DESIGN IS BOTH MORE AND LESS THAN IT SEEMS

In this talk I will describe the emergence of a new field of expertise, involved with the design of services. I will consider claims for this being a distinctive, new profession and discipline within design, including ideas of services being intangible and their being co-created by users and providers. I explore how service design, as currently articulated in practice and in research, is less than it seems when viewed from different perspectives, such as how it is described and also the numbers of designers who say they do it. I then suggest that designing for service is more than it seems, by identifying important aspects such as ownership and use of resources. Finally I discuss what this means for researchers interested in the field.
LIN-LIN CHEN

National Taiwan University of Science and Technology

Lin-Lin Chen is a professor in the Department of Industrial and Commercial Design at National Taiwan University of Science and Technology. She received her PhD from the University of Michigan at Ann Arbor, and taught briefly at Iowa State University before returning to Taiwan. Her research focuses on attractiveness of product appearance, computer-aided concept exploration and evaluation, interface design, and geometric algorithms.

She was dean of the College of Design at NTUST from 2004 to 2010, and president of the Chinese Institute of Design from 2007 to 2008. She is currently the convener for the arts (and design) area committee of Taiwan’s National Science Council, editor-in-chief of the International Journal of Design, a fellow of the Design Research Society, and an executive board member of the International Association of Societies of Design Research (IASDR).

Work with full understanding of constraints imposed by reality, but also maintaining a sense of idealism

POSITIONING DESIGN IN ACADEMIA

Design is gradually establishing itself as a legitimate discipline in Academia. As the Dean of College of Design from 2004 to 2010 at National Taiwan University of Science and Technology, one of the top research universities in Taiwan, I have tried to find ways to simultaneously build the distinctive values of design and strengthen the abilities of conducting rigorous research. I believe that a design department can make the greatest contribution to a university by being the very best in design—in practice and in research—rather than by being an emulation of another discipline. In this talk, I will describe some of these efforts: proposing measures for evaluating faculty performance in design and in research, seeking national funding for forward-thinking design projects that encourage interdisciplinary collaboration, and trying to create more legitimate publication venues by establishing the International Journal of Design. I hope that these efforts and their outcomes could serve as a useful reference for other design departments and colleges around the world.
SPECIAL SESSIONS

WEDNESDAY
2 November
12:00 - 13:00 uur

Perceptions of Design Journals

Location A, Aula Conference Centre

**moderator** Ken Friedman, Dean of the Faculty of Design at Swinburne University of Technology in Melbourne, editor of the *Journal of Design Research* and a member of the editorial board of *Design Studies, Design and Culture*, and the *International Journal of Design*

**presentation by** Cees de Bont, Dean of the Faculty of Industrial Design Engineering, Delft University of Technology

In this special session, we discuss the (perceived) ranking of design journals within the academic field in general. We do so by means of a forum discussion with editors and editorial design members of established design journals. We will start our discussion by presenting the findings of a worldwide survey on the quality of design journals as perceived by design academics. With the forum members we subsequently discuss the perceived quality of design journals relative to journals from other academic fields. Relevant topics to be discussed are: the antecedents and consequences of impact factors for design journals; publication and citation strategies of design academics; the existence and consequences of general design journals that publish articles in design across the different sub-disciplines and specialized design journals that focus on a design sub-discipline or specific field.

**forum members**

Lin-Lin Chen, Professor in the Department of Industrial and Commercial Design at National Taiwan University of Science and Technology and editor of *International Journal of Design*

Nigel Cross, Emeritus Professor of Design Studies, Faculty of Technology, at the UK’s Open University and editor of *Design Studies*

Paul Hekkert, Professor of Form Theory at the Faculty of Industrial Design Engineering, Delft University of Technology and a member of the editorial board of *The Design Journal, Empirical Studies of the Arts*, and the *International Journal of Design*

Janet McDonnell, Associate Dean of Research at Central Saint Martins and editor of *CoDesign*

Chris McMahon, Professor of Engineering Design in the Department of Mechanical Engineering at the University of Bath, and member of editorial board of *Journal of Engineering Design.*
Design Education Research: where do we stand?
Location B, Aula Conference Centre

Kees Dorst, University of Technology Sydney
Marc J. de Vries, Delft University of Technology

Is education a researchable area? Some people say: no, it is too complicated for that. Some people say: yes, even though you need to take into account a lot of variables. Is education research relevant for practice? Some people say: no, teaching is just a matter of having experience in the domain and a couple of didactical ‘tricks’. Other people say: yes, research can give clues as to what works and what does not work. Design education research is a matter of controversies. Yet, it has a dedicated stream in the 2011 IASDR conference. What can we harvest from the papers and posters in that stream? Does it confirm the skeptics’ opinion that it does not make sense to research design education? Or does it provide novel and useful insights for teaching design? And if yes, what kind of insights? What can we say about the status of design education research? Does it currently cover the major themes that would be brought forward by educational specialists? These are the kinds of questions that will be debated in the special session on design education research. In a short introduction, we will summarize the themes and topics that we find in the papers and posters of the design education stream in the conference programme and in the second part of this introduction, we will focus on one particular topic, namely how design expertise can be taught and learnt. Then we will invite the audience for a discussion on a number of statements concerning the relevance and status of design education research. By the end of the session, we hope to have a clearer perspective on what would make a good design education research agenda.
## DAY 1 PROGRAMME Overview

### MONDAY - 31 October

All of today's activities will take place in the Industrial Design Engineering building (32).

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<tr>
<th>Time</th>
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<tr>
<td>08:30</td>
<td>Central hall Industrial Design Engineering - Registration and welcome coffee</td>
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<td>09:00</td>
<td>Studio 23/24 Wim Crouwel room</td>
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<td>Workshop 1</td>
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<td>09:30</td>
<td>Designing new lighting experience using LED by Hyeon-Jeong Suk, page 22</td>
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<td>Studio 23/24 Norbert Roozenburg room</td>
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<td>Defining goals through collaboration using design thinking: building consensus among designer-user-client-stakeholders by Mithra Zahedi, page 22</td>
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<td>Human-centered evaluation strategies for concepts and preliminary design variants by Sandra Hirsch, Gavin Melles, Christian Wölfel, &amp; Stella Boess, page 23</td>
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The IASDR 2011 Doctoral Colloquium is a discussion platform for junior PhD candidates. It serves to provide junior PhD candidates in design research a platform to discuss their work-in-progress with an international group of experts and fellow PhD’s. Critical discussion will provide a broad reflection on the work-in-progress as well as input from fields that are not directly related to the candidates’ work. PhD candidates are expected to walk away with a broader perspective on how their work is positioned in the field of design research, as well as some critical insights into the work in terms of topic and research approach.

The day starts with a plenary session where all participants briefly present their work. This is followed by break-out sessions in which the work of participants will be discussed in more detail in small groups. The break-out sessions are guided by two experts per group of 4-5 PhD candidates.

**EXPERTS**

Our panel consist of the following experts:
- **Petra Badke-Schaub**, Delft University of Technology, the Netherlands
- **Lucienne Blessing**, University of Luxembourg, Luxembourg
- **Pieter Desmet**, Delft University of Technology, the Netherlands
- **Ken Friedman**, Swinburne University of Technology, Australia
- **Gabriela Goldschmidt**, Technion Israel Institute of Technology, Israel
- **Marianne Karlsson**, Chalmers, Sweden
- **Peter Lloyd**, the Open University, United Kingdom
- **Keiichi Sato**, Illinois Institute of Technology, United stated of America
WORKSHOPS

WORKSHOP TITLE: DESIGNING NEW LIGHTING EXPERIENCE USING LED

Organiser: Hyeon-Jeong Suk (KAIST, South Korea)

Abstract: As LED has become designers’ new utility, there is a growing interest in exploring the new experience of light, lighting, and color. In this workshop, we invite participants to create new lighting experience. Users’ emotional scenario of the certain context and situation will be a motivation. The three-hour-workshop consists of three parts: First, the participants will be introduced to light and lighting facilitated by LEDs in aspects of both technology driven invention and design driven innovation. The recent investigations will inspire the participants to have ideas of new lighting; Second, four participants will make up each team, and will describe their emotional quality of their experiences of lighting. Every team will be encouraged to develop and visualize scenarios of utilizing the LEDs while the organizers provide technical aids by dealing with LED lighting modules or human factors in lighting; Finally, the results of the teamwork will be shared and discussed.

MUST END WORKSHOP BEFORE 13:00 UHR, WIM CROUWEL ROOM

WORKSHOP TITLE: DEFINING GOALS THROUGH COLLABORATION USING DESIGN THINKING: BUILDING CONSENSUS AMONG DESIGNER-USERCLIENT-STAKEHOLDERS

Organisers: Mithra Zahedi (University of Montreal)

Abstract: In a project context, this workshop will explore design as a “meaning-making” process. Through design thinking, the participants —acting as a team of experts and non-experts— will dive into a HCI project and develop a worldview which is user-centered and sustainable. Design thinking will provide a framework for collaborating meaningfully, grasping the complexity of the situation and understanding it holistically, generating ideas, and constructing new knowledge through which projects takes form. The workshop ends with a team discussion regarding the transferability of the process in other practices. Complexity of design projects, meaning-making, and design thinking are the foundations of this workshop and will establish the mindset and the process of this collaborative exercise. This is a half-day interactive workshop. After a short presentation, participants will create personas, develop use-scenarios and offer solutions, which will then be tested. Following group interactions, discussion will ensue sharing the emerging ideas.

MUST END WORKSHOP BEFORE 13:00 UHR, NORBERT ROOZENGEBRUG ROOM
Workshop title: HUMAN-CENTERED EVALUATION STRATEGIES FOR CONCEPTS AND PRELIMINARY DESIGN VARIANTS

Organisers: Sandra Hirsch (TU München), Gavin Melles (University of Swinburne), Christian Wölfel (TU Dresden), Stella Boess (TU Delft)

Abstract: There is increasing demand for the deployment of reliable qualitative and mixed-methods evaluation strategies for the assessment of concepts and preliminary product design variants. Human-centered design research methods may provide insight into design relevant criteria. But how can these qualitative insights thereafter be integrated into the decision-making process? Within the workshop we will examine evaluation approaches that incorporate a human-centered approach alongside quantifiable measures. Through discussion of three example scenarios of concept development, with opportunity for contributions of scenarios by participants, we aim to develop shared criteria for systematic qualitative assessment that is appropriately rigorous and relevant for the problems and context of user experience and usage research in product development. The workshop consists of introductory presentations, a hands-on group work session and a structured discussion in which the participants are invited to contribute and share their experiences and develop shared criteria for useful approaches and their integration into product development processes.

Workshop title: ORGANISING DESIGNERS DOING PHD RESEARCH

Organisers: Pieter Jan Stappers, Maaike Kleinsmann (Faculty of Industrial Design Engineering, TU Delft)

Abstract: The past decade has seen a growing number PhD students who start from an MSc or MA in design. This poses challenges to academic institutions who host PhD research. Among these are (i) training research methods, (ii) developing research approaches and methods which make optimal use of the design skills of the researchers, (iii) establishing a scientific discourse in a rapidly evolving, transdisciplinary, field built on a diversity of disciplines, (iv) fitting in with new developments in education, such as the Bologna agreement in the EU, the formation of graduate schools, and calls for efficiency in light of reduced funding opportunities. This workshop aims at focusing on how universities deal with supervising the research PhD for designers. Participants are selected on the basis of a one-page note on their experience guiding designers in doing a PhD. Before the conference, the compiled list of these notes and a further a preparatory questionnaire is distributed to the participants.
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**WEDNESDAY - 2 November**

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**THURSDAY - 3 November**

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### DAY 2 PROGRAM OVERVIEW

**Central Hall Aula Conference Centre - Registration**

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  - Design & usability 4
  - Design & culture 3
  - Design & emotion 4

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### DAY 4 PROGRAMME OVERVIEW

**THURSDAY - 3 November**

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<td>Research and Design in Landscape Architecture - Jeffrey Hughes</td>
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<td>Optimizing design research courses for master students in Germany with the BCI model - Sunita Wren</td>
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<td>Diversity in Product Identity in 3C Products to Buddhist temple structures - research</td>
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<td>Keynote 4 - Jin-Lin Chen: Positioning Design in Academia - page 17</td>
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<td>Foyer, vide 1 &amp; 2</td>
<td>Poster session - page 28</td>
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<td>12:00</td>
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<td>13:30</td>
<td>Design</td>
<td>emotion</td>
<td>581</td>
<td>Primary study on influence of food packaging design benefits on brand association from consumers’ viewpoint - Shu Yuan Lin</td>
<td>582</td>
<td>Proyecto Dínamo: Designers exploring the possibilities of sharing a new electric bicycle - Santiago Bergego</td>
<td>583</td>
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<td>14:00</td>
<td>Design</td>
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<td>584</td>
<td>Aesthetics and Car Design in Product Semantics - Wen Ken Hung</td>
<td>585</td>
<td>Braille Design for Automotive Styling - Daniel V. van Grandella</td>
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<td>Aesthetics and Car Design in Product Semantics - Wen Ken Hung</td>
<td>588</td>
<td>Braille Design for Automotive Styling - Daniel V. van Grandella</td>
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<td>Aesthetics and Car Design in Product Semantics - Wen Ken Hung</td>
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<td>Braille Design for Automotive Styling - Daniel V. van Grandella</td>
<td>592</td>
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<td>16:00</td>
<td>Auditorium</td>
<td>Keynote 5 - Walter Correia: Aesthetics and Contradiction in Product and Social Design - page 17</td>
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<td></td>
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<td>16:30</td>
<td>Gassing session</td>
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**BOOK OF ABSTRACTS**
POSTER SESSION

THURSDAY
3 November
12:00 - 13:00 uur
Foyer, Vide 1 & 2

19 Method for Applying Cultural Characteristics to Emotional Product Design - Chien-Kuei Teng
23 Designenvolontaire Studio - New Educational Platform for Design as Connecting - Saehee Choi
25 User-Experience Ecosystem: A Tool for Understanding User Experiences From The User’s Viewpoint - Dori Mannosen
46 Mapping Movement: A human movement-based framework for the creation of organized integrated experiences - Letizia Elmenburger
52 Study on Platform's Effect on Active Impressions - Karii Yamada
66 Design for River Sign: A case study of Nikkagawa River - Haruka Endo
72 Regional originality in streetscapes: A case study of the urban landscape district in Nagasaki - Japan - Hidetada Maruo
84 Investigation on design method and thinking of chain-reaction game for image-based problem-solving ability - Guo and Liu
87 How to do Gender with Shopping Space Design? - C. Zhang
98 Conceptual Design of the Interactive Communication and Care Robot for the Older Generation - Chyi Yang
99 Current Practice of Design Promotion Activities and its Influencing Factors - Junghee Park
102 Li's Talk with an AI - Applying human communication theories to human machine interaction - Peer Leithki
130 Phulas Haptic in Augmented Reality Environment Based on Touch Screen - Chien-Mu Chen
233 A user-centered assessment of the usability of digital game devices for upper limb rehabilitation therapy - Lu-Ming Yang
134 Creating Meaningful Expressions in Virtual Worlds - Yin-Fu Chen
127 From Real to Virtual Pets:The Evolution of Artificial Creatures as Pet - Elena Carolina Li
162 Eco design and creative ideas - Ido Nedivi
167 Children's illustrative descriptive framework: analyzing Children's Perception and Representation (4 to 6 years old) - Sandra Lopes
171 Crafts and the souvenir business: testimony from a tourist city in southwest Brazil - Carla Eudays Dosly
193 Creating United Design: Thinking through Experience Mapping - Hsin Hao
196 Development of mechatronic-system-embedded wooden toys based on Hokkaido regional originalities - Asakha Akio
197 Ginger: a shopping cart interactive program. A case study for relational cultural theory and activity theory in interaction design - Gydi Wylie
199 The evaluation of way-finding for visitor information kiosk in the National Museum of Prehistory - Shih-Fung Lio
202 Teaching experiment and research on visual story narration design - Mo-Han Chang
209 Basic Study on Planning of Design Strategy for an Airline - Case Study on China Flyer Inc. (CFA) - Ayushi Tamura
216 Emotional Effect of Fonts during Chinese Reading Process - Po-En Yang
225 The Application of Industrial Design Students Towards Establishing Criteria in Engineering Course - Edilson Ueda
244 Material-Inspired Design Opportunities - Anna-Marii Rodriguez Vazquez
247 A Study on the Compositional Method of Visual Illusions - Myung-Hyun Jang
261 Stability analysis of iPad Electronic Picturebook Perkinsian Tail
264 Investigating how the FRCIDs industrial design concept is driven and approaches: The echelon between literature and practice - Youngse Lee
268 Precedent product form styles of consumer type digital camera series of different brands - Chien-Cong Cheng
274 Extreme Surgical Contexts: the Perspective of Industrial Design Engineering - Ana Maria Gomez Pontes
286 Effectiveness of design-based learning in engineering education - Selvi Maria Gomes Pontes
287 Using schemas as a cognitive design process: A case study of drawn cognitive maps and environmental perceptions and expectations - CLiff Gentry
288 An integrated laboratory on product design as a local development factor. A Brazilian case study. - Eduardo Moretto Filho
295 A Study on Color Scheme in Chinese Commercial Interior Design Space - Yang Li
304 The Social Interfaces Development for Cultural Creativity Industry: A user-centred Design Case Study on Chinese Shadow Puppetry - Yin-Kai Chen
307 Study on Semiotics of Human Behaviors Afforded by Architecture and Urban Space Using Multi Agent System - Akihito Kiso
309 Playful accessories. Design process of two engaging free-play experiences - Andreia Resende
311 Game playing in interdisciplinary design two designs and planning teams - Must Tanir Toynoffo
314 What does it mean to use a method? The roles of methods for experts and novices dealing with uncertainty: A qualitative analysis - Jaap Oudshoorn
318 The Value of Open Ended Problems in Design Pedagogy - Ultro-Design
319 I don’t understand what kWh means’ simulate electricity consumption data provision to households - Guo-Jhen Kwon
316 Simulations: Hands on education as a spatial learning tool. - Andrew Phillip Howe
327 Teaching Industry by Making Existing Facilities for the Handicapped. With the Case of Park Lane Nursing Homes - Hjelseth
344 Fostering tomorrow designers: an approach to incorporate sustainability into Thai design education - stove Lohwiboon
348 Exploring the Effects of Student-Teacher Interaction in Interdisciplinary Education (Engineering and Technology Workshop - Min-Shi Chu
351 Evaluation of Mobile Diary Tool's Recording Media for tailor-making of Observational Situations - Yu-Li Chuang
353 Compare and evaluate formats for using a mobile phone to self-report momentary experiences - Chia-Yin Lin
357 Designing an Experience: Integrating Industrial Design projects within PhD research - Alvin Park
372 Introduction of a new method for producing cut paper stencils for dying - an applied case of laser cutter - Mikiko Odita
376 What evokes your experiences? - Kanghy Kim
401 An Investigation into the Influence of Emotional Appeals on Purchase Intentions in Outstanding Print Advertisements – Regina M.Y. Wong
404 Simple, Complex, Innovative: Design Education at Civil Engineering - Sandor van-Meerven
407 Applying Virtual Reality for Participatory Design: supporting end users in the design process of an endoscopic operating Theatre - Suwen-Meryg Hjelseth
412 Designer Experience: Designing in Experience - Alika P. Alvecren
421 Product-Integrated sustainable energy technologies - Six years of experience with innovation in design processes - Angela Brinders
429 Sustainability in a Carpentry Factory of an Association of Women's Character led by Social Risk - A case study - Mårlene Finnäs Borg
430 Idea-building workshops: A rapid innovation method through interconnected different contexts - Rikido Kothisa
437 A Comparison of Contextual Explanation and Menu Navigation Interface Designs in Children's Arts Learning Website - Yan-Ching Lin
448 A study of the learning problems of undergraduate industrial design students in studio courses - Joon-Ho Bok
451 Pretesting evaluation in service design. A case study at an emergency ward. - Johan Broadren
455 Mapping perfumes fragrances for packaging design: The use of archetypal design characteristics in concept development - Joly-Veron
464 Diversity and Unity: Morphology of architecture and engineers - Min Zeller
472 Women's Domestic Tendency of Household Product Design in Korea - Youngae Kim
502 Activists, event and the transmission of practices designing with behavior for behavior - Tjetj-claoi
504 InitiASTORS: designing media facades to support links between people a places - Mine Yalvancioglu
525 A case of the application of customized standardization on floral design on OH Flower - Cho H Koo
527 Fuzzy Front-End and Designing towards a Rougher d’Etre - Mona Tassaa
542 A study on elderly behavior and - analysis of exhibition viewing at Susanoh Museum in Osaka - Lianen Shen
544 Predicting design student success across the design disciplines: a look at architecture, graphic design, interior design, and landscape architecture- Larri Brunner
549 The effect of color variation on consumers’ satisfaction with color: case of fashion and styling oriented products - Hsuyeh Kohyoubu
559 A Study on Corrective Images and Imagery Developing Skills: Towards a Pattern Language for Novice Designers - Yu-Ming Choung
560 Reinventing Mature Products through Colors, Materials, and Finishes - Chie-Feny Lin
564 Gardens of the mind: nature, power and design for mental health - Adithivan Kovan
563 3D-Visualizations as a means for engaging users and actors as co-designers in the fuzzy front-end of product development - Sanna Nykänen
566 Design Process for Sustainability - The Implications of User Observations for Emerging Post-Use Product Design Solutions - Søren Tørneth
571 Enhancing the usability of Graphical User Interface by User Participative Auditory Display - Sunny H. F. Yoon
577 The role of experimentation in creating and sustaining motivation in design work - Tai Bjornland
578 Analysis of decision making process for a systematic engineering design - Wakeman-Roofkjaer
584 Recycling as a Form: Improving a Patients' Ceramic Narrative - Paul Brokx
583 Service Design for Product Service Systems Using Context-Based Activity Modeling - Yong Se Kim
589 Interpersonal dimensions of services - Eun-Ji Cho
708 Ubiquitous Urban Game-between meaning production and the production of presence - SimonLehnert
670 How Max Designers Create Furniture That Allows Flexibility and Inclusivity - Marie Egeberg
676 Towards an Investigation of the Influence of Emotional Appeals on Purchase Intentions in Outstanding Print Advertisements – Regina M.Y. Wong
684 Inform Educating an Agent-based Web Information Retrieval Service in the Context of Urban Mobile Users - Yen-Chy Lee
815 Comparisons of Japanese and U.S consumers’ eye movements when choosing over the counter drugs. - "Name and benefits" vs. "Ingredients and risks" - Ayako Kawano
823 Korean Evaluation of Jewellery's Shininess - Seong-hy Man
DAY 5  DESIGN RESEARCH MEETS INDUSTRY
FRIDAY
4 November

WHERE INTERNATIONAL DESIGN RESEARCH MEETS DUTCH DESIGN PRACTICE.

On Friday 4 November participants of the IASDR conference get the opportunity to meet Dutch design practice. On this day, 4 day programmes are organized each visiting two companies dealing with Dutch design in a variety of fields: interaction design, product design, architecture, and more. Below you can explore the different programs. During this visits interaction between participants and the companies is key: how can we contribute to each other?

Practical
All programmes start and end at the Faculty of Industrial Design Engineering (IDE) in Delft, participants of the tour to Amsterdam can be dropped off at Schiphol Airport on the way back.

Costs
Free of charge. This is an activity of Design United, Platform for Dutch Research in Design, www.designunited.nl, and sponsored by Agentschap NL. (Transport and lunch is included.)

Information & Register
At the designated registration desk until 13h00 Thursday 3 November. It is possible that the programme of your choice is full as places are limited. So be in time to register.

Extra information
Can be acquired from Christine De Lille  c.s.h.delille@tudelft.nl

AMSTERDAM PROGRAMME  Meet at 08:00h at IDE

Waag Society
Waag Society develops creative technology for social innovation. The foundation researches, develops concepts, pilots and prototypes and acts as an intermediate between the arts, science and the media. Waag Society cooperates with cultural, public and private parties. Waag Society has a strong focus to let user groups participate in Internet, new media and technology that otherwise have limited access. Examples are The Storytable, a multimedia table for elderly people to share stories and Pilotus, a tool for mentally impaired people to communicate

UNGA toys
UNGAgroup consists of young-minded, toy-loving, creative, and dedicated people that all share the equal passion; creating high play value toys for global premium brands. UNGA is a one-stop-shop for offline an online cases and our Amsterdam establishment contains an in-house online game- and website studio. In addition, our Hong Kong subsidiary is engaged in engineering and manufacturing our designs

Booreiland - Design & strategy for web, print and meta
Hi there! We are Booreiland, a Dutch design studio that loves to discover meaningful ways to communicate brands. We are specialized in design and strategy for web services, print campaigns and Meta Products. Meta Products are web enabled product-service networks that help people, products and services connect in new ways. By combining the offline and the online world, we want to make the web a little bit more meaningful for everyone. We work on both client assignments and our own projects.
ROTTERDAM PROGRAMME  Meet at 08:45h at IDE

Spark Design & Innovation

‘Design and develop meaningful and sustainable breakthrough products’ Spark design & innovation is a leading Dutch product development agency, involved with inventing, designing and realizing innovative products for more than 15 years. We are a team of 25 professionals with a passion for innovation and design. We use our knowledge of design, usability, technology and business to create sustainable and meaningful products. With an approach that is specifically tuned to each project and client. We give life to innovations that build brands, create competitive advantage and result in commercial success.

www.sparkdesign.nl

V2

Lunch

V2_Institute for the Unstable Media, founded in 1981, is an interdisciplinary center for art and media technology in Rotterdam. V2_is doing research at the interface of art, technology and society. V2_presents, produces, archives and publishes about art made with new technologies and encourages the debate on these issues. V2_ offers a platform where artists, scientists, developers of software and hardware, researchers and theorists from various disciplines can share their findings.

www.v2.nl

DELFT AND THE HAGUE PROGRAMME  Meet at 09:30h at IDE

Fabrique

Fabrique is a multidisciplinary agency since 1992 and one of the leading companies in the field of brand, communication and interaction design in The Netherlands. We develop visions, strategies and resources, preferably in an integrated manner. Over more than 85 enthusiastic artists, engineers and storytellers work with pleasure and passion on a wide range of assignments for consumer brands, service-sector companies, the government, education, the entertainment industry and cultural institutions.

www.fabrique.nl

Muzus

Lunch

Muzus is a user-centered design agency, which means Muzus always takes the end-users of products and services as a starting point of their design projects. Muzus is an expert in applying design research techniques like contextmapping and co-creation. But most of all, Muzus stands out by their ability to translate the research findings into solutions for products and services. This results in rich designs, which fit the needs, dreams and wishes of the end-users.

www.muzus.nl

DELFT AND LEIDEN PROGRAMME  Meet at 09:30h at IDE

Flex / Innovation

FLEX/the INNOVATIONLAB is one of the leading Dutch design agencies for industrial design and structural packaging. Our international design team is creating innovations which are significant contributions to our clients’ strategic objectives, to the quality of life of people and to a more sustainable society. With our clients we want to create a new reality, something that aspires to truly make a difference. We work amongst others for Philips, LEGO, Grolsch, Brabantia, Lely, Skil, Hortilux, HERO, Otolift, SPA, FrieslandCampina, Sara Lee, Akzo Nobel and TEFAL.

Lunch

NPK

A strong partner in the development, design, and realization of extremely diverse products - that is npk design. Strategic advice and concept development, product development, engineering, and supply management are part and parcel of the services provided. The office is renowned for its power of innovation, originality, knowledge, precision, and pragmatic approach. It is exactly this combination that generates added value for our clients. Our approach has led to easily-realized solutions by means of which the products distinguish themselves in professional and consumer markets as well as in public spaces.

www.npk.nl
ORAL PRESENTATIONS

The following pages contain the abstracts of papers presented orally, arranged by paper id.
DESIGN STUDENTS’ PERCEPTION OF THEIR OWN DESIGN PROCESS

An essential element in the learning process is that students become aware of their own learning and can reflect on their actions. This ‘thinking about thinking’, referred to as metacognition, can be used to help students ‘learn how to learn.’ Metacognitive knowledge involves decisions that help to identify the task on which one is currently working, to check on current progress of that work, to evaluate that progress, and to predict what the outcome of that progress will be. In order to observe the degree of awareness Design students have about their own cognitive and design processes a research project was conducted among Portuguese students. Sub-goals of the project were: to identify structural elements students choose during their process, and difficulties they perceive. Two methods were used: an electronic survey to Design students of the 5th grade of the Design Program in two sequential years (39 in total) and an experiment conducted with 32 students in the optional course ‘design process management’ of a Master Design Program. A pilot survey preceded the electronic survey in which 11 students participated. This pilot was meant to test several aspects of the survey tool: easiness of data collection and treatment, the formal aspects of the tool (to facilitate easy fill out) and the contents - its structure and nature. The content was structured according to the following data categories: demographics, the design course in general, the design studio, the design process, time management, quality, and Information management. In the experiment during the ‘design process management’ course students were asked to analyze their design process making use of diagrammatic representation. It was expected that the diagrams created by students would be adequate to represent concepts and relations regarding quality, quantity, distribution, subdivision modification and transformation (Massironi, 1982). The use of a graphic image to model the phenomena is assumed to be a good research instrument as well as a good vehicle to scientific information. What we get from the diagrams of the design processes of each student is their understanding of a design process in its components, relationship among elements, level of dependence between elements, dominance and subjugation of elements, and emphasis and exclusion of elements. The results of the surveys showed that information and time management were critical elements of the design process. Also relevant was the fact that most of the students describe design process phases in similar ways being more detailed in the initial phases and less in the last ones: detailing and pre-production. Another conclusion was that the conceptual phase is the one students get more concentrated on and the one richest in terms of ‘incidents’ i.e. blockage, information management, contact with external sources such as peers and teachers. Finally, it was possible to assess some fundamental issues to be studied through experiments, such as the design strategy used by students (problem, solution or co-evolution driven). The main results of the experiment show that students have low conscience of their own design processes. The use of its diagrammatic description helps them to several aspects of the process they never reflected upon before. Moreover, the outcomes show that the majority of the students had difficulties with inductive thinking. Starting from the description and analysis of a specific design problem to ending up with a proposal of a general model to frame the design processes was hard to accomplish.

KEYWORDS Design Process; metacognitive Knowledge; Design Process management;
17

CHALLENGE THE SCHOLARS - EDUCATIONAL ASSIGNMENT FOR UNDER GRADUATE DESIGN RESEARCH STUDIES

Turkka Keinonen
Aalto University

The shift towards more conceptual and discursive design discipline requires changes on all the levels of design education including the first introductory modules. 'Challenge the Scholars' was a teaching experiment to introduce design literature and discuss its relevance in contemporary design practice with undergraduate design students. The driving motivation for the experiment was a need to find models to link theoretical studies and lessons on design thinking to a Bachelor of Arts program in design in a manner that would be motivating for students with practical and professional orientation. In the 'Challenge the Scholars' assignment the students interviewed design practitioners based on selected items of design literature and made the practitioners to respond on the scholars' interpretations based on their first-hand experience. The results of the experiment were promising: the students worked with high motivation and the results actually challenged the scholarly texts in interesting manners.

KEYWORDS Design education, design research, educational assignment

27

ROLE OF TOUCH FOR ENRICHING REMOTE INTERPERSONAL INTERACTION OVER DIGITAL PRODUCTS

Young-Woo Park
Korea Advanced Institute of Science and Technology
Tek-Jin Nam
Korea Advanced Institute of Science and Technology

Remote Interpersonal Interaction (RII) is an emerging research theme aims to support / enrich interpersonal interaction when the people are physically separated from each other. This has been an important design topic as the network and mobile communication technologies develop. In this paper, we aim to understand and find ways to apply Touch for RII over digital products. We present critical review of existing literature and suggestions of future directions on the application of touch in RII. First, we investigated features of current channels that are mostly used in RII over mobile phones and computers. Second, we showed the importance of touch interaction in the aspect

KEYWORDS Touch, remote interpersonal interaction, mediated touch, computer mediated communication

29

PRIMARY STUDY ON INFLUENCE OF FOOD PACKAGING DESIGN BENEFITS ON BRAND ASSOCIATION FROM CONSUMERS’ VIEWS

Shu Yuan Lin
National Yunlin University of Science and Technology
Jen Yen
National Yunlin University of Science and Technology

Product packaging design is the approach with the most cost benefit for establishing brand equity. In severely competitive sales market, it will influence consumers’ cognition, attitude, and preference toward brands and become the key factor of establishing of brand equity. As exploratory research, this study focuses on major dimensions (brand association) of brand equity to probe into the packaging design benefits that most influence brand association, as well as the composition categories of brand association that are easily influenced by packaging design benefits. Focus groups are conducted on consumers and analysis is based on qualitative data. Finally, the researcher indicates the most representative research propositions on influence of packaging design benefits on brand association as the criteria for development of research hypotheses.

KEYWORDS brand association, packaging design benefits
“LIKE AN UNPOLISHED PIECE OF WOOD!” APPLYING DESIGN SEMIOTICS TO THE ANALYSIS OF VERBALISATIONS OF HAPTIC PRODUCT EXPERIENCES

Li Wikström
Design & Human Factors, Chalmers University of Technology

Jessica Dagman
Design & Human Factors, Chalmers University of Technology

MariAnne Karlsson
Design & Human Factors, Chalmers University of Technology

KEYWORDS
semiotics, haptics, product experiences, analysis

GENERAL CHARACTERISTICS OF ANTICIPATED USER EXPERIENCE (AUX) WITH INTERACTIVE PRODUCTS

Thedy Yogasara
Queensland University of Technology

Vesna Popovic
Queensland University of Technology

Ben Kraal
Queensland University of Technology

Marianella Chamorro-Koc
Queensland University of Technology

KEYWORDS
anticipated user experience, product design, human-centered design
35

BOOK OF ABSTRACTS

ORAL PRESENTATIONS

THE ERGODESIGN OF CHILDBIRTH

The ways in which a mother labours, and how her baby is born, is determined by a techno-culture, controlled by the availability of science and technology, and safety management procedures in modern obstetrics; rather than by the anatomical, physiological and ergonomic advantages that are naturally endowed to childbearing women. The main aim of this paper is to showcase the symbiotic potency of an integrated Ergonomics and Design Research to significantly improve childbirth. The focus is to capture actionable insights for the design and evaluation of an Obstetric Body-Support System for physiologic childbirth. Such a system would be biomechanically more efficient for the mother, in addition to improving the tasks of the birth attendants in the management of labour, and ensuring the safety and well-being of the mother and her baby. The current medical model adopted for the management of labour and childbirth is discussed to highlight current idiosyncratic procedures adopted in childbirth practices of modern obstetrics, and the challenges and opportunities for improvement. A transdisciplinary evidence-based method is detailed through a case study to demonstrate how ergonomics research is applied to elicit empirical anatomical, physiological, psychological and behavioural knowledge, to inform the designer with evidence and insight for problem framing, new concept visualization and design, prototyping, and system evaluation in hospital settings. ‘Ergodesign’, a hybrid paradigm to humanise labour and childbirth, is proposed as a design science to improve current obstetric practices that take into account the aspiration of a growing number of women who seek a more physiological and meaningful experience in pregnancy, labour and childbirth.

KEYWORDS: Ergodesign, Childbirth, Evidence-Based Design, System Thinking

36

A COMPARISON STUDY OF THE APPLICATION OF THIRD-PERSON AND FIRST-PERSON POINT OF VIEW VIDEOGRAPHY IN EMPATHIC DESIGN PROCESS

Empathic design is a process in which the designer attempts to assess the needs or problems of users by examining them from the user’s perspective. Observation establishes the knowledge foundation of empathic design. Videography, a widely adopted observation tool, is used in empathic design because it can capture subtle, fleeting body language that may convey large amounts of information that may be stored for future review and analysis. Third-person point of view videography (POVV) has been the primary method used by designers to perform video observation in empathic design. It captures the activities of users from a third person perspective with a video camera. Although third-person POVV is able to capture details of the user’s activities, it does not provide designers with the user’s own visual perspective. Some of the user’s perspectives, such as line-of-sight and shift-of-view, are not precisely documented in third-person camera angles. First-person POVV through video cameras worn by the user (as close to the user’s line-of-sight as possible) compensates for the lack of perspective found in third-person POVV. This paper presents a case study that compares the differences between using third-person and first-person POVV and proposes the adoption of both techniques in the empathic design process.

KEYWORDS: Empathic Design, Video Ethnography, Videography

41

THE ERGODESIGN OF CHILDBIRTH

The ways in which a mother labours, and how her baby is born, is determined by a techno-culture, controlled by the availability of science and technology, and safety management procedures in modern obstetrics; rather than by the anatomical, physiological and ergonomic advantages that are naturally endowed to childbearing women. The main aim of this paper is to showcase the symbiotic potency of an integrated Ergonomics and Design Research to significantly improve childbirth. The focus is to capture actionable insights for the design and evaluation of an Obstetric Body-Support System for physiologic childbirth. Such a system would be biomechanically more efficient for the mother, in addition to improving the tasks of the birth attendants in the management of labour, and ensuring the safety and well-being of the mother and her baby. The current medical model adopted for the management of labour and childbirth is discussed to highlight current idiosyncratic procedures adopted in childbirth practices of modern obstetrics, and the challenges and opportunities for improvement. A transdisciplinary evidence-based method is detailed through a case study to demonstrate how ergonomics research is applied to elicit empirical anatomical, physiological, psychological and behavioural knowledge, to inform the designer with evidence and insight for problem framing, new concept visualization and design, prototyping, and system evaluation in hospital settings. ‘Ergodesign’, a hybrid paradigm to humanise labour and childbirth, is proposed as a design science to improve current obstetric practices that take into account the aspiration of a growing number of women who seek a more physiological and meaningful experience in pregnancy, labour and childbirth.

KEYWORDS: Ergodesign, Childbirth, Evidence-Based Design, System Thinking

36
A STUDY ON TACTILE STYLE OF PRODUCTS – USING HANDLESS CUPS AS A CASE STUDY

Global economy is changing constantly. Now, the traditional manufacturing and technology based economy has transformed into the new six senses based “Experience Economy.” Since the sense of Touch is the next important sense to the vision, in regard to the influencing factors on the product style, tactile sensation of a product becomes a prominent factor in developing product style. Therefore, this study tried to explore the product tactile style by using the approach of Kansei engineering. The result of this study can help designers to design products with demanded style of tactile feeling.

KEYWORDS Kansei engineering, tactile style, form feature, multidimensional scaling , cluster analysis

DESIGNING A PLEASANT NEW RENTAL BICYCLE SYSTEM

This study is concerned with improving the available rental bicycle system in Iran. Although, Bicycle riding is one of the amusements that invite people to visit Kish Island, it seems the available system cannot satisfy its users. To explore the reasons, users were interviewed and it was found that there are some difficulties in bicycle racks. To design a new system, Kansei Engineering was used. Several concepts were generated and evaluated based on Kansei words. Due to the users’ satisfaction, it was concluded that the new Rental system and bicycle rack could meet the majority of the users’ emotional needs.

KEYWORDS Rental Bicycle System, Bicycle rack, Kansei Engineering

IOT DECK: A DIGITAL CARD-BASED IDEATION GAME TO INSPIRE INTERNET OF THINGS DESIGN

As the technology grows rapidly, exploring the Internet has become a common activity in our daily lives. We can expect a future image of an every daily object connecting itself to the Internet. By the development of RFID, Wireless and Mobile network technology, designers can start to consider how Internet of things (IoT) can support our lives in various scenarios. Our aim is to design an idea generation technique that creates special IoT ideas which could be utilized within the industry. The IoT deck was created to convey 20 aspects of a framework of Internet of Things to designers. The normal cards are physical cards, while the digital cards apply Augmented Reality technique with a digital table. In the case studies we have found that two techniques offering different types of inspiration, and the digital technique had improved the process of building the mood board and expanded the interaction within the design groups.

KEYWORDS Internet of things, Card, Game, Brainstorming
THE INVESTIGATION OF DESIGN FEATURES OF BRAINWAVES INDUCED BY COLORS

Regina W.Y. Wang
Department of Industrial and Commercial Design, National Taiwan University of Science and Technology

Ying-Chun Chen
Department of Industrial and Commercial Design, National Taiwan University of Science and Technology

Chiung-Fen Wang
Department of Industrial and Commercial Design, National Taiwan University of Science and Technology

The display design of experience-oriented retail stores strongly affects consumers’ emotions by lights, music, and colors. Colors can attract consumers’ attention and influence their likes, expectation, and decision-making toward the products. The present study is to investigate the effects of different color temperatures of store display on aesthetic brainwaves. We control the display color temperature at 6500K with matched colors red/green, yellow/red, and yellowish-green/green as the stimuli. Research findings showed that: (1) red/green combination induced greater aesthetic brainwave and attracted consumers’ attention, aroused their emotions, interests, and desires more quickly, which contributed to the final buying behavior (action); (2) parietal lobe is a reliable area for observing color-induced brain responses. The results revealed that colors induced aesthetic brainwaves and activated brain regions situations. It is hoped that it will be beneficial for the color design in commercial application and cross-disciplinary development.

KEYWORDS: color combination, memory, P300

INDUSTRIAL DESIGNERS AND ENGINEERS IN PRODUCT DEVELOPMENT: CONFLICTS AND APPROACHES FOR IMPROVING COLLABORATION

Constantin v. Saucken
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Bernd Schröer
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This survey analyzes the complex reasons for conflicts in collaboration of industrial designers and engineers in the context of product development. By qualitative interviews developers in the industrial practice were asked for their personal perception, attitude and behavior in cooperation. In addition, findings of psychological research regarding conflicts, diversity and cross-functional teams were transferred to the inspected tension field. The most relevant findings are as follows: Differences in role models comparing self-image and perception of the other discipline lead to conflicts as a result of false expectations. Also critical to conflicts is the responsibility and liability of engineers for the developed product in market. In contrast, industrial designers can be more open-minded which also can lead to disputes. A frequently observable deficit in collaborative projects is a lack of common team briefings, in what roles, tasks and rules between disciplines are defined. Moreover, an adequate team leader with competencies in both disciplines is mostly missing. Not least communication problems occur because of different representations, terminology and techniques of externalization. Based on these findings opportunities for improving the cooperation were developed, mainly in the field of team leadership, process planning and education.

KEYWORDS: industrial design engineering, interdisciplinarity, conflicts, diversity, cross-functional team, communication
THE USABILITY OF AUGMENTED REALITY SUPPORTING THE MOCKUP MAKING IN INDUSTRIAL DESIGN LEARNING.

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Given that fact that the physical and virtual models are seldom inter-referred for the development of 3D form in design in current design learning, this paper proposed that the AR system could potentially improve the inter-reference. This study explores the usability of AR system and conducts a design trail where 30 participants recruited and take a mock-up-making work with the assistance from the AR system. Each participant was asked to make three mockups with different levels of complexity; simple, moderate, and complex. Questionnaire and interview survey is given to the participant in order to collect the data for the analysis. The analysis includes three aspects, the frequency of marker adjustment, the subjective survey to the satisfaction, and the workload. Results indicate that the AR system does provide useful visual information to reduce the uncertainty in form, particularly to the complex form, and to facilitate the mockup making.

KEYWORDS augmented reality, design learning, usability, form design

SAFEGUARD POLICY AND THE DEVELOPMENT OF DESIGN IN THE NEWLY INDUSTRIALIZING COUNTRIES (NICS) - THE CASE OF TAIWAN HOUSEHOLD APPLIANCE INDUSTRY

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Governments of newly industrializing countries (NICs) after the Second World War have often been keenly involved in market intervention, adopting protectionist policies in order to foster local infant industries and provide a breeding ground for the development of industrial design. The household appliance industry in Taiwan is a typical case. As such, this study followed the historical evolution of Taiwan’s household appliance industry and reviewed the establishment of design divisions in local household appliance manufacturers, including Tatung Co. and Sampo Co. Through investigating historical documents and interviewing senior personnel in the industry, this study explore how household appliance companies respond to domestic consumer characteristics and the pressure of international economic liberalization in the mid-1980s with the execution of industrial poli

KEYWORDS Industrial design, electrical home appliance industry, design history, Taiwan’s economic development, cambered-surface refrigerator
THE THREE PHASES IN THE DEVELOPMENT OF SHAKER FURNITURE IN AMERICA, EUROPE, AND JAPAN

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Shaker furniture is a style of furniture that was made in America mainly in the nineteenth century. However, it has since been introduced in various other countries, and the style has been applied in modern design theory. This article classifies the three phases in the development of Shaker furniture, and it clarifies the cultural elements that diversify the style as well as those that unify it in the twentieth century. These processes are developed through a search for the Shakers’ philosophy and design, the contemporary discussions about them, and the cultural background of these discussions: (1) Furniture of functionalism (2) Furniture for home living (3) Furniture of Mingei Each of them shows the diversity of the Shaker furniture. Conversely, the three phases described in the above Sections have factors that contrast with each other in the following manner: (1) The ideal aspect of functionalism discussed in Section 1 contrasts with the actual aspect of ergonomics discussed in Section 2. (2) The industrial aspect in Section 1 contrasts with the pre-industrial aspect in Section 3. (3) The user’s viewpoint in Section 2 contrasts with the craftsman’s viewpoint in Section 3. The three phases are balanced and organized by each contrasts. This unity is appearing in the context of their cultural backgrounds; this is another aspect of diversity. Therefore, the three phases have two aspects of diversity and unity.

KEYWORDS The Shaker, Functionalism, Home living, Mingei.

THE TACTILE AND VISUAL OF MULTIPLE TOYS DESIGN FOR AUTISM CHILDREN

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Toys are important media in child development, and it is also essential for the child with autism who has difficulties in interaction behaviors. It is very helpful that keep good interactions between parents and child with autism in family for child’s development.. Based on the sensory integration, this research will continue and find out the different level of Stimulation (physical feature, the tactile and the vision), and to improve the prototype of multiple toys, the experiment will be held for discussing the relationship between different intensity of toys and the parent-child interactions. Research steps are as follows: (1)Screening by visual- tactile sensation of the sample compound: 8 groups of tactile and visual samples are selected by Cluster Analysis. (2) Prototyping the multiple toys: 6 materials are selected, there are, shimmer and furry fabrics (Shimmer fabric No.15 and Furry Fabric No.16) which tactile and visual perception are equally stimulating; flannel and suede (Flannel No.3 and Suede No.5) which tactile perception is more stimulating than visual perception; linen and canvas (Linen No.4 and Canvas No.17) which visual perception is more stimulating than tactile perception. Based on these 6 materials, prototypes are made. (3) Experiment: The parent-child interaction behavior (number of Smile and laughter; Eyes contact; finger indicating; degree of concentration) from 15 families are surveyed. After the experiment, physical features as independent variable and interaction behavior as dependent variable are analyzed by Quantification theory type I. The results are as follows: In the parent-autistic child interaction, (A) The Physical features that effect upon ‘Smiling and laughing’ features are fine weave fabrics and low density in tactile sense and shimmer fabrics in visual sense. (B) The Physical features that effect upon ‘Eyes contact’: features are smoothness weave in surface · low density in tactile sense and shimmer fabrics in visual sense. (C) The Physical features that effect upon ‘Concentration’: features are the thickness weave surface in tactile Sense and glossiness fabrics in visual sense . (D) The Physical features that effect upon ‘Finger indicating’: thin fabrics weave in tactile sense and glossiness in visual sense. Although there are significant differences in the behavior of children with autism, multiple toys contribute to positive reactions from autistic children, and it enhances parent-child interaction.

KEYWORDS Karsei, Toy design, Autism, Interaction
THE RULES OF UNRULY PRODUCT DESIGN

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This paper is part of a research into the history of unruly design, which aims at finding theoretical background for the design of everyday things in a postmodern society. Unruly design is defined in this research as: all objects that are designed with the intention to undermine the existing design-paradigm of the functionalists. The paper will present the research background, research approach, and findings in the form of the first five design practices that have been identified as a set of ‘rules of unruly design’. The conclusion in this research has two sides; a cynical one and a positive one. The cynical conclusion can be that the postmodernist experiment in itself has failed; although the central idea was “anything goes (as long as it is not modernist)” it showed that postmodern design largely followed shared paths. One can say that in the end, unruly design followed its’ own rules. The positive conclusion however is that the identification of the five rules of unruly design can support designers to understand the implementation of meaning into demand driven design practice, and therefore extends the possibilities for making meaningful objects. These five rules of practice can be considered a toolkit for the contemporary designer to make meaningful objects.

KEYWORDS Unruly Design, Design History, Design Meaning, Design Method, Aesthetics

PLEASURABLE & EMOTIONALLY-ENRICHED EXPERIENCE: AN EXPLORATION THROUGH LIGHT

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As we considered the light as an interesting medium for interaction exploration, we focused on an explorative approach for pleasurable and emotionally-enriched experience. We first attempted to design prototypes to explore new opportunities for light application. Then we conducted a user study to gather qualitative feedback through an open-ended prototypes. We gave them 2 different setting types of prototypes that they can control color and frequency with. We carefully designed these prototypes to make sure that they can maximize the possibility of discovery-oriented user-driven creations through the iteration of various prototyping ideas. From the user study, we extracted the followings: 1) the colors and the frequencies the users created for the prototype usages, 2) the users’ originally intended ideas of their usages of the prototypes and their actually created atmospheres and usages, 3) the contexts of the usages, and 4) any existing objects they mentioned as comparisons to what they created. As a result, we discovered different emotionally guided explorations that open on opportunities for new experiences with light, primarily for their emotional expressions through 1) grouping different light elements, 2) building companionship, 3) Do-It-Yourself, and 4) applying them to other objects. The important contribution of our research is that it led us to discover that light has a great potential to be re-created and re-shaped for new design applications which may support people’s emotionally enriched experiences. The result showed us that we can use light also for various creative usages that were not conventionally available usages of light.

KEYWORDS emotional design, open-ended prototyping, light
There is a growing market of applications that relate to our bodily wellbeing or ways of expressing ourselves through bodily acts, such as monitor our sleep, deal with stress, create life logs or diaries including bodily data. These applications interact with our bodily, physical selves through biosensors or body movement/gesture recognition. The question is how we best design these to allow us to be empowered, recognize ourselves in the interaction and be expressive. Here we want to uncover the design process behind a bio-sensor-based wellness-system, named Affective Health, aimed to help users to get into biofeedback loops as well as find patterns in their bodily reactions over time. By describing and discussing details of the design process, we provide a reflected account of the particular design we arrived at. Three design qualities are used to both guide the generation and evaluation of different design sketches. They are, in short, (1) the design should build from elements that feel familiar to users, mirroring their experience of themselves, (2) creating designs that leave space for users own interpretation of their body data, and (3) that the implementation of findings required further explorations.

KEYWORDS  Design research, design qualities, design process, affective interaction

Musical sound interfaces diverse in their tonality and pitch were employed to investigate the influence of emotions on contextual interpretation; two empirical studies using smartphone platform were conducted. The measured appropriateness of the interfaces for several purposes revealed the influence of emotions on the perception of context, with significant relation between the interfaces’ emotional qualities, which were rated in terms of pleasure and arousal, and perceived context represented by appropriateness. In addition, the contextual attributes of the interfaces measured by verbal estimation were shown to be correlated with the sounds’ pleasure and arousal. Throughout the studies the effect of emotional qualities on musical interfaces contextual attributes were verified, meanwhile the implementation of findings required further explorations.

KEYWORDS  sound interface, pleasure, arousal, context

Soundscapes, or acoustic environments, are part of natural, multi-sensory territorial experiences. The symbolic properties of sounds can influence perceptions of landscapes. In spite of this, the analysis and design of auditory experiences are rarely undertaken, resulting in territorial sound elements which are mere byproducts of everyday human activity. The discipline of acoustic design aims to enable the deliberate composition of environmental sound, thus contributing to shaping the subject’s interpretation of his environment. This study aims to identify the key aspects of urban soundscapes which influence territorial interpretation. Acoustic design methodology, as originally conceived by R. Murray Schafer, is revisited through the lens of interpretative anthropology, communication theory and design. The aesthetic and social dimensions of the soundscape are considered and, additionally, a soundwalk methodology is presented as a model for the analysis of urban soundscapes. This study concludes with reflections on the application of soundwalk methodology.

KEYWORDS  Acoustic Ecology, Soundscapes, Design
116  ECO-PRODUCT FORM DESIGN: A MULTIATTRIBUTE DECISION MAKING APPROACH

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Monash University

Yang-Cheng Lin
National Dong Hwa University

This study moves beyond technical evaluations of environmental performance of eco-products by developing a new design decision support approach for evaluating the eco-product value (EPV) as perceived by consumers. A consumer-oriented experimental study on office chairs is conducted to illustrate how an EPV evaluation model can be developed to evaluate the value of a given eco-product. The design support database built based on the neural network model helps office chair designers work out the optimal value of eco-product form element combination on aesthetic, functional, and environment-friendly attributes that contributes to the eco-product value.

KEYWORDS eco-product design, eco-product value, Kansei engineering, neural networks, TOPSIS

117  A CONCEPTUAL MODEL OF INTERACTION BETWEEN HUMANS AND NETWORKED PRODUCTS

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An increasing number of products are connected via networks becoming a system of two or more devices. In this situation, a user needs to control the connection and termination of the devices as well as the functional usage of each device. Designing interaction for such a complex system becomes a challenging problem in mediating its system model and users’ mental model. In this paper, we present gaps between the system model and users’ conceptual models of the interaction of Bluetooth networked devices, and discuss interaction design.

KEYWORDS conceptual model, networked devices, Bluetooth

119  BALANCE BETWEEN BEAUTY AND USABILITY IN KANSEI INTERFACE FOR SMARTPHONE

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A well-designed interface must be both usable and beautiful. A kansei interface additionally requires the ability to arouse positive emotions. The purpose of this paper is to illustrate the kansei interface that appears to be important determinants of acceptance for smartphone’s apps. The concept of the “kansei interface” proposed by Yamazaki is extended to interface design of smartphone in this study. The way users evaluate applications on a smartphone was evaluated using direct observations, rating scales, and interviews. Some relationships between users and the interface were found.

KEYWORDS aesthetics, interface, kansei, smartphone, usability
122

THE EVOLUTION OF VERNACULAR DESIGN: CASE STUDIES OF KIMCHI REFRIGERATOR, RICE COOKER, AND FLOOR HEATING SYSTEM

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Vernacular design for the artificial world is the topic of the book Architecture without Architects, by Bernard Rudofsky, written in 1964. It attempts to break down our narrow concepts of building art by introducing the unfamiliar world of non-pedigreed architecture. In equal terms, this idea can be adopted to product design area. For want of a generic label, we have called it vernacular, anonymous, spontaneous, indigenous, rural, and local as the case might be. For Koreans it is a remote area for multi-national corporations or global star designers to design appliances and facilities related to life's indispensable staples. Examples include the Kimchi refrigerator, the rice cooker, and floor heating system. Highly educated local designers are developing and commanding the design of local staples and modern vernacular design projects, adapting series of professional conventions of their locality and paying substantial attention to what may be fashionable as well as useful for their neighbor customers. This study explores three cases of modern Korean vernacular design: the Kimchi refrigerator, the rice cooker, and the floor heating system. A new perspective on vernacular design as contemporary high-tech products of necessities is then proposed in a local context.

KEYWORDS vernacular design, design evolution, Kimchi refrigerator, Rice cooker, Floor heating system

132

ON PRESCRIBING EXPERT DESIGNING: A LOGICAL ANALYSIS

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In this contribution a logical analysis is given of the in design research regularly held expert position to prescribe expert design practices as favourable design practices to other designers. First I argue that despite its conservative starting point to consider only types of already existing expert design practices as favourable, the position allows for some room to also prescribe new types of design practices. Second, I analyse the very claim that expert design practices define types of favourable practices. It is shown that the expert position may be formulated in a way in which this claim is tautological, and in a way in which it involves empirical prediction. This latter formula-tion allows testing the expert position by determining whether designers when mimicking experts indeed engage in favourable design practices.

KEYWORDS Logic of Design Methods; Expert Design; Empirical Claims of Design Methods
Sound Capsule: The Study of Reminiscence Triggered by Utilizing Sound Media and Technology

This study is focused on recalling past emotions with sound materials. Sound capsule is a cell phone application developed on the android platform, which allows users to record their voices, and in the future it will make a phone call and randomly play the voices if users answer the phone. We plan to install the sound capsule on the cell phones of ten users. We expect different types of sound will trigger users’ different memories, leading to social interaction. Furthermore, the serendipity of hearing the recorded voices in daily lives brings users expectations and positive surprise of memory recalling.

Keywords: sound capsule, emotion, serendipity, memory recalling

Beyond TechCards: A First Step Toward the Investigation of New Dimensions of Intermediate Representations to Support the Creative Process of Emerging Technologies

This paper presents a design tool that supports collaboration, communication and creativity in a context of highly specialized technological complexity and within a multidisciplinary team. This study analyses the impact of such intermediate tools, the TechCards, by exploring two research questions. The first investigates the effect of the tool in a creativity session. The second examines the opportunity to turn a typical creativity session into a gaming experience with the TechCards. Creativity production and intrinsic motivation were measured. Results showed that our intermediate objects improve fluency and adaptation of ideation related to our industrial context; plus, the game condition combined with TechCards enhances intrinsic motivation and the overall creativity of the generated ideas. The implications of these findings and future research tracks are discussed.

Keywords: Design tool, Intermediate representations, Creativity, Serious gaming, Intrinsic motivation.

Cultural Differences & New Product Opportunities: Thai Indoor Mobility Aids

Suitable mobility aids can decrease the intensity of elder care burden. Thai culture and economy are important barriers to the Western mobility aids adoption, leading to eldercare failure. This research aims to study barriers to adopting Western mobility aids in Thailand, and to identify opportunities for new product development. Techniques for this research include contextual interview, self-documentary study, and Q-sorting. Findings on cultural barriers suggest new product requirements appropriate to the Thai context. The results of this research could impact the quality of life of the elderly and their families in both Thailand and other developing countries in the region.

Keywords: indoor mobility, elder care, product development, cultural factors, economic factors
EMOTIONAL DESIGN CAN IMPROVE THE HEALTH

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The statistics shows that consuming milk in Iran is less than the average in the world. Since consuming milk has an important role in children health, it is necessary to persuade them to drink it. In this study emotional packaging was investigated to find the role of emotional design in children decisions on drinking milk. For this aim Kansei Engineering method, which is an appropriate methodology for linking users’ emotions to product properties, was used. 10 milk packages were selected among 100 samples. Clustering was used to find out the most related properties for each package. A representative package was chosen for each category. The representative package covered the most number of properties in each group; therefore 10 packages were selected to be studied. According to the choice of domain in Kansei Engineering, the representatives have been evaluated by Kansei words with 50 students, between 7-11 years old. The study was done by questionnaire and interview. The result of the study shows that using emotional design has a significant role in encouraging users to consume milk. It is concluded that using emotional design encouraging users to drink milk. It proves the key role of design in human life. Emotional design can help people to improve their health by provoking them to consume healthy products such as milk.

KEYWORDS  Emotional Design, Kansei Engineering, Milk Packaging

A CO-DESIGN EXPLORATION: DESIGNING SENSOR-ENABLED EXERCISE WEAR FOR AGING

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This paper documents an ongoing research project investigating the possibility of design for sensor-enabled clothing or devices that augment the exercise experiences of the independent elderly. Qualitative user-centered methods are employed to elicit the sensory knowledge and experience of a group of older adults. The research takes a grounded theory approach to collecting and analyzing sensory data. It structures and investigates the dynamics of co-design interaction in the initial stages of the design process, where student designers and older participants work together in this technology-oriented process. The mature participants contribute both to the initial idea generation and to the subsequent evaluation of the conceptual scenarios. The paper discusses two sets of findings that contribute to the general body of knowledge in the areas of design of wearable solutions for aging and co-design. First, it identifies sensory, body, and exercise issues that are important to older adults. It also illustrates concepts for sensor-based wearable computing assistive clothing or devices that address those issues. Second, it describes four steps for applying co-design techniques to unique research investigations involving older adults: immersion, sensitizing, co-design, and scenario development. In the first step design facilitators develop a contextual framework for the research. The second stage focuses on sensitizing the participants through ethnographic field studies and pre-session homework for participants. In the third stage designer/facilitators and older adults participate in co-design sessions. In the fourth stage of the research activity the design participants analyze and develop the ideas generated in the co-design sessions into concept scenarios.

KEYWORDS  co-design, design for aging, user-centered design
154

AGE DIFFERENCES IN THE COGNITIVE PROCESS OF SIGN RECOGNITION IN ZOOS: A CASE STUDY OF SAPPORO MARUYAMA ZOO

The aim of this study was to obtain fundamental data to design zoo signs that are easy to understand by visitors of all ages by using Sapporo Maruyama Zoo as a case-study to identify age differences in the cognitive process of sign recognition. Subjects were divided into three groups, children, young adults and the elderly, and by using synthesized simulated images of signs and landscape photographs from inside the zoo, the time needed to complete tasks, error rate, subjective evaluation and changes in line of vision were evaluated. Results showed that age differences existed in sign seeking behavior and spatial cognition including where a subject was and where s/he wanted to go.

KEYWORDS  Universal Design, Sign Recognition, Eye tracking

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CO-CREATING SERVICE EXPERIENCE WITH STAKEHOLDERS: THE CASE OF TAIWAN’S CULTURAL CREATIVE INDUSTRY

Recently, co-creation has become an important issue in service design. However, there is very limited research on exploring how a firm can efficiently and effectively co-create with different types of stakeholders to deliver a holistic service experience. To date, the cultural creative industry has been steadily popular around the world. Therefore, this study aimed to explore the ways in which a firm, Lin’s Ceramics Studio (LCS), co-creates with different stakeholders to offer Chinese tea culture experiences in Taiwan’s culture industry. In doing so, this study adopted an ethnographic approach to obtain deeper insight.

KEYWORDS
service design, co-creation, cultural creative industries

SEMANTIC SHIFTING WITHIN THE INTERACTION SEQUENCE

This study integrates the grammar of narrative proposed by structuralist Tzvetan Todorov with the interaction protocol proposed by Krippendoff, and examines the semantic shifting in the context of human-product interaction sequences. First, eighty five metaphoric products were collected and carefully classified into six simplest modes of an interaction sequence based on our integration proposal, which sufficiently explains basic semantic shifting. Second, seven lamps belonging to different modes respectively were chosen as stimuli, and each sequence was illustrated by five frames. The experiment was carried out by forty-eight participants to examine the emotional effects of these lamps at each step. Finally, the early results showed that semantic shifting could influence to the level of emotion at each step, in particular which caused by an atypical form and operation. The special operation could play the role of hook in the sequence to make products more special.

KEYWORDS
motion semantics, interaction sequence, emotion.
158

A DIAGRAMMATIC TOOL FOR DESCRIBING HOW A PRODUCT ENGAGES USERS

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In this paper, “how a product engages users” is defined as a situation in which a product provides one or more additional features related to its primary function; therefore, the user has more senses engaged in the product experience. For example, if the appearance of a toaster is completely transparent, a user can observe the bread darkening. The transparent sides stage the toasting process as a visually engaging performance. The other example is a tape dispenser with a simple odometer. In addition to acquiring tape, the person who uses such a dispenser can observe how much tape has been dispensed in terms of distance. These two cases convey the way in which individual products can engage users’ senses. To describe it in a flexible way in this paper, how a product engages users literally equals to user engagement. Because user engagement is a novel domain, it is necessary to develop a new analytic tool for describing and recording it. Based on models and frameworks that visualize design variables, such as functions (Stone, Wood & Crawford, 2000), user contexts (Lim & Sato, 2006) and human machine communication (Suchman, 1990), visualization is an advantageous technique. They indicate the usefulness of visualizing human-artifact interaction as well as provide a basic understanding of how to develop an analytic tool for describing user engagement. As a result, a diagrammatic tool for describing user engagement is developed, named as the model of user engagement (MUSE).

KEYWORDS user engagement, design tool, user-product interaction

160

REQUIREMENTS MANAGEMENT FROM AN INTERDISCIPLINARY POINT OF VIEW

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An integrated modeling approach is presented to consider requirements in an interdisciplinary development project. Targets and requirements on system level are consistently decomposed into requirements for different disciplines using extended SysML and UML notation. Although, specific development, testing and verification techniques in the different disciplines are used, the consistent fulfillment of requirements is monitored and possible goal conflicts are identified as soon as in the early phases. The approach is shown for the development of parallel robotic systems from mechanical and software related viewpoints that are integrated on system level.

KEYWORDS requirements management, interdisciplinary development, robotic systems, SysML/UML
165  DIVERSE FORMS DESIGN BASED ON CONCEPTS OF EMERGENT DESIGN AND OPTIMUM DESIGN

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Yoshiyuki Matsuoka  
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In this research, a concept of emergent design and optimum design, which are the artifact design that can be applied to such the early process of design and the late process of design, were shown. Additionally, as an application of the emergent design, the system for deriving diverse solution, which consists of a bottom-up process and a top down process, was proposed. Moreover, it was shown that diverse solutions were derived applying this system to the form design.

Emergent Design, Diverse Design Solutions, Optimum Design, Design Process

KEYWORDS

166  COMPARATIVE ANALYSIS OF TOILETRIES DESIGN IN KOREA, CHINA, AND JAPAN -FROM LATE 17TH TO 19TH CENTURY -

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This research describes the design characteristics in Korea, China, and Japan by investigating makeup culture and toiletries. To find unique design characteristics, the toiletries of upper class women from the 17th to 19th centuries were compared. The three countries developed their own forms, proportions, materials and surfaces. The design characteristics of Korean toiletries had diverse forms, flexible proportions, painted patterns with symbolic meanings, practical materials and soft surface, while those of China had a complicated structure and carved patterns. Japan had simple forms, sharp edges, and layered structure with colorful lacquers.

makeup, toiletry item, aesthetic, comparative analysis

KEYWORDS
DEVELOPING A VALUE MODEL OF WELLNESS SERVICE

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The aim of this study was to develop a value model of wellness service. In this study, those persons who work in health care systems were recruited to participate in interviews for investigating the value of various roles and the effects of these values between the roles. Throughout this study, the flow model, sequence model and cultural model were established to explain the relationship between the different roles, the process being influenced by others, and the effects of other values in wellness-related activities. According to the models, the following features of value in wellness activities could be found: personal, interactive and temporal. Based on the result of this study, the investigating and presenting the relevance of effects between values more completely will be researched in the next study.

KEYWORDS Wellness, Value Models, Service Design

SILENT NOISE: CHANNEL NOISE IN VISUAL COMMUNICATION

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Do visual designers sacrifice message fidelity for style? Do they understand that their choices can compromise communications effectiveness? Have designers studied how messages are either kept intact, or interfered with? Visual communication technologies have been rapidly developing for over half a century. Currently, visual messages are disseminated across channels such as web-based channels, broadcast channels, print channels and others. These visual messages are complex codes. They contain text that is codified language, diagrams and charts that are codified information, and images representing people, places and things. When the message's visual code gets to the message receiver, the receiver decodes the message and reconfigures it into meaning. If the code is interfered with if it does not get to the intended receiver of the message intact then the meaning of the message is compromised. Visual noise compromises the receiver's ability to see the code they were intended to.

KEYWORDS visual noise, channel noise, message fidelity, communication design

LAST PRESENT: AN OPPORTUNITY FOR PREPARING A GIFT FOR LOVED ONES BEFORE DEATH

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In this study, we discuss the relics which people prepare for their loved ones when they face death. Through interviews and cultural probes, we investigated their opinions in regard to these relics and realized their purposes. We also collected the meaningful items in their lives to clarify the relationship between the users and the meaningful objects. During the process of their preparation, we also found some problems and difficulties they encountered. According to the results, we proposed a few design suggestions for designers when they design memorial products or services.

KEYWORDS death memorial relic
**183**

**EXAMINING THE PHYSICAL TO VISUAL SHIFT IN HOW WE NOW EXPERIENCE DESIGNED OBJECTS**

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From tables to cars, vacuum cleaners to telephones and lamps to lighters, industrial design, in a conventional sense, is concerned with enriching people’s lives whilst at the same time designing more functionally robust products, less expensive services, and systems that reduce damage to the environment (Rodgers, 2009). By this we mean that the majority of goods produced and used widely are highly tangible, real, physical objects but their visibility on the intrusive and ubiquitous world of the media such as magazines, websites and exhibition events is close to zero. In recent years, however, there has been an increasing shift in the power and reach of the media within a design context. This is particularly evident in relation to the design and production of limited edition and one-off design pieces. We have witnessed a growing phenomenon in the number of these objects being produced, which have quickly become part of private and public collections. Objects generated in this context of design proved having a relevant impact on the design and its community of practitioners, aficionados, educators and students. This paper chronicles an investigation involving a group of design students from Northumbria University, School of Design. The outcome of this case study aims to better understand how the shift from physically to visually consumed designed objects impacts on industrial design students. Specifically the way they access and use design material for inspiration, learn about design and develop their ambitions to work as designers. References Rodgers, P.A., The Little Book of Big Ideas: Design, A.&C. Black Publishers Ltd., London, 2009.

**KEYWORDS**  
Physical, Visual, Consumption, Design Education

**184**

**SPACE FOR DEBATE: POP DESIGN**

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Design for debate asks carefully crafted questions and makes us think. Since the publication of Design Noir there have been many art and museum gallery exhibits and a great number of student design projects that are conceived as designs for debate. But the question, who is having this debate, has troubled amongst others, Dunne and Raby themselves. If there is a debate, it is for the most part held in the university seminars, art galleries and conference halls where it is displayed and discussed. The debates then are often held in relatively rarefied and elite institutions. This paper considers the extent to which critical design might extricate itself from this dilemma. It asks if critical design is for debate then how can the debate be moved out of the gallery, the museum, the university seminar and into more accessible domains. The emergence and ubiquity of social media tools and web 2.0 sites such as YouTube facilitate the distribution of user-generated content through videos and comments, which may offer a new appropriate platform for design debate. This paper describes the adoption of YouTube as a mechanism for “design for debate” in relation to three “excessive designs”, namely The Fastest Clock in the World, The Highest Popping Toaster in the World, and Signs of Life.

**KEYWORDS**  
Critical Design; Design for Debate; YouTube; Audience
**CONFLICT AND CREATIVITY WITHIN DESIGN TEAMS**

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Organizations are faced with a fast-paced competitive marketplace and rapidly advancing technologies, yielding the need for an innovative response for any hope of survival. This innovative response requires the establishment of diverse, collaborative design teams that can confront the increasing complexities of design. As members collaborate and interact with one another, conflicts arise that have both beneficial and detrimental effects on the creative process. Through a review of extant literature, this paper focuses on the relationship between conflict and creativity, and how cognitive- and affective conflict affect the generation of ideas and the development of design solutions that contribute to innovative outcomes. Cognitive conflict, if experienced at a moderate level, is found to be beneficial for stimulating creativity whereas affective conflict is considered detrimental. In order to enhance creativity during the early conceptual design phase, cognitive conflict between team members must be moderated while preventing the impedance of affective conflict.

**KEYWORDS**  
Conflict, Creativity, Design Teams

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**HOW EXPERT DESIGNERS EXPRESS SHAPE AND SHAPE OPERATIONS**

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Computer support for shape ideation could be more intuitive if the human-computer interface were adapted to the way designers ideate shape. We observed expert designers who communicated shape modifications. The shape terms which the subjects used during their communication were recorded and categorized. The results were compared to the results of a similar test in which the subjects were bachelor design students. Moreover, they give us insight in the possible advantages of earlier proposed support tools for shape ideation.

**KEYWORDS**  
Human-Computer Interaction, Shape ideation, Computer-Aided Design

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**THEMES AS BRIDGES BETWEEN PROBLEM AND SOLUTION**

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**Douglas Tomkin**  
University of Technology, Sydney

The ability to reframe is widely seen as a key design skill, and central to the claim that design thinking can contribute to radical innovation. Yet there are few studies that seek to describe and understand this process in detail. In this paper we will use four case studies of complex design projects to study the art of frame creation. We find that designers use deliberate strategies to explore the wider problem area, and create new frames based on those explorations. The notion of ‘theme’ is adopted from hermeneutic phenomenology to describe and understand the subtle ways in which designers navigate the area between problem and solution space during framing.

**KEYWORDS**  
frame, design problem, design solution, theme
204

**CONNECTING EDUCATION, PRACTICE, AND RESEARCH CASE STUDY: CREATING MEANINGFUL PRODUCTS WITHIN AN INDUSTRIAL DESIGN STUDIO USING A PRODUCT NARRATIVE FRAMEWORK**

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Jacqueline Power  
University of Tasmania

This paper considers a conceptual design framework that was developed in professional practice. The framework is termed the ‘Product Narrative’ and is an approach to design that has been developed by the principal authors of this paper in their own award-winning Sydney-based design practice. The Product Narrative framework consists of a four part approach - Narrative; Manufacture; History; and Interaction. This framework offers a means to stimulate a multilayered narrative or story, communicating the ideas of the designers to the end-user via the product. The following paper elaborates on this approach in practice, and describes its implementation in a second year industrial design studio. The perceived value of the Product Narrative is described, and the value of connecting design education with practice.

**KEYWORDS**  
product narrative, design studio, practise

205

**TIME FACTOR OF CORE EMOTIONS DERIVED FROM DESIGN MATERIALS: TOWARDS A DEEPER UNDERSTANDING OF PRODUCT EXPERIENCE**

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Impressions and emotions affect both the selection of a product and its long-term use. We need to investigate the origins of emotions from designed products in order to create better product designs. This study focuses on the time factor of emotions, particularly on the impression formation of product design materials. We conducted an experiment to observe how participants experienced a set of product design materials. We identified and compared the core emotions formed early in the process and the accompanying experiences from the entire session. The results suggest that the provided designed products elicit core emotions that are usually formed on first contact with the materials, are strongly associated with basic emotions, and define what people think about the use of the products. These findings are important in helping to improve product design and the design of products that evoke emotional attachments.

**KEYWORDS**  
User experience with materials, Product design materials, Emotions in time

221

**DIGITAL BRUSH WITH INTUITIVE OPERATION DESIGN FOR CHILDREN ON TANGIBLE USER INTERFACE**

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This study was based on the intuitive operation. Combining with tangible user interface, investigate the form of digital brush with intuitive operation that is suitable for 4-7 years-old children. Considering with the needs and cognitive ability of children, applying their tactile and visual abilities to learning in this period and convey the use by form. Through identify different patterns and observe the shape, change the brush intuitively and show more plentiful lines. The intuitive operating digital pen for children is feasible to promote the use of digital drawing of the fluency, fun and learning.

**KEYWORDS**  
intuition; digital pen; tangible user interface (TUI); children; drawing
226

INVESTIGATING MOTIVATIONS AND EXPERIENCES OF DESIGN DOCTORAL STUDENTS: RESEARCH DESIGN AND RESULTS FROM A STUDY IN DE

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In DE, doctorates in the design discipline are developing with increased enrolments, completions and new programs. However we know little about the motivations, experiences and challenges of current candidates. Mixed-methods studies employ qualitative and quantitative methods to research such educational issues. On the basis of qualitative and quantitative data from a survey of doctoral students (n=39) gathered during a publicly funded research exchange, the authors demonstrate what can be learned through such methodologies. In this paper, we focus on the research methodology as it is applied in different studies in design in DE and may be used as a basis for similar studies in other regions or domains. The study findings indicate some of the current tensions and challenges in this area, which require addressing as doctoral design in DE develops.

KEYWORDS PhD in design, doctoral education, practice-based PhD, DE, survey study

232

MAKING EXPLICIT IN DESIGN EDUCATION: GENERIC ELEMENTS IN THE DESIGN PROCESS

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1) Making explicit ‘what to do’ in designing and more specific making explicit the design process will help students in learning to design. 2) There are generic elements in the design process, which teachers have to be aware of for training students and making explicit the design process. Goal of this paper is to research generic elements in the design process, within and for an educational context. Experimenting with a guiding theme, exploring, decision making, frame of reference and a language of sketching and modeling are some of the notions.

KEYWORDS Generic design elements, design process, design education, explicit, implicit

235

ELECTRIFYING A CAR BRAND. EFFECTS ON BRAND PERSONALITY AND BRAND EXPERIENCES.

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In proposing new options for cars as important manifestations of mobility and transport, and in getting them accepted in the marketplace, it is important to investigate to what extent these options fit with the personality of the car brand and the experiential characteristics that consumers associate with the brand. Furthermore it is desirable that these new options improve brand personality and brand experiences and lead to positive brand attitudes such that adoption is being considered. This paper investigates the effect of introducing different electric car designs under different existing car brands on brand personalities, brand experiences, attitudes and buying intentions.

KEYWORDS sustainable product design, electric car, brand personality, brand experience
238  
**A GOOD CONVERSATION: A PARADIGM SHIFT IN AIRPORT SECURITY**

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Technical University Delft

Ruud van Heur  
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Worldwide airport security stays high on the political agenda; safety, terrorism and corresponding procedures are under debate. Security has become a necessity in which the human perspective has disappeared from sight. Within the airport business the current mindset seems to be designing for business needs. In the article a service design approach is taken in which a balance has been found between business needs and consumer needs. Or differently put, an approach that enables to design a user-friendly security environment. This method shows how in complex cases co-creation with important stakeholders can contribute in creating a solid service design in which consumer experiences are represented.

**KEYWORDS** Paradigm shift, qualitative research, airport security, co-creation, stakeholders, future concept.

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240  
**DESIGNING INTERACTIONS BY DESIGNING BUSINESS MODELS**

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The global economic crisis is pushing forwards thoughts and conjectures about productive models, their logics and features. In particular business model generation is emerging as a strategic issue to be addressed as many contributions from managerial and business sciences are pointing out (Amit, Zott, 2001; Teece, 2010). Also design research, especially, the integrated design thinking framework (Brown, 2008; Martin, 2009) the area that relies on designers “tool box” are progressively addressing their contribution towards the generation of “value innovation” and its related business models (Kim, Mauborgne, 2005; Ostervalder, Pigneur, 2008). In the current hybrid and networked economy a multiplicity of business models is prevailing that is making available different values that rely on diverse models of interactions between producers and consumers. By exploiting a case based qualitative analysis the paper investigates the relations between models of interactions designed to support the producers-users communication, and the underlined business models.

**KEYWORDS** interaction design, business model

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241  
**DEVELOPING A HUMAN-CENTERED ATTITUDE THROUGH EXPERIENTIAL LEARNING**

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Rotterdam University of Applied Sciences

Peter van Waart  
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This paper describes factors that nurture a human-centered attitude of a design curriculum. A brief literature study defines a human-centered attitude and explains how to develop this attitude by using experiential learning theories. Furthermore, an illustrative case study reflects on the human-centered elements of a multimedia design course. This study recommends the teaching of human-centered methods as an integral part of a design curriculum, a teaching style that questions the human-centered aspects of the student’s work and composing authentic and challenging project briefs with real people. To develop a human-centered attitude students need to involve real people into their design process and empathize with them. The experience with real people affects their beliefs, which can result in changing their attitudes towards people.

**KEYWORDS** design education, human-centered attitude, experiential learning
The concept of design thinking has received increasing attention during recent years - particularly from managers around the world. The ample attention given to design thinking has resulted in a need to understand its core essence. However, despite being the subject of a vast number of articles and books, a search for definitions of design thinking does not produce a concise portrayal or a clear-cut breakdown of what the concept encompasses. In addition to the vagueness of the concept, also the effectiveness of the approach is unclear, as the claims about the concept are not grounded on empirical studies or evaluations. This paper discusses the need for empirical research on design thinking, the relationship between two differing discourses on design thinking, as well as their focus and direction. We conclude by proposing directions for research that further explore design thinking as a management practice.

**KEYWORDS**
design thinking, design research, management

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This paper reports on an experiment examining familiarity across a range of users. The research objectives are discussed, and research questions are posed. The experiment is introduced and an overview of a 3 level theoretical framework of familiarity is provided. The overarching findings are explained and the conclusions drawn from those findings are presented.

**KEYWORDS**
Familiarity, Prior Knowledge, Intuitive Interaction, Older Adults, Usability

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This paper describes a study in which designers learned about the needs and experiences of children with autism for design through direct contact with these children, and especially their caregivers. Designers and caregivers used an observation tool, developed to support and stimulate designers and caregivers in memorizing learning moments and discussing these moments together. This should result in an understanding for children with autism, and thereby products that better fit these children's needs. This paper discusses the role of this tool in structuring the observation and bringing out learning points.

**KEYWORDS**
Design tools, Empathic design, Experiential learning, Autism Spectrum Disorder
252 CONDITIONS AND CONSTRAINTS OF COLLABORATIVE DESIGNERLY WORK

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As the problems we face today become more complex and larger scale, designers need to investigate what people actually do, what they value, and how they understand things. This human-centred approach to solving complex problems requires greater breadth and depth of expertise, than any single designer can possess. Therefore it becomes necessary for designers to work in collaborative situations to share knowledge with different stakeholders and understand the interaction between people and their environments. Drawing on a recent series of interviews (n=14), this paper provides insight into what collaboration means from the point of view of professional designers. The paper focuses on designers' experience.

KEYWORDS: Collaborative design, Interdisciplinarity, Design Activity, Design Methodology

254 LOST IN CO-X: INTERPRETATIONS OF CO-DESIGN AND CO-CREATION

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Delft University of Technology

In the last decade, co-design and co-creation are terms that appear widely in scientific literature, in professional magazines, websites of product development companies, design research and market research agencies and even public organisations’ reports. We have noticed that the terms are often tangled. The objective of this paper is to clarify the relationship of co-design and co-creation in the context of design and design research. We aim to make sense of the background and use of the terms to show similarities and differences between them. We review literature and discuss recent cases to demonstrate the spectrum of co-X. Our main aim is to clarify the co-terms for our design students in the rapidly evolving design research field.

KEYWORDS: co-design, co-creation, user engagement

255 A STUDY ON ORGANIZATIONAL STRUCTURE AND DEVELOPMENT PROCESS IN DESIGN ACTIVITY

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The purpose of this research is to clarify the element of organizational structure and development process involved in design development to achieve creating highly advanced, innovative design and establishing a coherent corporate design identity thorough making a deep analysis of cases in Japanese electronics manufactures. Therefore, through considering prior studies about product development and design management, this research extracts an analytical perspective to make analysis organizational structure and development process involved in design development. This research mainly describes two points. Firstly, this research describes organizational structures and development processes that two Japanese electronics manufactures adopt. Secondly, this research describes designers’ communication with other department members and other designers in that organizational structures and development processes. Finally, this research makes analysis of these cases through the analysis perspective. As a result, this research finds out what natures of communications are needed among members in order to create highly advanced, innovative design and establish coherent corporate design identity. This research also finds out the element of organizational structure and development process to affect such communications among members.

KEYWORDS: Management, Organization, Development Process
This paper aims to introduce the particular methodology of the author’s and their colleagues at TU Delft Chair of Landscape Architecture. This approach is characterised by theories, methods and techniques converging towards design research and research by design. The research domains of design research and research by design cannot be seen apart from each other: design research is an indispensable step in research by design. Together they constitute a heuristic approach for knowledge based and creative design. The development of these research domains and their variables are considered to be crucial for understanding of the formative elements behind landscapes and for the development of planning methods and design strategies. Knowledge of the landscape form enables us to test the transformations for an insight into the physical conditions which are decisive factors in ecological and social-economic development. The paper offers an introduction to design research and research by design in landscape architecture and discusses their variables and relationship. Exemplified by studio and research work, it elaborates on plan analysis and comparative research as constituent elements of design research, and design experiment and experimental design as constituent elements of research by design in landscape architecture.

**KEYWORDS**

Landscape Architecture, design research and research by design

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**THE STUDY OF PREFERRED TOY CATEGORIES FOR CHILDREN WITH DIFFERENT TEMPERAMENTS**

It is through playing games that children learn as they develop and grow up. Toys are important tools, and children can learn and grow from playing by using toys as teaching aids. Besides, every child has a different natural “temperament”. Children with different temperaments need different teaching aids in their development. This study aims to identify the preferred toy categories for children with different temperaments. This study uses The Carey Temperament Scales to divide preschool children into different groups, and select sample toys which is representative of each toy categories. To build the relationship between preference for toy categories and children with different temperaments, ANOVA Analysis, and LSD Multiple Comparisons would be used to analyze the research data. Research result shows: children have different preference for toy categories, and children with different temperaments shows different preference for different toy categories.

**KEYWORDS**

Temperament, Preference, Toy design

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**USING VISUALS TO EXPLORE THE CONTEXTUAL ASPECTS OF HUMAN EXPERIENCE AND USER-PRODUCT INTERACTIONS**

Experience underlies all kind of human knowledge and it is context dependant; people’s experience within a particular and physical context-of-use determines how they interact with products. Within this research context, this paper describes two empirical studies employ visual representation of concepts as means to explore the experiential and contextual component of user-product interactions. This paper demonstrates that using visuals in design research is a valuable source to explore and understand contextual aspects of human experience and its influence on people’s concepts of a product use.

**KEYWORDS**

visual representation of concepts, design methods, context of use
270

CREATING RECIPROCAL VALUE PROPOSITIONS- THE CASE OF THE IMPROVEMENT OF THE QUALITY OF LIFE OF ALZHEIMER PATIENTS AND THEIR CAREGIVERS

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This study is concerned with the way designer’s build-up and maintain shared values and uncover the unmet needs in a network of partners in the context of service innovation. It draws attention to the activities related to the probe and learning process of creating value propositions that are not dichotomous, but reciprocal. We study the case of the improvement of the quality of life of dementia patients and their caregivers. In this research we apply the method to create so-called ‘experience flows’ for onset dementia patients and related stakeholders, such as caregivers, relatives etc., to uncover unmet needs and opportunities for innovative solutions with lighting. The contribution of this paper lies in the application of design driven tools to create value for multiple stakeholders. One of the major findings of this paper is that the experience flow method enables designers to involve stakeholders in the analysis and synthesis process of design without being fenced by existing problems and scenario’s.

KEYWORDS design process, design methods, experience flows

272

EVALUATING THE PREFERENCES AND EFFECTIVENESS OF DIFFERENT ONLINE BREAST CANCER HEALTHCARE INFORMATION PRESENTATION FORMATS

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The capacity of Internet to serve as a virtual clinical house for communicating health information enable people with common health interests to maintain electronic contact. The Internet is an important source of Breast Cancer Health Care information which can provide people valuable information and guidance. The purpose of this study was investigating what types of online BCHC presentation formats to communicate with Taiwanese women were more effectively. The methods included three phases: the first phase was “document method” to generalize the communication types of online BCHC; the second phase was questionnaire method to understand women’s preference of online BCHC formats; the last phase was in-depth interview method with medical professions and web design experts to understand the most effective online BCHC presentation format.

KEYWORDS Breast Cancer Health Care information, Preference, Effective, Web Design
276

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EXPLORING THE EFFECT OF DESIGN TASKS ON CONCEPTUAL DESIGN ACTIVITIES: A DESIGN PROTOCOL STUDY BASED ON THE FBS ONTOLOGY

This paper reports an ontologically-based protocol study exploring the effects of different classes of design requirements on the cognitive processes during conceptual design activities. The designing processes of the same groups of industrial design students were studied for two different design tasks; one targeted the existing market and the other was a visionary task beyond the normal new product development time frame. The protocol study transformed the designers’ verbal utterances and gestures into a sequence of design issues by applying a generic coding scheme based on the FBS ontology. Statistical methods were used to compare the design issue distributions between the two tasks. There were no statistically significant differences found between the two sets of design tasks in the beginning of designing processes, but significant differences occurred following the beginning. Results suggest that the nature of the design requirements may influence how industrial design students generate and develop solutions. In particular, designing with open-ended requirements is more concerned with the purpose of designs being produced; the design problem may be constantly re-assessed and modified throughout the designing process. Whereas when designing for a well-formulated task the main cognitive efforts are shifted to the solution development after the problem situation has been framed, and rarely goes back to revise the initially formulated problem.

KEYWORDS
Design thinking; design protocol study; FBS ontology
298

DESIGN COLLABORATION IN MEDICAL RESEARCH: DESIGNING DOCTOR PATIENT INTERACTION

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KEYWORDS: Collaboration, Design Visualization, Patient Communication, Physician Patient Interaction

With the expansion of specialization has come a contraction of innovation needed to meet systemic problems. To rectify this, calls are coming for greater levels of collaboration across disciplines from research funding agencies such as the National Science Foundation (NSF) and National Institutes of Health (NIH). This paper describes the collaboration of graduate design students at the University of Cincinnati (UC) with researchers at Cincinnati Children’s Hospital Medical Center (CCHMC) to improve doctor-parent interaction surrounding Attention-Deficit Hyperactivity Disorder (ADHD). The combined CCHMC/UC team collaboratively designed communication materials to ensure 1) information provision on all treatment options and 2) elicitation of parent preferences among the treatment modalities. Preliminary testing of the materials has been encouraging. This paper reports on the collaborative design process of those materials.

282

A STUDY ON COLOR-CONTROL METHODS FOR WORK-RELATED SPACE IN HOSPITALS

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This paper describes color control methods for workspace in hospitals. For this purpose, it is possible to improve the color environment and establish a guideline for color planning based on objective facts as specific solutions for work-related stress for nurses. As a first step, this paper focuses on a nurse center where the sharing of medical information takes place. A survey was carried out to check current circumstances of the nurse center, and then a color pallet based on analysis and evaluation of digital pictures is created by using a colorimetric pallet software. Finally, the chromatic pattern that enables to improve the nursing work environment is defined. This study uses a three steps level examination method, which helps us determine the psychological profile of nursing personnel and how the profile plays an important role in defining possible chromatic patterns that can help reduce the stress present in this working environment. In addition, there are significant advancements in establishing a proper guideline for color planning based on objectives facts.

KEYWORDS: Nurse, Stress, Color Environment

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KEYWORDS: Nurse, Stress, Color Environment
This study aims to explore design opportunities using ubiquitous computing healthcare systems for pediatric asthma patients and their primary caregivers. In this paper, we illustrate a rigorous process of user-centered design research that includes contextual interviews, concept refinement, and scenario development. Based on the empirical results and a theory of behavior change, we formed a three-stage design framework for healthcare: detection, behavior plan, and compliance. This process is essential in order to maintain constant and consistent asthma management. Our results also lead us to conceptualize and develop the Asthma Bag for Life Enhancement (ABLE). The ABLE system supports children and their caregivers’ daily routines to improve asthma management strategies that lead to better health outcomes.

KEYWORDS: Families, Healthcare, User-centered design, Empirical study, Ubiquitous computing
DESIGN EPISTEMOLOGY: WEDDING REASON + REVELATION

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Although the foundation for any discipline is how its practitioners know, design is still uncertain about its epistemology. Design is not alone in this. Science and theology have debated epistemological questions within and between themselves for decades. Within that debate emerged common ground in critical realism, a philosophy that combines belief in our ability to perceive objective realities external to ourselves with assent to the power that personal contexts exert over our perceptions (Barbour, 1974; Polkinghorne, 1998). Michael Polanyi’s epistemology of personal knowledge is based on critical realism (Polanyi, 1958). This paper explores how epistemology grounded in personal knowledge might serve as a model for a design epistemology called Reason + Revelation that can integrate design as art with design as science, illuminate how design thinkers combine intuition and analysis, inform how design education should move from tacit to explicit knowledge, and suggest how design can develop a distinctive research methodology that blends qualitative and quantitative methods.

KEYWORDS: epistemology, design knowledge, design thinking

DID IT WORK? EVALUATIVE RESEARCH METHODS FOR GRAPHIC DESIGN

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Did that design work? It’s an evaluation question yet there appears to be little evaluative graphic design research to answer it. None of the 40 research methods covered in Brenda Laurel’s book Design Research Methods and Perspectives described evaluative methods (Laurel, 2003). Yet designers should know, and clients will eventually demand to know, did that design work? This paper reports on methods used for two related evaluative design research studies conducted at the University of Cincinnati. While the results of the studies were often definitive, the research methods were not. In response to issues uncovered during the execution of the research protocols, an additional study was conducted to explore not the subject of the original research, but the research methods used for it. The methodology of those studies is discussed here as a means of advancing evaluative research methods for graphic design, and improving the quality of design work.

KEYWORDS: design research, evaluation, methods

CAPTURING NOTIONS FROM ABSTRACTIONS: THE FOUNDATION OF POETIC INTERACTION DESIGN

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With the emergence of various genres of interaction design, there seems to be a promising direction: Poetic Interaction Design. We propose that poetic image could be created through leaving blanks in the design expression, and be delivered via users’ reflection and imagination. The concept of Poetic Interaction however is abstract for designers to apply in practice. To address this challenge, we developed four principles by performing the process iteratively according to action research method. For further validation of the principles, we built a design work, Scentonight, to evaluate the influences brought to the users in the context of usage. A within-subject experiment was performed. The result shows a significant difference that the participants tend to think of an everyday object in terms of its imaginary linking rather than its function. This paper demonstrates a systematic process of developing the theory of Poetic Interaction Design in a pragmatic manner.

KEYWORDS: Interaction Design, Poetic Image, Poetic Interaction, Poetic Space, Expression-making, Gestalt, and Computational Artifacts
307

The Competitiveness Analysis of Design Firms for the Qualitative Growth of Korea - Based on the Analysis of Present Conditions of 25 Design Firms of 6 Countries

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Seoul National University

Innseok Park
Korea National University of Arts

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Jeho Lee
Gauzen

This study aims to seek implications for the qualitative growth of design firms of Korea through the analysis of Korean firms and their comparison with the present conditions of 25 design firms of 6 countries. On the basis of the existing models of competitiveness measure, this study extracted 9 key indicators from the viewpoint of the circulation regarding investment, competence, and performance, and systematized sub-indicators of the details. The indicators consisted of 9 sectors: the history of firm’s growth, design value proposition and core competence, business structure and profit model, customer relation, design process, organizational structure and external network, research/development and education, facility and information system, and future plan. Focusing on these indicators, the questionnaire of the survey was elaborated by differentiating between qualitative elements and quantitative ones. The survey, which the representatives of firms answered by e-mail or in person, was done by 10 researchers from 6 countries during two months 2010. The 25 design firms listed are as follows. - WolffOlins, SeymourPowell, Think Public, INDES, Flex, STBY, Lunar, One & Co, Mike & Maaike, Kartell, Edra, GiovannoniDesign, UchidaYoko, GK Design Group, Shift, M’design, D’strict, Ocon, Ahngraphics, Mmmg, Designmall, Cyphics, Perception, Crevate, Workroom. The implications were drawn from it by comparing the results of investigation and the analysis of success factors derived from 9 indicators mentioned above. In conclusion, this study recommends design firms in Korea to keep in mind 5 implications: distinctive professionalism, initiative skills, management skills, connectivity and internationality in design business.

Keywords: Competitiveness, Design Firms, Qualitative Growth

315

Teaching Decision Making in Architecture Studio Courses Using a New Technological Case-Based Tool

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Design fixation is an effect that prevents designers from producing creative solutions when referencing cases because it is difficult for them to get away from the observed idea. This effect has been proved in other disciplines but in Architecture where there is insufficient and inaccurate data to draw conclusions. This document presents an experiment conducted in a studio course in the Architectural department of the University of Los Andes in Bogota (Colombia) which demonstrates the existence of high rates of design fixation and low rates of creativity among Architecture students when a new design problem is imposed. It is concluded that referencing at least a single case is the most used strategy students use to solve an imposed design problem and that their decision making processes while designing are characterized by the thoughtless transposition of typified components from the observed case. In reaction to this fact and to increase students’ analysis, creativity and innovation capacities a new Case-Based Design Aid (CBDA) is formulated to support design processes by enabling students to visualize similar problems to those presented in studio courses which have been solved by professionals in real and precedent design practices. The strategy is to relate the technical data of cases to their real contexts using explanatory case studies and dynamic situations. This is done by storing these contextualized data into acyclic graphs to be navigated, so the variables that produced a particular case are revealed to students and they can consciously take them into account in their projects.

Keywords: Case studies; design fixation; repository systems; Dynamics of situations; Graphs
317 DESIGNERS INITIATING OPEN INNOVATION WITH MULTI-STAKEHOLDER THROUGH CO-REFLECTION

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KEYWORDS co-reflection, open innovation, multi-stakeholder, design action

This paper explores a designerly approach to open innovation initiation. More specifically, it presents the application of co-reflection sessions by designers in a healthcare open innovation project to initiate multistakeholder participation. Integrating co-reflection in open innovation makes designers more equipped with opportunities to a) negotiate with and function in multi-disciplinary environments consisting of stakeholder representatives and stakeholder customers (possible users); b) analyze complexity and structure of stakeholder ambitions, wishes, concerns and restrictions in order to frame a collaboration space; c) synthesize, visualize and materialize the value proposition to communicate the benefits to multi-stakeholder networks in order to define a design space and motivate their participation; and what is more important, keeping the balance between design thinking and design action. Lessons learned from this study can be used to provide a set of criteria and practical guidance to designers when initiating open innovation.

318 EVALUATING LIGHT QUALITY IN GENERAL ILLUMINATION ENVIRONMENTS.

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In this paper, I present a new method for evaluating light quality. The first stage is based on the use of Semantic Differential Scaling, an established technique in lighting evaluation. The second stage employs a technique drawn from Computer Human Interface (CHI), a technique that I have adapted to the study of this domain. The paper reports on how the each stage of the evaluation process was carried out, the nature of data elicited, and the themes that emerged from analysis of the data. The paper concludes with an analysis of the value of this mixed methods approach to the evaluation of light quality.

KEYWORDS Lighting, light quality, evaluation, LED lighting

319 USING DIY CARTOON STORYBOARDS, LIVE SKETCHING AND CO-SKETCHING TO INVOLVE YOUNG AND OLDER USERS IN PARTICIPATORY DESIGN

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This paper presents and discusses results from two cases, where various sketching techniques including DIY cartoon storyboards, live sketching and co-sketching, were used to provoke young and older users to think about new designs and design qualities, and help designers evaluate and investigate these ideas together with users. Results suggest that both amateur and expert sketching can provoke and support valuable evaluation and generation of design concepts. We conclude with presenting recommendations for the use of sketching activities in participatory design.

KEYWORDS user-centered design, sketching, design thinking, participatory design
323  

OHLALA, EXPLORING THE RELATION BETWEEN CONTENT RICHNESS AND EMOTION CONSTRUCTS

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Among other explorations, the field of telepresence technology has looked at ways to create a feeling of telepresence based on the transfer of minimal information. On this topic, the Cololo project has taken an extreme position by proposing the experience of 1-bit communication. Based on the observation of Cololo in use, it is shown that content is not necessary to trigger an emotional experience. This paper introduces a novel dimension to be taken into consideration in communication technology: the content-completeness dimension, ranging from non-content to hyper-content. Furthermore, we built the Ohlala framework, aiming to explore the content-completeness dimension. Based on Ohlala, by way of a research through design, we intend to explore further the relations between this dimension on communication and emotional experience.

content-completeness, communication, emotional experience

327  

CONCRETIZATION OF USER-REPRESENTATION: MODELING USER (INTER) ACTION AS (COUNTER) PART OF A PRODUCT SOLUTION

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In Human-centered design the whole system of (human) user and technical product is focused within the design process. Regarding the methodological support, current HCD-methodology supports primary phases of requirement definition and (usability) testing rather than the phase of designing as such. Within the conceptual design phase though, methodology from engineering and industrial design finds application for the development of interaction solution as well. However, this methodology focuses on designing technical product solutions and thus developing a product “around” the user. The user as such is seen as important part of the all-over system but not as partial solution of the whole user-product system. Within this paper an approach is depicted that focuses on the development of physical user (inter) action solutions as partial solutions of the all-over user-product system. By explicitly modeling these user (inter)actions this approach employs effects of externalization and confrontation by solution explication which are used in various conceptual design methods. Within a first design workshop the suggested approach is illustrated before experiences made are summarized and further research ideas are derived.

Human-centered Design, Conceptual Design, User-Product Interaction
332

UNIVERSAL-DESIGN MANAGEMENT FOR PERSONS WITH DISABILITIES

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Due to severe economic changes in Japan in recent years, the problem of vocational aid centers (VAC) has become more noticeable. Consequently, a local government launched a collaborative project between the prefecture, the Association of VAC, and a design-oriented university to aid persons with disabilities in gaining economic independence. It is often expected that the main role of designers in supporting the independence of persons with disabilities is to develop product designs. This paper, however, deals with broader areas to which support through design is applied. By executing design management activities, aimed at achieving positive results by integrating information on the market, technologies, production, logistics, and the social environment into product design development, the project described in this paper supported the creation of a mechanism enabling people at VAC to engage in product development by themselves in a sustainable manner, referred to as “universal design management” in this paper. Examining the method and its effects, the author finds five factors for success: (1) a paradigm shift from welfare service to business management, (2) common goals and cooperative systems, (3) shared information and knowledge transfer, (4) collaboration with local communities, and (5) the accumulation of successful experiences.

KEYWORDS Universal design, design management, sustainable system

334

IDENTIFYING CHANGE: IMPROVING WAYFINDING BY DETECTING CHANGE IN FOOTPATH MATERIALS

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Throughout time man has traveled to new places and experienced unfamiliar territories often without fear of what lies ahead. However, in today’s world any environment outside of our everyday paths of travel can be challenging and intimidating. This research investigated the role typical footpath materials play in communicating a user’s position within an urban environment. While illustrating the importance of detecting changes in materials, it argues that positional information should be available to all users. To examine this phenomenon, this study compared two components: the user, and the material, while also considering their relationship. A theoretical framework was developed to explain this relationship and a methodological design was used to elicit quantitative values. By doing so, the research produced a means of evaluating existing as well as future use of construction materials as a piece of a larger information system.

KEYWORDS Way-finding, Materials, Visual Impairment, Campus Planning, Universal Design
345

THE ONIGIRI MACHINE: DEVELOPMENT OF WEARABLE DEVICE BY KID’S FRIENDLY DESIGN FOR CHILDREN’S SAFETY

In this study, we develop a wearable device for kids under 6 years who are growing up so fast physically to face various experiences but low ability to describe by language exactly what they have experienced at nursery or kindergartens to share with their parents. This system will be linked with local safety network somebody to react real time when a kid faced to any inexperienced events. We adapt biological information such as heart rates, physical information such as body movements, GPS and camera on the device. The data from the device could be shared to parents or teachers in the kindergarten afterwards or real time. We focus on designing the device which has fascinated form giving, ease to wear and symbolic indication of Protected by wearing on. To keep kids enjoy wearing the device a

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KEYWORDS
Kid’s friendly design, areal network, shared information

346

A REVIEW OF THE USING PROCESSES OF ELECTRIC COOKERS IN TAIWAN

Due to the progresses of living standards and medical technologies in recent years, people’s life style has been changed gradually. Moreover, aging society indicates the issue of family structure changes such as decreasing number of family members and the growth of solitaries. In Taiwan, majority of people nowadays work under high pressure and demands. Eating, as one of physical factors, influences people’s daily life. Electric cookers are the most common electric appliances in most families because their using process is easy and simple. However, their functions are not only cooking, but also are also steaming, stewing and braising food. They include the function of heating food up and keep food warm. As an efficient cooking design, electric cookers should be reviewed from the respective of user-centered design and safety. The review aims to investigate the using process of electric cookers in Taiwan and the differences between variety of users, as well as the problems of using electrical cookers. There will be three stages contained at survey. Firstly, an interview will be regarding to designers’ point of view, which refers the design strategies and thinkings that they have planned. Then, there will be another interview focusing on usage behaviors of electric cooker users. A half-open-questionnaire using at second stage will be based on the results of the first stage. Finally, verbal protocol analysis will be used to analyze all collected data.

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KEYWORDS
Electric Cookers, Universal Design, User-centered
**349**

**AN ACTOR-NETWORK RESEARCH FRAME FOR ANALYSING COMPLEX SOCIO-TECHNICAL SITUATIONS**

The paper describes a framework based on aspects of actor-network theory for thinking about how future designs integrate with other systems and processes. The approach provides a structure for thinking about how existing designed situations came about, for considering how to insert new designs into existing situations and how to produce new situations which are required to support innovative designs.

**KEYWORDS**

actor-network theory, placements, case studies, fieldwork

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**378**

**SERVING THE UNDER-SERVED: WHAT CAN DESIGNERS LEARN FROM RURAL APPRAISAL TECHNIQUES?**

Current Contextmapping techniques (CMTs) (Sleeswijk Visser et al., 2005) are developed mostly in Western cultures and make use of social interactions that need substantial adaptations to work in other cultures (van Rijn et al., 2006; Siemerink et al., 2010). Designers do not know how to apply CMTs in cultures they are not familiar with. In this paper we compare CMTs with Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA) (Chambers, 1994). This results into five guidelines for the design and preparation of CMTs for BoP projects. The study includes also insights from CMTs experiences for RRA and PRA. Examples from cases illustrate our findings.

**KEYWORDS**

design methods, contextmapping techniques, culture, Base of the Pyramid, rural appraisal

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**386**

**IN SEARCH FOR UNITY: FINDING A DISCIPLINARY APPROACH TO DESIGN CREATIVITY**

The proposed paper is based on the first stage of the research, which explored ideas, perceptions and theories of creativity held by senior design academics and practitioners. Through face-to-face interviews, written submissions, and a symposium in which 22 senior design academics and practitioners participated, the hypothesis of design creativity being a complex and diverse concept was confirmed. Data gathered illustrate how design academics and practitioners define creativity according to theoretical and pragmatic terms.

**KEYWORDS**

Creativity, design cognition

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**387**

**DEVELOPING URBAN DESIGN DISCOURSE BEYOND THE CRITICAL POINT**

This paper discusses some environmental challenges confronting humanity over the next fifty years by considering the conditions that emerged over the previous fifty years in one of the world’s ‘megacities’. Problems of urban water, homelessness & poor social housing conditions, and visual communication, are linked in a case study about the City of São Paulo. From the combined perspective of philosophy, the arts and engineering, the paper seeks to explain how such diverse disciplinary concerns can be unified through urban design to address a situation that is well beyond what has been called by Henri Lefebvre as ‘the critical point’.

**KEYWORDS**

Urban design, Sustainability, Social design, Education
TOWARDS DISCURSIVE DESIGN

Design research needs to explore and communicate the potential for design practice to be speculative and motivate discourse as and in design. This may be achieved via Discursive Design. Such a view comes out of practice-driven research on interaction and communication design within a sociocultural perspective. It is informed theoretically by Discourse Analysis in Applied Linguistics, with core concepts from social semiotics and studies of multimodality. Together these concepts form a fuller frame for design and design research at the level of mediated articulation and discourse through design. We link the discursive with developments in hybrid products that are medleys of physical form, technologies, interactions and services. We illustrate Discursive Design by referring to a span of artifacts and articulations from a large research project in interaction design. We close with a set of key concepts.

TOWARDS DISCURSIVE DESIGN

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KEYWORDS
discursive, interaction, mediation, multimodality, hybrid

RUDOLF MODLEY’S CONTRIBUTION TO STANDARDIZATION OF GRAPHIC SYMBOLS

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This study considers Rudolf Modley’s efforts to achieve the standardization of international graphic symbols from 1940 to 1976. Modley was one of the major activists in the movement to standardize graphic symbols and his interest in standardization continued throughout his life. During the 1930s and 1940s, Modley, who had the experience of working under Otto Neurath in Vienna, worked in the making of charts in the U.S. After WWII, he continued to undertake various projects and institutional works devoted to developing international graphic symbols until 1976, the year of his death. Although in some instances he is regarded as a ‘designer’, in reality, he was a consultant and coordinator in his field. By focusing on these more appropriate roles, this study examines his activities with the project of compiling a symbol dictionary and his work at Glyphs, Inc. It is noted that Modley’s aim was not to produce standardized graphic symbols by himself, but to set the foundation for enabling the standardization by proposing symbol dictionary or symbols archives, by investigating scientific methods for categorizing graphic symbols, and by coordinating between various related organizations. Finally, three characteristics of Modley’s principles related to the standardization of graphic symbols are discussed and evaluated.

KEYWORDS
Rudolf Modley Otto Neurath Glyphs Standardization Graphic Symbols
IMPLICIT EFFECTS OF MOTIVATIONAL CUES AND COLOR STIMULI ON CREATIVITY

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The present research explored the notion that the meaning of the color red varies depending on regulatory focus, with implicit effects on creative thinking in a Remote Association Test. Specifically, inducing promotion (vs. prevention) enhances creativity, because red (vs. blue or grey) then triggers the meaning of approach and potential success. Two laboratory studies revealed this regulatory focus-color interaction showing that promotion yields more creativity for red, whereas this effect is not observed for prevention. These results show that the effect of red on creativity depends on someone’s motivational state, and not only contribute to existing research on the context-dependence of color, but also add to the growing research on creativity and design cognition.

KEYWORDS: creativity, regulatory focus, color, implicit effects, social psychology

EXPLORING USER EXPERIENCES IN A LOCAL SMART GRID

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The study presented in this paper aims to provide insights in the experiences of end-users in smart grids, in order to define guidelines for the development of a community based intervention, e.g. a neighbourhood display or a game. In a pilot in the Netherlands 24 households make use of smart grid technology that controls when appliances are switched on or off, based on the availability of power. The households are interviewed to gain insight in the effects of the smart grid technology on the energy behaviour. This will be supported by energy consumption data of the households.

KEYWORDS: user experiences, energy related behavior, smart grids

CO-DESIGNING WITH COMPANIES

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Today co-design is mostly intended as the activity that enables new collaborative relations between end users and designers. Many researchers in design (Sanders, 2006; Binder and Brandt, 2008; Westerlund, 2007) have conducted design experiments to test the effectiveness of the tools designed to support end users participation in design processes. Moreover co-design with customers has become an approach to the project for many design firms (Brown, 2008). The paper reports the authors’ experience with co-design in 4 different companies. All cases presented have been planned as an opportunity of interaction between different actors from companies and professional designers. Each of the design interventions has been conducted to boost innovation processes in companies with the aim to encompass the difficulties that people with an everyday contact with a problem find in expressing an innovative point of view on it. The cases analysis pointed out that co-design with company seems to diverge from co-design with end users for the aims perused, the tools used and the role that designers play in it. In particular, co-design with company seems more focused on designing new business models and envisioning innovation as a dynamic and systematic change at each level of the company; it is better supported by tools that boost envisioning (scenarios, trends analysis, promising cases) and support representatives from the different company internal divisions to discuss together; designers are sources of inspiration for the employees, they act as triggers of innovation and co-design process leaders.

KEYWORDS: workshop, codesign, design process
EXPERIENCE-VALUE: A FRAMEWORK FOR DETERMINING VALUES IN SERVICE DESIGN APPROACHES

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The aim of this paper is to present a framework for value assessment in service processes and service design projects. This framework is based on a literature review and interviews with experts. Central to the presented framework is the finding that value perception by people occurs fundamentally differently than value perception in an organizational setting. We present two categories of value: Performance-value (attributed by organisations) and experience-value (attributed by the people who use the services). The presented framework has a number of implications for designers, decision makers and researchers in service design projects. Firstly we argue that in order to understand the full value services have for people, one has to include the experience-value of the service. Subsequently we argue that personal and organizational value perceptions will need to be more interrelated for organizations to adequately increase the experience-value of services for the people involved. Finally we argue that by understanding and acting upon the experience-value of services, organizations will be able to improve services in ways that are valuable for people. This will ultimately result in value increase from a performance-value perspective.

KEYWORDS
value, measuring effect, services, service design, user centred design, UCD.

DESIGN INTO LIFE: WHY APPLY DESIGN TO THE ELEMENTARY EDUCATION

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This paper presents an exploration of the relevance of design in the public elementary education. The European/western educational system - the standard educational model promoted by the public administration - has its fundaments in the Enlightenment period and recently it became the subject of a broader discussion about re-thinking the system. Discussions arose with the increasing importance of information media, which made the relevance of what is learnt at schools more important to the students than the knowledge itself. Reflected on this background, this research is led by the question: Why apply design to education?

KEYWORDS
Education, School, Design Thinking

AESTHETIC APPRECIATION AS A MATTER OF EXPERTISE IN CAR DESIGN

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The paper reports a study on expertise-determined perception and evaluation differences between designers and design-inexperienced recipients when judging car-exterior models varying systematically in innovativeness and balance. Following the assumptions of Leder, Belke, Oeberst, and Augustin (2004), gaze behaviour, attractiveness assessments, and aesthetic emotions of 11 designers, 11 engineers and 11 humanities scholars were collected in a three-phased repeated measurement quasi-experiment. Group comparisons confirmed the proposed interaction of stimulus properties and expertise, while unexpected findings regarding aesthetic emotions were observed.

KEYWORDS
design expertise, design appreciation, innovativeness, car design
449

THE INFLUENCE AND IMPACT OF TOP EXECUTIVES ON INNOVATIVE PERFORMANCE

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As more and more top business leaders deemed the enhancement of product design innovations at higher and higher priority on their agenda, their ways of leadership and support to innovative efforts are certainly becoming important ingredients that surely deserve more attentions than before. This research had studied six Taiwanese companies with superior achievements in product design innovations, which were defined by the number of iF Gold Awards of product design they won in five years. The research aim was to reveal the effective ways of influence and impact from top executives on innovative performance in product design. Using document analysis and in-depth interviews for these investigations, two research questions were addressed: Did top executives of these innovative companies usually have some unique ways of leadership to enhance their performance in product design innovations? And, what kind of leadership behaviours did they adopted for this purpose? The results had shown positive answers to the first question, and many important examples were found for the second. Finally, seven effective ways of enhancing product design innovations from top executives was concluded from these examples for reference of other executives in Taiwan.

KEYWORDS
Innovative performance, influence and impact of executives, principles of leading innovation for top executives.

451

ZERO IMPACT DESIGN OF BUILDINGS

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Economic and sustainability problems led to planned actions to reduce energy consumption of buildings and the related carbon dioxide emissions gradually to zero. However, very few designers have the necessary skills or experience to design net zero energy or net zero impact buildings. Therefore it was researched whether it is possible to support the design process for Zero Impact Buildings in by applying a design method. This method was tested in workshops with professionals. The research is done in close cooperation with the Dutch professional organizations of building design. As we want to prepare out student for their professional career the findings of the research were implemented and tested in our educational master program.

KEYWORDS
Zero Impact Design Building

453

A PRELIMINARY STUDY OF VISION-INDUCED TACTILE ENTICEMENT.

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Objects in our daily life contain the ability that arouses people to touch. The research defines it as “Tactile Enticement,” and mainly focuses on visual aspect. The research chiefly aimed at finding the cause of Tactile Enticement, and trying to categorize visual characteristics of objects which are enticing to touch. For doing so, 10 subjects were asked to cruise around the shopping mall and touch anything they want, which were recorded. By applying Evaluation Grid Method, the original reasons of why they touch, the solid characteristics of what they noticed and the feeling when they touched would be obtained. The result shows six aspects—Attract Attention, Raise Curiosity, New Experience Provision, Amusing Interaction, Friendly and kind Feeling, and Disapproval that may cause the Tactile Enticement.

KEYWORDS
Tactile enticement, Touch, Vision, Product Design
455

COLLABORATIVE DESIGN STRATEGY: KNOWLEDGE EXCHANGE SETTING FOR COLLABORATIVE ROOF DESIGN

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In the (Dutch) Building Industry sub optimal use of knowledge by participants during the design phase causes damage and failure costs, as well as it hinders innovative sustainable solutions. Therefore a design tool was developed to support design knowledge exchange between different design team members. Based on experiments in the period of 2006-2009 a workshop method was developed to support professionals, architects, installers and roofers, in collaborative design teams to share, use and develop collectively knowledge for innovative roofs. The set up of the final collaborative design workshop is explained as well as some results are discussed.

KEYWORDS collaborative design, integral design

456

WHAT DO WE KNOW ABOUT PRODUCT USE?: A TECHNIQUE TO SHARE USE-RELATED KNOWLEDGE IN DESIGN TEAMS

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Delft University of Technology

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Eindhoven University of Technology

We propose a workshop technique that enables members of a product development team to share and become aware of knowledge they have and do not have about product use. The technique was developed in an iterative process in which the workshop was executed and evaluated with practicing designers. The technique combines steps in which knowledge is accessed in different ways such as remembering, imagining, experiencing and envisioning product use. The evaluations showed that with this approach a broad spectrum of product use knowledge can be collected in a half-day workshop.

KEYWORDS usability, user experience, design technique, consumer products, design teams

463

DESIGN METHODOLOGY IN PRACTICE: CASE STUDY OF BRINGING A SCENARIO-BASED APPROACH TO DESIGN PRACTITIONERS

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University of Twente

This paper presents a completed research-through-design on the adoption of a design methodology in practice and the development of support for the adoption process. A case study was conducted to explore how design practices apply Scenario-Based Product Design methodology and how it can be supported by a design tool. Prototypes of the tool, as an instrument of design knowledge enquiry, have informed the researcher of the practical concerns and possible implications of supporting the methodology using a design tool. The availability of support encourages a more explicit use of scenarios in design thinking and reflection and increases the clarity of rationales behind design decisions. By making explicit and supporting concrete steps in a design methodology, the cumulative practice-based experiences will deliver a more solid knowledge base required to improve the design methodology.

KEYWORDS Scenario-Based Product Design, design tool, scenario development, research through design
466

ORGANIC FOOD PACKAGE DESIGN MANAGEMENT IN SMES: A CONJOINT ANALYSIS APPROACH

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Recently, the organic food market in many places of the world has grown at a soaring rate. With a flood of similar products with identical features available in today’s marketplace, package design becomes one of the important factors for marketing managers in their decision making. Against this backdrop, corporations tend to invest large amounts of money into packaging to influence consumer’s intension to buy. However, it is not the case for SMES, since their financial resources are more than often limited. In this study, we identified major elements of packaging and examined their effectiveness to derive managerial guidelines for SMEs to efficiently design organic food packages. We conducted two different user tests, and applied conjoint analysis to evaluate the relative importance weights of four visual elements. Subjects were influenced by visual stimuli equally regardless of purchasing experience. We showed that “typography” played the most influential role by appealing to consumers’ eco-sensibilities and affecting their purchasing decisions. The study could be extended to various products as well as consumer groups, so that designers find an appropriate design strategy to communicate with consumers more properly.

KEYWORDS
Eco, Package Design, Food Package

474

CHARACTERISTICS AND TRANSITIONS OF PRODUCT DESIGN CURRICULUM IN JAPAN BETWEEN THE 1970S AND 2000S

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The purpose of this research is to clarify the product design education of undergraduates by identifying the characteristics of product design curriculum in Japanese universities at undergraduate level. A comparative study was done on the product design curriculums from nine sample Japanese national and public universities. Through the findings, some key characteristics were observed. Firstly, ‘integrative’ subjects were gradually offered in the product design curriculum in the 1980s with an increased in numbers in the 1990s. But the emphasis of ‘integrative’ subjects seemed to differ among the sample universities. Secondly, the sample universities seemed to differ in the emphasis on offering diversity and flexibility in the study of professional education subjects. Thirdly, industrial experience was not an emphasis for students to transit from school to work. The undergraduate education seemed to focus on providing fundamental knowledge and skills while the industries would provide further education in professional and specialized knowledge and skills.

KEYWORDS
product design curriculum, curriculum development, curriculum structures
A REVIEW OF DIFFERENCES AND SIMILARITIES IN THE DRAWING PRACTICE OF GRAPHIC AND TEXTILE DESIGNERS

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Recent opportunity to work closely with textile designers and educators has lead to a significant addition to the author’s long-term research program conducted since the mid 1980s into the role of drawing for design. This program was initially concentrated on graphic design but, in the latest phase of research, the role of drawing in textile design has been investigated in sufficient depth to facilitate comparative analysis with the findings for graphic design previously established. Textile designers described a greater dependency on drawing than graphic designers, with the visual awareness needed to draw from observation and the visual literacy needed to copy and interpret archive material being deemed essential. While, for both professions, many similarities were indicated in the use of drawing in the design process, textile designers also need the drawing ability to create both decorative qualities and detailed technical specifications for production. While developments in computer-aided design have greatly benefitted textile design and enhanced its interaction with industry, traditional drawing has not been replaced by digital drawing methods to the same extent as in the case for graphic designers. The intellectual development behind true innovation can be seen to necessitate the complex modelling systems that only a wide range of drawing ability can support, and so time should be found for drawing studies on the textile design curriculum in higher education if originality and quality are truly aspired to.

KEYWORDS  
drawing, graphic design, textile design

WORKING TOWARDS SUSTAINABLE CONSUMPTION: DESIGN APPROACHES

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This paper presents differing points of view surrounding consumption patterns in relation to sustainable development and how design can support lifestyle changes. The potential for designers to incite change is discussed, along with the following conflicting consumption theories in relation to design: consuming less vs. consuming efficiently, policy vs. consumer choice, status-seeking goods vs. symbolism in identity and trend vs. longevity. Two companies: TOMS Shoes and SIGG are examined within the context of these theories. Understanding conflicting ideas surrounding sustainable consumption may help designers develop a more balanced vision for the future and invoke change through design.

KEYWORDS  
Sustainability, sustainable design, consumption, consumer behaviour, conflicting theories, SIGG, TOMS Shoes

SOCIALLY RESPONSIVE DESIGN - OPEN AND PARTICIPATORY DESIGN LED SOCIAL INNOVATION

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This paper explores the links between crime, design and innovation. It is written in two sections. The first discusses ideas about the ‘dark side of creativity’ concept that considers the shared aptitudes of criminal and designers. It explains how designers might use this similarity to help them to design against crime, and introduces the user and abuser focused methodology of the Design Against Crime Research Centre in London that addresses social issues via participatory and collaborative design activities described as ‘socially responsive design’. The second looks at the ‘open innovation’ approach, originally explained by Chesborough (2003), as it is applied within the process of research led socially responsive design. The paper considers the process of the resulting social impact to be desirable, optimal and sustainable in economic and non-economic terms.

KEYWORDS  
Socially Responsive Art and Design,
This paper focuses on examining the impact that mobile value-added services may have on the process of digital learning. We explore many types of e-book readers that have been developed for the iPad, and summarize the application of gestures to communicate with a touch screen. The study analyzes popular user interfaces designs based on the characteristics of good interaction design proposed by Saffer in 2006, to assess the user interface of interactive e-books. It discusses the interface of e-books that users read and places emphasis on key points for operation gestures, content plans and interaction design. User testing was adopted to study the interaction design in reading e-books based on mobile devices. The study concludes that the participants' opinions of e-books were fairly neutral in user testing, discusses value-added services of e-books and provides a case study for the creative cooperation model. The paper offers the features of value-added services for the development and improvement of interactive e-books in the future.

**KEYWORDS** Interaction design, Value-added services, E-books
**488**

**DESIGNING WITH USERS: A TEACHING METHOD**

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In the last few years the interest towards the study of solutions centered on the human being has grown greatly leading to an ever-increasing cooperation between different disciplines such as sociology, psychology, anthropology, ergonomics which, through Design, finally got in touch. The nature of innovation changes: the sphere of technologies and forms blends with the sphere of signifiers and experiences. The need for different educational methods and new design ways of expression able to satisfy the extremely interactive potential of new technologies becomes evident. Research and didactic activities will become ever more participatory generating new forms of explorative learning. This paper introduces the IDEACTIVITY method used during the Final Synthesis Design Studio course at the Politecnico di Milano - Faculty of Design, focused on an explorative learning approach. Due to the tangible importance of the understanding, handling and developing of tools able to highlight creative aspects arising from people’s experiences, part of our researches are dedicated to the study of new methods of investigation and new tools for design. IDEACTIVITY is a meta-methodology developed on the former considerations with the aim of being a fluid and flexible working tool able to meet the needs of companies with different targets and configurations. With IDEACTIVITY we aim at elaborating a structured system able to integrate and mix several known techniques. The method relies on an indispensable part of “play”: get involved, collaborate, work as a team towards a common goal and look at things from a different perspective inspired by the others.

**KEYWORDS**
Design education, didactic experimentation, collaborative tools, design training

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**495**

**COPYIST DESIGN: A METHODOLOGICAL ESSAY FOR BREAK OF PARADIGM WITH A REGIONAL APPROACH**

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This article presents an essay about the culture of copyist between artisans of one cooperative in the Brazilian northeast and proposes an argument about the need for break standards established which limit the creativity, the innovation and the expansion of market. The handicraft today is a consolidated segment in the economy and should be more and more oriented for the market. Being motivated by the marketing pressures many artisans have appealed to copy pieces of others artisans that have bigger commercial exit and consequently hinder their own inventive capacity.

**KEYWORDS**
Copyist Design; Paradigm; Handicraft Design
500  CREATING A COLLABORATIVE ACTION: THE BENEFITS AND BARRIERS IN MULTIDISCIPLINARY DESIGN PROCESS FOR SUSTAINABILITY

In sustainable design multidisciplinary collaboration is often a necessity. In this kind of collaboration participants merge and translate their professional knowledge, requiring certain skills and proper management of the process. Earlier research on such collaboration identifies a transdisciplinary process to merge the different professional inputs towards a common aim, knowledge and value systems. It also outlines different psychological and professional approaches to the collaborative, inter-professional design process. This article studies the literature on inter-professional design collaboration, and is reflecting the findings on data gathered with student questionnaires and professors’ interviews from a multidisciplinary Master’s programme in sustainable design. The aim is to study different approaches towards a shared, transdisciplinary design process between several professionals, and to better understand how to manage this kind of design collaboration.

KEYWORDS  multi-professional design process; transdisciplinary design; collaborative design framework;

510  REPOSITIONING USERS AS DESIGN PARTICIPANTS IN INTERACTIVE SYSTEMS

To cope effectively with everyday situations it is necessary to understand what the world affords to us. But, it is also fundamental to understand the meaning of one’s action in the ecology of actions performed by human and nonhuman participants. We propose to dislocate the user’s central position in a system and distribute his or her hegemony in a network of human and nonhuman participants. From this perspective, we offer a triadic structure of social relationships of human-artifact collectives as the minimal unit of analysis from which sociality, social action, and interactive complexity are enacted. We conclude by defining a theoretical-conceptual framework for the design of smart artifacts that can enable social interaction.

KEYWORDS  Interaction Design, Social Interaction, Actor-network Theory, Distributed Interaction

513  PARAMETRIC ‘ROUTE STRUCTURE’ GENERATION AND ANALYSIS

Marshall (2005) developed the concept of characteristic structure of a street network as a characteristic set of indicators extracted from the street network through a process which he called “route structure analysis”. In this paper we propose an integrated process for street network generation and route structure analysis embedded in a parametric urban design process. The street generator is compatible with a larger system aiming at the production of parametric urban designs. The system has been built in a parametric CAD environment and encompasses a method for interactive urban design allowing for dynamic visual responsiveness to morphological change and data change. The street network generator, presented in this paper, is based on a recursive rule which subdivides rectangles within the bounding box of a site area. For each set of goal inputs a street network is generated and “complexity” and “relative connectivity” are calculated through a semi-automatic procedure.

KEYWORDS  design tools, parametric urban design, route structure analysis, design methods
520

FROM FACTORY TO REPLICATOR: TOWARDS DESIGN METHODS FOR ON-DEMAND ADDITIVE MANUFACTURING

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Additive Manufacturing (AM) represents a collection of digital fabrication technologies such as Selective Laser Sintering and Fused Deposition Modeling. These means are maturing and getting widespread and some predict AM as a game changer in New Product Development. But how will designers adapt or change their way of working to a process where AM is an integrated part? This article proposes a research approach which explores the possibilities of AM for industrial designers and New Product Development. The approach is a combination of research in design context and design inclusive research, leading to design methods and software tools. A forerunning focus group study with design students and a senior designer confirms our hypothesis that the gap between the possibilities of AM and industrial design needs to be addressed.

524

AESTHETICS AND CONTRADICTION IN PRODUCT SEMANTICS

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In this research, we examined the relationship between product aesthetics and contradictory semantics in the Typical–Novel dimension. We conducted two experiments, in which participants evaluated pictures of chairs using indirect or direct measurement method adapted from attitudinal ambivalence research. Analysis of experimental data showed that both semantic contradiction and semantic insensitivity correlate with product aesthetics. Furthermore, we found asymmetric influences by typicality and uniqueness of products. We propose that the four-quadrant method is a better way for measuring contradiction in product semantics then the bivariate method, which can better depict all possible semantic combinations and the participants’ interpretations.

528

THE DYNAMICS OF THE COMPONENTS IN THE TRIAD PROBLEM-SOLVING MODEL OF DESIGN

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The objectives of this study are to investigate the general patterns of the triadic components drawn from the triad problem-solving model of design and to examine how the triadic components are associated with design task, process, and outcome. To examine the general patterns of the triadic components, we conducted the protocol analysis with trashcan design tasks at two different determinization levels, and coded the data by a triad problem-solving model coding scheme (Triad coding scheme), which is composed of Problem (P), Goal (G), and Solution (S). The post-experiment survey was administered to each designer to investigate the correlation among the triadic components, design task, process, and outcome. The protocol analysis results showed that both the percentage and increase rate of the solution category were highest while those of the problem category were lowest. This indicates that designers spend most times on creating solutions while least times on analyzing design problems, and these patterns of the triadic components become more dominant as the problem-solving activities progressed. Through correlation analysis, we found that designers redefined the design task more when they identified more design problems. In addition, the correlation analysis results supported the positive effect of the goal-oriented problem-solving process on the concept generation as well as the importance of the analyzing problems to produce solutions with better functional utility.
530  
THE APPROACH OF PRODUCT IDENTITY IN 3C BRANDS IN TAIWAN  
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Many globally successful brands use product identity to improve their brand recognition and to achieve the goal of differentiating themselves from their competitors. The researchers conducted in-depth interviews to investigate how five 3C international brands from Taiwan managed their product identity; the Ground Theory Method (GTM) was used to conduct data analysis. The results of the study can be used by 3C brands as a reference when designing their products. The main findings of this study include the following: (1) The main purpose of PI includes the delivery of information, maintaining a consistent image, and to facilitate identity and differentiation; (2) Product identity is built using brand objectives as a starting point; products are discriminated based on the products’ constant and unique designs; (3) The more products a brand produces, the less likely these products are to share a common product identity; (4) A product’s trademark and style are two of the most commonly used devices to reflect product identity and can be used across all types of products; (5) There are six key factors that influence product identity, namely: brand objectives; brand image and direction; product type, positioning, and attribute; trends and social issues; new technologies and materials; and advertisements; (6) Overall, PI is not common in 3C brands in Taiwan.

KEYWORDS  
Product identity, Product style, Product design  

531  
VISUAL ANTHROPOLOGY AND PUBLIC DESIGN: CAN THE ASSOCIATION BETWEEN THESE FIELDS GENERATE VALUABLE INSIGHTS INTO THE DIVERSE PATTERNS OF URBAN BEHAVIORS?  
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Understanding the users’ needs in public spaces is often a challenge to industrial designers. Cities are growing fast and urban spaces should be adapted to these changes. This paper probes the utilization of visual anthropology theories and methods as tools to support the interpretation of the city dwellers’ diverse behaviours. Adaptations and interventions performed by the public are regarded as hints of their desires, which should be fulfilled by the urban elements, that is, the products that are placed in urban spaces. In order to verify such assumptions, a cultural inventory was conducted in selected public spaces in Ottawa, CA. The researcher looked for material evidences of modifications to urban products made by the population and documented them in photographs. The images provided the study with useful data, whose analysis provided possible insights into public design development.

KEYWORDS  
Visual anthropology, public design, public spaces
CONCEPTUALIZATION BY MATERIALIZATION - DESIGN AND MATERIAL TECHNOLOGIES

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In recent years the convergence of design and materialization technologies are promoting new material-based design practices in architecture, and other design fields. With the rapidly emerging technologies of fabrication and manufacturing, current impact of material practice upon conceptual design has become a prominent influence in design. In design fields with a high material interface such as architecture and industrial design we are currently witnessing a transition in both theory and practice towards a level of involvement with material, and away from the primacy of form as a dominant model in design. Returning design to its material sources seems to contribute today to a new unified conceptual model. This shift is characterized as a synthesis of conceptual principles of spatial, structural and material ordering integrated within the logic of materialization and the rationale of fabrication and manufacturing technologies as a holistic model of design. The paper presents a theoretical approach termed The New Structuralism (2010). Through the collection and analysis of a body of case studies, first reported in the journal Architectural Design (AD) under the title, The New Structuralism, concepts and theoretical issues that are underlying these emerging design processes are identified. The pilot research provides challenges to our conventional models of design, begins to identify informing processes characteristics of digital design, and helps to formulate research issues into the paradigm of material-based design.

KEYWORDS Design Theory, Design Processes, Conceptual Design, Materialization

DEVELOPING A DESIGN ETHICS COURSE FOR DESIGN UNDERGRADUATES IN TAIWAN: OBJECTIVES, CONTENT, PEDAGOGY, AND CURRICULUM SETUP

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This paper based on the results of a previous research, related advices form design experts, and ethics education from others disciplines to propose a design ethics course for undergraduates. It reports on the development of a required stand-alone course in the third year of the industrial design curriculum. Consideration is given to the development of course objectives and contents, teaching and assessment methods, and curriculum setup. The paper would draw up a syllabus with weekly teaching schedule for the field of design and would conclude with suggestions for the development of ethics education in other academic fields and professions.

KEYWORDS Design Ethics, Design Education, Syllabus, Design Curriculum.

AN INQUIRY INTO SOCIAL ASPECTS OF OBJECTS: EVOLUTION OF PRAYER BEADS INTO DIGITAL COUNTERS

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This paper reviews the study which focused on the use of prayer beads. Prayer beads, which are the objects used for counting prayers, are evolving into digital counters, during the last decade in TR. Focusing on this evolution, the current study aims to explain social and cultural aspects of using a product. For this purpose, first a brief theoretical framework on material culture of consumption and everyday life is provided within the specificity of how Islam informs these in Turkish context. A brief history of prayer beads is given based on the field study. The field study is composed of semi-structured interviews with tarika members and regular attendants of a mosque, and observations in these fields which elaborates on the meaning of objects and daily practices, the co-evolution of objects and practices, how social, cultural, and religious values inform the use and appropriation of objects.

KEYWORDS material culture, design research, religious products
543

THE GREEN USER. DESIGN FOR SUSTAINABLE BEHAVIOUR.

To reduce the environmental impact of the use phase of products, research has suggested applying design strategies for sustainable behaviour to products and services. The aim of this study was to evaluate four different design strategies in order to achieve long-term acceptability and effectiveness in inducing sustainable behaviours. A literature review was carried out and a model for categorisation of strategies was created containing five categories: Enlighten, Spur, Steer, Force and Match. Four design strategies for sustainable behaviour, belonging to the first four categories, were implemented in prototypes to achieve moderate dosing of washing detergent. The prototypes were distributed to 16 households. A between subject study design was applied. The results indicate that three of the four strategies were both effective and accepted by many households. A few participants had learnt how to dose moderately and could later manage also without the prototype, while the others had not. For those who had not learnt, continuous access to the prototypes was a necessity to maintain moderate dosing. Thus behavioural interventions may require the design solution to be present in everyday use in order for the desired behaviour to be maintained. In conclusion, product design can be a feasible way to induce sustainable behaviour. Furthermore, high effectiveness can be achieved together with high acceptance. This implies that design (and designers) can motivate and direct sustainable behaviour beyond the possibilities of laws and regulations.

KEYWORDS eco-design strategies, sustainable behaviour, washing detergent

543

THE WOODBOT PILOTS: EXPLORING NO-HANDS INTERACTION FOR INTERACTIVE PUBLIC INSTALLATIONS

We present and discuss the Woodbot Pilots, an interactive experience in the form of a gesture-based game that runs on a large-scale interactive installation designed to be placed in an airport terminal and used by the general public. The background of the project is described, as well as the installation itself and a scenario of its use. To end the paper, we discuss some of the issues it raises in relation to public installations as well as some of the lessons we have learnt in conceiving, designing, implementing, and studying its use.

KEYWORDS Installation, gestures, 3D camera

545

CITY SPACES - A NEW LINE OF QUESTIONING

There is no singular solution, or definition, for space within a city centre; when discussing design proposals for a site, it should be as pertinent to seek a new methodology of understanding perceptions & users of a space, as it is to create a design solution. Users, daily activity and patterns of movement become a performance of what space can be, in turn, they can provide the tools to re-address the design landscapes of our cities. They can ask the questions. A commissioned design project, entitled 83 Trellis , puts forward a new framework for the definition of urban spaces in Glasgow city centre. Working primarily with the boundaries of long-term, empty sites to create temporary perimeter proposals the project aims to create a design discussion about the potential of permanent public realm development. This design project demonstrates how a form of critical questioning has progressed into an overall conceptual approach, which communicates more t
AN APPROACH TO EMBODY PERSONALITY IN PRODUCT APPEARANCE

Durable products are often described by users relying on personality traits, e.g. serious or happy. Understanding the relationships between product attributes and personality traits has the potential to influence product consumption. This article explores the possibility of designing product appearance with predefined personalities. An approach to embody specific personality traits in product appearance is introduced. Using this approach two design objects were developed with the aim to embody an elegant or a provocative personality. These were used as stimuli in an assessment study. Fifty-one participants were asked to report which personality traits they could identify in these design objects. The results indicated that it is possible to direct the personality of product appearance.

KEYWORDS: Product personality, Communication, Design intention, Consumers, Research through design

DESIGN FOR THE REAL CHILD - TOY DESIGNERS AND PSYCHOLOGISTS IN DIALOGUE ON REVERSAL THEORY

The social sciences constitute a rich potential source of theoretical contexts for understanding human behaviour, not all of which are easily accessible to designers. Dialogue between social scientists and designers should, therefore, improve design outcomes. The paper discusses experiences in implementing this dialogue in a design context. Within the setting of a course on design for children’s play, the dialogue between psychologists and design students was organized around Reversal Theory, a psychological theory that describes relations between arousal levels and hedonic tone underlying the experience of situations. This theory has been little explored in design. The project showed that psychologists and designers were, through discussion, able to connect theory to practical implications for design by entering each other’s domain, and by discussing design ideas as carriers of psychological concepts. The paper reflects on, and supports, the value of Reversal Theory for toy design and should be seen as just one example of the value of sustained direct dialogue between the social sciences and design.

KEYWORDS: design methodology, psychology, design for play, Reversal Theory

USABILITY PROBLEMS: THE INFLUENCE OF USER DIVERSITY

In spite of the enormous progress over the last decades in technology and design consumer dissatisfaction is increasingly mainly caused by soft usability problems people experience. The mismatch between expectations and real use is influenced on the one hand by product characteristics and on the other hand by user characteristics. Therefore, this study focuses on how user diversity is related to the occurrence of soft usability problems in terms of user characteristics. To investigate how user characteristics interact with soft usability problems in actual product use an experiment was conducted with 23 American, 33 South Korean and 22 Dutch people. The study concludes that participants' background including culture influences the kind of soft usability problems and they differ per product. On the basis of these data user profiles are formulated which in relation with electronic consumer products provide design guidelines to a design team.

KEYWORDS: usability, user characteristics, culture
**560 SUGAR RUSH: UNDERSTANDING EMOTIONAL VALUES IN UTILITARIAN PRODUCTS**

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**KEYWORDS** Design emotion, laddering, stimuli, sugar, moodboard, personas.

Traditionally focused on form and function, now the Design research field has targeted the experience (aesthetic, symbolic and emotional) as one of its main topics. This challenge becomes more complex when we try to understand the emotional values that possibly coexist within a utilitarian type of product. Therefore, this article studied the sugar and its emotional values by using the laddering technique along with stimuli application during the interviews. We will conclude that there’s potential to achieve innovation if we can establish attachment bonds and improve the contexts of user experience.

**562 RESEARCHING INTUITIVE INTERACTION**

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**KEYWORDS** Intuitive interaction, Intuitive use, design research methods, observational analysis

Intuitive interaction is based on past experience and is fast and often non conscious. We have conducted ten studies into this issue over the past ten years, involving more than 400 participants. Data collection methods have included questionnaires, interviews, observations, concurrent and retrospective protocols, cognitive measures and surveys. Coding schemes have been developed to suit each study and involve robust, literature based heuristics. Some other researchers have investigated this issue and their methods are also examined. The paper traces the development of the methods and compares the various approaches used over the years.

**571 DEVELOPING A REPRODUCTIVE HEALTH CARE DECISION AID FOR WOMEN AGES 18-25 AND THEIR MEDICAL PROVIDERS**

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**KEYWORDS** Medical Decision Aid, Reproductive Health, Design Research

While there are many online resources that discuss reproductive health care options, the information often does not encourage young women to engage in productive conversations with their health care providers. Therefore, many women will be more influenced by peers or advertising than their medical providers. This leaves out an important piece of the decision-making process that should come from the important healthcare provider and patience relationship. This research identifies an effective communication strategy to help young women communicate with medical providers. Through better communication young women can make better choices that better fit their life style and reproductive healthcare needs.
THE CHARM OF MEMORY: EXAMINING NOSTALGIC EXPERIENCE FROM A DESIGN PERSPECTIVE

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Nostalgia, as both a social phenomenon and subjective experience, plays a significant role in product experience, consumer preference and human-product/brand relationships. Despite frequent mention and use, relatively little explicit knowledge of this topic in relation to design has been generated. This paper therefore investigates nostalgic experience from a design perspective. Firstly, it proposes a heuristic model for explaining the underlying process of design-evoked nostalgic experience. Secondly, in order to provide a comprehensive understanding of the experience, it analyses nostalgia from three distinct product experience levels (experience of meaning, aesthetic experience and emotional experience) and highlights the relationship between nostalgic experience and memory retrieval (explicit memory and implicit memory). It then examines the influential factors of nostalgic experience from two angles: (1) the user and usage context; (2) the product and interaction process. Finally, nostalgia is placed within a wider context in relation to familiarity and novelty within the overarching research field of “Design and Memory”. The ethical dimension of nostalgia is also addressed.

KEYWORDS Affective Design, Nostalgic Experience, Heuristic Model

EDUCATING A NEW GENERATION OF INNOVATORS THROUGH AN INTERDISCIPLINARY DESIGN PROGRAM IN CHINA

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The thoughts and practices for educating the new generation of Chinese designers to meet sustained growth and inclusive development in China is the focus of this paper. Three institutes at Tsinghua University in China co-established the interdisciplinary master’s program, Information Art and Design, in 2009. We created a new research framework for this program to identify the opportunities of social and business innovation, integrate the methodologies based on design thinking, and frame the multi-entrance educational model. The exploration, thoughts and lessons on team building, project management, knowledge construction and integrated innovation will hopefully be a good reference for building similar programs.

KEYWORDS Design education, interdisciplinary program, integrated innovation
UNVEILING THE PROCESS OF CROSS-CULTURAL DESIGN: MAKING THE IMPLICIT EXPLICIT

Globalization has enriched lifestyles of people, and cultural diversity in the world has become more visible. New “non-Western” markets with traditional cultural backgrounds like China and IN have emerged. With the onset of worldwide product marketing, the design process has become multi-cultural, bringing together designers, users and other stakeholders from different cultural backgrounds. These conditions have created new responsibilities for designers, such as making explicit the socio-cultural context and finding ways to embed cultural factors in product design. The objective of this research is to understand the effect of cultural difference between designer and user on the design process. The study especially focuses on the challenges of designing in cross-cultural contexts and the strategies and methods used by designers to overcome these challenges. Grounded theory methodology was employed and data were collected from interviewing ten geographically dispersed designers who have experience in designing for other cultures. The theoretical framework of “culture-centered design process” emerged from three levels of coding and reflective journaling. Culture-centered design process is composed of two iterative cycles of pre-design and design phases. During pre-design, designers position themselves in the cultural context to overcome challenges of access and cultural bias. During the design phase some of the major challenges include: building rapport, negotiating roles, communicating with the other culture, allocating time and cost, and finding ways to alleviate ethnocentrism, cultural imposition and resistance from the other culture. The paper fully discusses each challenge in conjunction with strategies using examples from field experiences of designers.

KEYWORDS culture, design process, grounded theory

A THEORETICAL FRAMEWORK FOR THE STUDY OF FIREFIGHTER WAYFINDING AND COMMUNICATION

Unlike typical building users, firefighters are commonly required to find their way through unfamiliar spaces under low or no-visibility conditions. As such, they may be required to employ less conventional methods of spatial navigation than their civilian counterparts. To date, research on the subject has evolved around isolated aspects of the phenomenon and there has been no systematic effort to define the broad theoretical framework necessary to direct the systematic development of individual research efforts and to interpret and integrate their findings. The primary aim of this paper was to fill this gap, presenting a theoretical framework for the investigation and explanation of firefighter wayfinding in unfamiliar spaces and the communication of locational and directional information to others.

KEYWORDS wayfinding, safety, communication

PROYECTO DÍNAMO: DESIGNERS EXPLORING THE POSSIBILITIES OF SHOOTERS AS ACTIVE GAMING

This poster presents the current status of a project involving a modification of the user experience of an existing shooting action video game to explore this genre’s possibilities as new scenarios for physical activity. A prototype in development serves as a tool by conditioning the functionality of the game controllers to the alternated movement of the legs the player has perform. Upon reaching a defined speed (“walk”), the device enables the component controlling advance and, upon reaching a defined a higher value, the one controlling the “run” function transforming an shooting game into an shooting themed active game.

KEYWORDS design, active gaming, tangible user interfaces
586  UNDERSTANDING PERCEIVED CONTROL: PRINCIPLES & A FRAMEWORK FOR SERVICE DESIGNERS

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Desire for control is widely accepted as a driver of human behavior and a major factor in design work, yet despite strong evidence suggesting that the perception of control is crucial to quality service experiences, little has been written for service designers on the subject. We provide a framework to understand how the service experience is impacted by the user’s perceived control, supplementing our work with a case analysis of the travel

KEYWORDS  service design, perceived control, user-centered design, user experience

596  NEW METHODS FOR EVALUATING EMOTIONAL EXPERIENCES IN THE PRODUCT DESIGN PROCESS

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In recent years, users’ needs have been recognized as valuable parameters for product design. Hence, capturing user experiences and emotions are essential to design pleasant products. The present study focused on user experience and how it can be captured during the use of product. It aimed to introduce two new types of emotional evaluation methods that can be used to examine and understand user experiences while they are interacting with the products. The two novel methods are called; Kansei sheets, and Read Body Language sheet. The results of this study will be of interest for design educators, and decision makers.

KEYWORDS  Emotional Evaluation Methods, User Experience, Product Design

598  CODING FOR RESPONSIVENESS: ON THE GENESIS OF A CODING SYSTEM TO ANALYSE DESIGNER’S TALK

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In this study I focus on the ‘designer’s talk’ as a site for the articulation and dissemination of design expertise. I discuss the development of a qualitative coding system generated in the course of analysing public presentations delivered by three prominent visual communication designers: David Carson, Paula Scher and Stefan Sagmeister. The coding system is informed by theoretical concepts drawn from a model of expertise developed by Hubert and Stuart Dreyfus. Central to the Dreyfus model is the assumption that expertise is not something that is represented in the mind, but in the way that the world shows up for us. Expertise is manifest in the expert’s ‘responsiveness’ to situations. I discuss the value of the coding system as a tool for understanding ways in which designers orient themselves in the course of developing and extending their practice.

KEYWORDS  design expertise, Dreyfus model of expertise, qualitative coding

602  CONSCIOUS VERSUS UNCONSCIOUS SOCIALLY RESPONSIBLE DECISION-MAKING

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This research classifies conscious and unconscious design decision making in terms of social, economic and environmental issues. The above two aspects are again divided into company regulation issues and non-regulation issues, respectively, depending on whether the company has those principles or regulations at the strategic level. By investigating the degree of the conscious decision-making and that of the unconscious decision-making at the operational level, the research finding intends to demonstrate where CSR decisions are being made, and how conscious and unconscious socially responsible design decisions affect CSR particularly in the new product development process, with special reference to the electronics industry.

KEYWORDS  Corporate Social Responsibility (CSR), Socially Responsible Design(SRD), Design Decision Making
617  
**MOTIVATING SCIENCE AND TECHNOLOGY STUDENTS FOR SOCIAL DESIGN**

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**Hilde Eling**  
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**Maarten Van der Sanden**  
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Students in a masters’ programme for Science, Technology and Math teachers and Science Communication specialists at Delft University of Technology (DUT) participate in a design course, since designing teaching materials and communication processes and products will be part of their future professional lives. Design in a non-technology context, however, seems not to particularly motivate these students as their relevant previous experiences were mainly within the DUT technology domain. This research project investigated how closely monitoring students can be put to use in optimizing instructional strategies and course content. An optimized curriculum, it is reasoned, leads to better motivated students, better learning and better student products. To monitor students’ motivation and progress, weekly surveys were administered. Two motivation theories were used as a framework to measure students’ motivation: expectancy-value theory (Wigfield and Eccles, 2000) and self-determination theory (Ryan and Deci, 2000). A didactical approach with variations in instructional strategies, such as lectures, interactive sessions, guided practice and reflection, contributed to highly motivated students. Students showed to be able to apply social theories in their design process. This paper is based on a mid-course evaluation of students’ reports and products. Some of the final students’ products will be available at the conference. These include course materials on nano-technology for secondary schools and a communication plan for the introduction of “SmartCard”.

**KEYWORDS**  
Student motivation; design education; social design theories

626  
**DESIGN METHODS AS MEANS FOR CHALLENGING ORGANIZATIONAL PRACTICES - CASE: RECRUITING**

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Many of the organizational systems and work practices, e.g. recruiting processes, especially in the public sector have remained relatively unchanged during the last decades. In this paper we argue for, the potential of applying typical design competences such as empathic and visual methods, as tools to support ‘out of the box’ -thinking and spirit of an instant experimentation in organizational practices. This argument is based on a case study that took place in the context of recruiting. The gained experiences suggest that developing a recruiting event that simulates realistic working tasks, candidates’ expectations, interests, skills, character and suitability can be revealed more profoundly than through traditional interviewing methods.

**KEYWORDS**  
organizational practices, design methods as means, challenging management processes, recruiting practices

632  
**ONLINE DESIGN CONTESTS: A NETWORK OF INSPIRATION FOR DESIGNERS**

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**Ingrid Mulder**  
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**Pieter Jan Stappers**  
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The phenomenon of crowdsourcing has drawn the attention of the design community, but is primarily regarded as a way to 'outsource design work.' This study explores the use of one form of crowdsourcing - online design contests - as a source for gathering information and inspiration for designers. The results demonstrate the inspirational value of hosting a crowdsourced design contest by creating content for evoking discussion within the design team, opening a line of communication, and highlighting the benefits of the hosting process, beyond outsourcing a solution.

**KEYWORDS**  
Design Contests, Crowdsourcing, Inspiration, Design Research, Design Tool.
641

THE VALUE OF INDUSTRY-ACADEMIC COLLABORATIONS IN SPORTSWEAR TO CREATE GAME CHANGING RE-USE OF TEXTILES

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The context of this paper is the growing incentive for the sportswear industry to move increasingly towards sustainable design and production. Through a co-design case study, the authors look at the advantages of the sportswear industry and academia of collaborating in this area, with a particular focus on ways of generating value added garments through the re-use of textiles. The authors argue that with changing attitudes among the public the social and economic capital of re-use now makes it possible to sell re-use at a premium providing the garment designs are innovative and attractive.

KEYWORDS sportswear; sustainability; design collaboration.

646

IDENTIFYING FACTORS AND CONDITIONS OF MULTIDISCIPLINARY DESIGN TEAM IN AN EDUCATIONAL SETTING

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Business schools and Engineering colleges are seeking to work with Design schools to forge new interdisciplinary programs (Lockwood, 2010). Multidisciplinary Design Education plays a core role in such programs. Seoul National University’s Design department, Engineering College, and Business school have started Integrated Creative Design Education Program in 2009. Two years of education management has revealed necessity of developing implementable multidisciplinary design education study. This paper studies multidisciplinary design education cases to identify its factors and conditions, and to analyze causality the factors. The final aim is to find blueprint for multidisciplinary design education model. As outcome, four main categories have been drawn out: project theme and attribution, composition of project team members, project development process, and knowledge resource management. Then causal relation between these categories was identified. The next step of the study will be to explore more education cases and refining study outcome, and to apply in actual education.

KEYWORDS Multidisciplinary Design Education, Team Creativity, Multidisciplinary Factors and Conditions

650

THE MASTERPLANNING TOOLBOX: AN EARLY STAGE TOOL FOR THE SYNTHESIS AND EVALUATION OF MULTIMODAL COMPLEXITIES AT A CITY SCALE FOR URBAN DESIGN CONCEPTUALISATION.

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University of Technology Sydney

Effective city planning requires multimodal analysis at a level which challenges the co-ordination of disciplines and cohesion by the lead designer. The author presents the case for an early design stage tool to complement the growing array of downstream design tools for city design. An early stage tool would improve design conceptualization and provide a live knowledge-base for complex masterplanning issues: the inter-related criteria of a city that create a ‘perfect storm’ of design requirements - many of which are contradictory and divergent. This paper describes the research and development of the Masterplanning Toolbox, software tool that aims to provide a multi-layered data environment to help synthesize and evaluate urban design proposals at an early stage, developed by the author for the 180 Hectare One North masterplan for Singapore’s Jurong Town Corpora-tion, led by Zaha Hadid Architects. The author concludes with reflections on future research.

KEYWORDS The Masterplanning Toolbox: an early stage visually rich computational design tool to assist in the synthesis and evaluation of multimodal complexities at a city scale for urban design conceptualisation.
656

CREATING KNOWLEDGE IN DESIGN THINKING: THE RELATIONSHIP OF PROCESS STEPS AND KNOWLEDGE TYPES

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This article analyzes the design thinking process in terms of its capability to create design knowledge. For this purpose, we refer to a typology that suggests four different types of design knowledge as well as three interjacent transitions. According to this typology, design knowledge can be represented in physical artifacts, as tacit gut feeling, as codified knowledge, or as testable theories. We analyze the different process steps of design thinking through extensive case studies of design thinking projects in an educational context and map them to the different levels of this typology. The work presented in this article contributes to a better understanding of the working mechanisms of the design thinking process.

KEYWORDS Design Thinking, Knowledge Transfer, Knowledge Creation, Design Process, Innovation, Knowledge Types

666

STRUCTURING DIVERGING IDEAS AND CONVERGING THEM TOWARD THE USER-AXIS: A DESIGN PROCESS

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This paper proposes a model for human-computer interface design. Unsuccessful design is generally accepted to be a direct result of an inadequate approach at the conceptual level, and in many cases, the inadequate approach is caused by miscommunication and lack of understanding among team members. Although all team members know that working with professionals in other disciplines is inevitable, they are not always prepared to perform in such a way to assure the needed collaboration from others. In such context, as a designer, how do we create the conditions for a variety of contributing experts and non-experts to go beyond their individual knowledge, thereby enriching their reflections in order to efficiently collaborate along a human-oriented design? Design activities are integrated into the early stages of the discovery process to bring team members (all stakeholders) together and help them reach common goals and explore the project through a particular way of collaboration. The model offers an environment for dealing with the complexity inherent to the design process when the aim is a human-centered design. The proposed model guides and structures the move around a central axis that represents the evolving users' interests by bringing team members to collaborate in design activities. Everyone's engagement around that central line, their dialogues and their exchange of information lead to the convergence of viewpoints and to enrichment of project knowledge for the team, more successful design, and development of the project in a timely and more economically efficient manner.

KEYWORDS User-centered design; HCI; Interdisciplinary; Project-grounded research; Theoretical model

667

IMPROVING CHILDREN’S SENSORY INTEGRATION CAPABILITIES WITH RICH INTERACTION DESIGN

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Recently, there are more and more children found to have learning or behavior problems when they enter the schools. Some of them were diagnosed to have insufficient sensory experience in their childhood. To prevent this kind of problem, it is important to provide proper sensation stimulations regarding to the child's growth path. In this paper, the development of an interactive device for one-year-old babies will be demonstrated. The design integrates visual and auditory sensations to motivate young children's body motion. It also provides various tactile sensations to enrich their sensitivities on touch. Based on result of user evaluation with the prototype, the design concept is able to improve children's sensory capabilities.

KEYWORDS Sensory Integration, Design for Children, Toy, Infancy
677

DESIGNING FOR SOCIAL SUSTAINABILITY

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IIT Institute of Design

Design has a role to play in framing and designing for negotiation of the kinds of ‘wicked’ problems posed by sustainable development. Arguing for a concept of ‘social sustainability’, we draw on contemporary environmental theories to build a discussion of design in relation to behavior change, transition management and social innovation. Specific methodologies are developed for design research intervention into stakeholder negotiations around water, energy, habitat and waste, understood as ‘microcosms’ for larger social change. In progress as case studies and a pilot demonstrator, this paper reports on the first phase of a multi-year, international and cross-institutional design research program.

KEYWORDS social sustainability, design methods, future contexts for design

685

A STUDY OF USERS’ EMOTIONAL EXPERIENCES FOR COMMUNITY CULTURAL PRODUCTS USING KANO MODEL

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The purpose of this paper is to explore how emotion, usability, and user relationships are related and emotional experience of user from community cultural products are elicited. This research involved the preferences and satisfactions of users on emotional experiences with community cultural products by using Kano Model. The high involvement in the communities of 80 people participated positive and negative questionnaires in the study. The quantitative analysis of the questionnaires was conducted users need and level through cultural products. The suggestion is in providing designers with a better understanding of how to devise well emotional products through positive experiences.

KEYWORDS Users’ Emotional Experience, Community Cultural Products, Kano Model

689

BYPASSING ETHICS VIA DESIGN: ETHICAL DISCOURSES IN THE ROAD DESIGN PROCESS

Peter Lloyd
The Open University

In September 1996 two people were killed shortly after the Bedford Southern Bypass in the United Kingdom was first opened to traffic. The deaths sparked discussion about the design of the bypass and this paper draws together the different discourses involving ethics and the process of design. The paper begins by noting theoretical similarities between the areas of design and ethics, it goes on to discuss the concept of ‘moral imagination’. Two discourses are then presented, the first describing the reaction to the deaths, the second looking at original documentation from the bypass design process. The paper concludes that designers, through exercising their imagination in designing, are able to resolve ethical problems without relying on the ethical discourses prevalent in both philosophy on the one hand, and the media on the other, which tend to rely on individual accounts of imagination and explicit ethical awareness. The discourse of the design process suggests a more social idea of imagination (past and present) and design judgment that, although having a strong aesthetic component to it, is able to address ethical issues.

KEYWORDS Design Ethics, Design Processes, Design and Culture
692

**DESIGN OF INTERACTIVE INDOOR WAYFINDING MAP FOR ELDERLY USERS**

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**Kevin Tseng**
Chang Gung University

**Yun-Fong Kao**
Chang Gung University

The purpose of this research was to establish an appropriate design of interactive indoor wayfinding maps for elderly users. The user interface of interactive wayfinding maps, including visual representation and operational interface, should satisfy the needs of elderly users. Map use by elderly participants was explored using methods of observation and interview. Protocol analysis was used to understand user needs and experiences. This paper suggested design guidelines of visual representation from the results of analysis. Based on literature review and user experience, this paper proposes a conceptual framework of user interface using a non-predefined hierarchy-structured zoom that integrates the operations of re-center zoom and hierarchy-structured zoom.

**KEYWORDS** wayfinding map, interaction design, aging

693

**BUILDING DESIGN TOOL ARTEFACTS AS PERSONAL THEORY**

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This paper describes a practice-led research project that has proceeded through building three different design tool artefacts. The tools were built on the assumption that design tools are seeds for design ideas and guide their formation. Material design tools and computer based tools both work as bases about how and what to design. Instead of seeing them as just assistive devices, they may be used for setting the stage for design in the first place. The three tools, designed artefacts in themselves, are described as stemming from initial premises into concepts that have generative potential. The process of building these tools are discussed in terms of practitioner knowledge. As a method, engagement into tool building is a self-imposed contract through which also theoretical insight and learning becomes generated.

**KEYWORDS** design tools, practice-led research, personal theory

694

**TALK AROUND THINGS: PROTOTYPING AND DISCUSSION IN THE DESIGN PROCESS**

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**Peter Lloyd**
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Designers have to manage an increasingly inter-disciplinary process which requires extensive collaboration and thus discussion between different parties. One way to manage discussion is to use prototypes to get across ideas, a major component of design thinking. The primary purpose of this paper is to begin to bring together the areas of prototyping on the one hand, and studies of design discussion on the other hand. The paper reports two studies conducted at Swiss product design agencies. The first sought to apply existing typologies of prototyping to examples collected for a prototyping database. The second looked at the form and proportion of discussion in real-time design activity. The paper concludes by distinguishing between prototype-rich environments and prototype-poor environments suggesting an area for further work is to explore whether better quality discussion can be had in the former. This is important because, as the paper shows, discussion takes up a significant part of the design process.

**KEYWORDS** Prototyping, Discussion, Design Thinking, Design Practice, Case Study
GOING RUSH: A STUDY FOR REINVENTING THE LOCAL RUSH-WEAVING INDUSTRY

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This study attempted to explore how leveraging design creativity can unearth new opportunities for local rush-weaving crafts of Yuan Li in Taiwan, expanding the market potential of the crafts through the development of new products. A collaborative team of design students and Yuan Li craftspeople was established as a means of expanding the craft vocabulary and tapping contemporary markets. As a result of the nine-month project, this study proposes several design concepts to demonstrate the potential in rush-weaving crafts.

KEYWORDS Design, Rush weaving, Local craft industry, cultural product

DESIGN.LIVES LAB: A CASE TO INTRODUCE SOLUTION-FOCUSED DESIGN METHODOLOGY FOR PARTICIPATORY DESIGN FOR SOCIAL INCLUSION

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Hong Kong Polytechnic University

Paula Dib
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There will be two-folds of this paper. Firstly, it will unfold the latest development of the collaboration between the disciplines of design and sociology on the practice of design participation through educating young designers. Based on a three-week design lab, Design.Lives, design practice is inspired and informed by reflexive ethnography. Secondly, our effort is an attempt on showing the significance and effectiveness of using solution-focused approach as a design methodology.

KEYWORDS Participatory design, social inclusion, design education

PRODUCT-FRIENDLY USER DESIGN: A CRITICAL DISCOURSE ON USER-CENTERED METHODOLOGY.

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TU Delft

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User-centered design risks becoming user design; turning people into users. The more successful the design, the quicker and easier we adopt the model of a user that the design evolved around, and uncritically embrace behavior and preference patterns scripted in this model - often unconsciously by the designers themselves. This research generates a critical discourse from a literature review. It discusses the conceptual models about ‘users’ that designers design around, challenges design preconceptions of ‘user-friendliness’ and explores experimental approaches that embrace the unpredictable complexities of real-life experiences as creative possibilities.

KEYWORDS critical design, practice theory, user experience, user models
GAME INTERFACE DESIGN ACCORDING TO THE SPATIAL RECOGNITION DEVELOPMENT OF CHILDREN BY STAGE --FOCUSING ON THE HORIZONTAL SCROLL GAMES--

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The purpose of this study is to prove that there are differences in the commonly used horizontal scrolling games for all ages depending on the stages of spatial recognition through an investigative analysis. For this, the structural characteristics of the horizontal scrolling and the theory on spatial recognition were examined and the factors were selected through the FGI of the expert group and three groups of 130 children were asked to play two games for 20 minutes each to analyze the age differences in the spatial recognition during playing. The analysis results showed that the controlling abilities of the spaces and the recognitions were different in each age group, which were consistent with the spatial recognition theory. The statistical results showed that there are recognition differences in each stage despite the individual differences. This result implies that the all-age group games for the younger children are meaningless and the game interface design needs to consider the spatial recognition stage characteristics of children.

KEYWORDS: spatial recognition development of children, spatial recognition, horizontal game interface design

TEACHING DESIGN GAMES IN FIVE WEEKS - EXPLORING DIVERSITY AND UNITY FOR A DESIGN SCHOOL IN TRANSITION

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The Danish Design School

Gudrun Risak Schou  
The Danish Design School

Martin Vallin  
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This paper is about educating designers as co-designers and reflective practitioners. It is argued that an important goal in design pedagogy is learning the students’ strategies and tools for how to involve various stakeholders in designing, and how to deal with uncertainty and open design agendas. It is important in order to prepare students for a career as designers. The paper reports from an intense five weeks course about developing and using design games as a frame for design-oriented collaborations with people outside the core design team. Co-design is about making room for people with diverse interests, roles and responsibilities in rehearsing the future. Using the game metaphor to stage and engage everyone is a valuable format for collaborative inquiry and co-creating future visions - in other words exploring diversity and creating unity about values and goals. The professional designer is the one to organize co-design events that can accommodate common learning through inquiry and design. Developing and playing design games is a valuable format for co-designing and therefore a good example of what could take place during a specific design event. Hence they can be very useful in design education.

KEYWORDS: educating designers, design games, co-design, reflective practitioners

DEVELOPMENT OF FRAMEWORK FOR DESCRIBING AND CONSTRUCTING FUN EXPERIENCE

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Nowadays, usability issues in interaction design have been moved from useful and efficient towards emotional concerns. People want to enjoy the use of the products, not just archive functional purposes. The goal of this research is to establish the framework for describing and constructing fun experience. In order to establish the framework, diverse users’ fun experience has been collected from users’ postings on the web and statements from individual interviews. Many products and contents such as game consoles, mobile phones, game software, and web-sites have been investigated for this research. Along with this, previous publications have been reviewed. The framework can be used fundamentally and practically for design emotional artefacts and contents.

KEYWORDS: Fun experience, Experience framework
NURTURING DESIGNERS IN PHD RESEARCH: ESTABLISHING A TRANSDISCIPLINARY GRADUATE SCHOOL

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As design as a profession and an academic discipline are maturing, there is a need to establish and improve the standards of research. Especially in the area of PhD education, the growth in quantity and quality is a concern that universities are currently dealing with. In this paper we describe these developments, observations from our own university, where the number of PhD researchers in design has grown from about a dozen to a hundred in about twenty years. We finish by discussing the state and plans for structuring PhD education.

KEYWORDS Design Education, PhD research

AN APPROACH FOR CONSIDERATION OF PERFORMANCE RESTRICTIONS AND ASPECTS OF ACCEPTANCE IN THE PRODUCT DEVELOPMENT PROCESS

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This paper describes an approach to develop products that are adaptable to the changing needs of age-related disabled people and accepted by them. By including the users into the product development process not only usability and accessibility of the products will increase, but also the users’ acceptance for the products. The adaptability of the product functionality to the users’ need can be realized by using a modular product structure. If the modules are both, adaptable to a certain extent and exchangeable the range of functions is variable. This makes the product adaptable to the needs of the user at the time of purchasing and during its useful life. Product to support disabled people should provide exactly the support that is needed and nothing more, in order to keep the abilities of the users trained. Therefore the adaptability of the product is crucial to spare the user to buy a new product, whenever the ability or the environment changes. These aspects have to be combined to one approach for products for seniors, in order to fulfill their needs and provide useful and accepted products.

KEYWORDS design for elderly people, performance restrictions in product development, age-based product development

PROCESSES OF BECOMING A DESIGNER

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In order to gain employment as a professional, it has been suggested that an individual would benefit from developing personal capital which is aligned with the profession's cultural values. For an individual, this development of personal capital can be associated with the development of a professional identity. If we understand that design is a profession, then it follows that design graduates need to develop an understanding of professional cultural values in circulation within the design profession. We argue that design undergraduates will benefit from an understanding of these values as they will need to construct an identity in relation to the norms and practices of the profession.

KEYWORDS autobiographical processes, design education, design pedagogy professional identity, notions of self
PARTICIPATORY DESIGN FIT FOR THE 21ST CENTURY: IMPROVING THE DESIGN OF AN EMERGENCY DEPARTMENT IN A UK HOSPITAL

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Design has enormous potential to affect people’s health and wellbeing. One way to improve staff and patient experiences of healthcare services and environments is to use participatory, or co-design approaches. However, the issue is that participatory design projects are often described as taking place in “greenhouse settings”, shielded from the time constraints of everyday work, where workers are given time off their everyday duties to participate in design improvement projects typically in intensive face to face sessions. The challenge therefore, is this: in today’s economic climate with the time and financial pressures facing healthcare staff in a busy, stressful environment, how can staff and patients be engaged in extended participatory design improvement projects at the minimum cost but with the maximum benefit? The environment under study for this yearlong project is a UK hospital Emergency Department. This is a particularly demanding working environment, requiring high levels of concentration and long working hours by staff. The core research team for this project come from industrial design, HCI and environmental psychology. This combination of different disciplines brings an interesting, and complex mix of different approaches to tackling this problem. This paper describes the adaptation and combination of some existing participatory and co-design methods to be more appropriate for use in this stressful healthcare context. Four approaches are used as inspiration: (i) the emerging field of distributed participatory design; (ii) the use of “informational probes”; (iii) the idea of crowdsourcing; and (iv) a situated intelligent kiosk that collects feedback and suggestions.

KEYWORDS participatory design; healthcare; environment design

OPENING DOORS: BROADENING DESIGNERS’ SKILL SET

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In this paper we will use a case study from an English post-1992 university to illustrate how a student project can potentially facilitate development of both ‘traditional skills’ and some of the ‘wider skills’ promoted by critics such as Don Norman. One of the aims of the project was for participating students to begin to explore the ‘work’ artefacts ‘do’ in relation to social practices. The social practices investigated during the case study project related to the ‘giving’, ‘receiving’ and ‘reciprocation’ of corporate university gift(s) designed by the participating students. This project was an opportunity to open spaces for the students to practice wider skills through discussing rituals, ceremonies and protocols related to ‘gift exchange’.

KEYWORDS Design Pedagogy; Design Education; Collaborative Projects; Widening Design Skills; Project-Based Learning

SEARCHING FOR INSPIRATION DURING IDEA GENERATION

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When facing a design problem, designers tend to rely on a variety of available sources to get inspired during idea generation. However, little is known about what designers use as inspirational sources, and how they process such information. This paper presents the results of a questionnaire on novice and expert designers’ preferences regarding inspirational sources for creativity stimulation. Results revealed that novice and expert designers make similar choices regarding stimuli, but their frequency of use varies significantly. The outcome of this study can uncover important implications for design education regarding the search of inspiration.

KEYWORDS Sources for inspiration, external stimuli, ideation methods, novice and experts
738
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Advantageous applications of Virtual Reality (VR) in product design can be found throughout the product development process. For instance, VR can facilitate stakeholder communication or enable virtual prototyping. However, despite a wealth of literature describing opportunities of VR, and an accompanying range of VR toolkits, it has yet to become a common design tool. It is argued that the limited adoption of VR as a design tool is caused by the fact that most VR design tools are less accessible for product designers. The research presented in this paper aims to provide designers with VR design tools that are useful, usable and easily accessible. The approach involves three industrial case studies in which we first identify advantageous VR applications and then provide the industrial partner with tools to create this application. The resulting requirements are validated through a cross-company evaluation. This paper presents the results of the first case study.

KEYWORDS case study, virtual reality, design tools, usability

739
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The present study integrates an empirical research that aims to identify designers’ practices of value delivery across design disciplines. The study reports findings based on the analysis of video recorded meetings from case studies. Data collected during periods of observation provide insight into the characteristics of designers sharing working environment in three design consultancies established in graphic design, architecture and engineering. The research is a contribution to understand how designers’ thinking and acting enhance the value of the design process and design results. Findings report similarities and differences of designers’ patterns of thinking and acting in collaborative meetings across disciplines.

KEYWORDS designers, thinking, acting, values, decision, patterns

742
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Methodological knowledge is a requirement for interdisciplinary collaboration on an equal footing and should be a central part of the master level design education. This paper describes the development of a design research course for a cross-disciplinary Industrial Design Program in DE. The course should enable students to face the demand for new knowledge and methods needed for future decision-making. The majority of the supervisors in DE are not experienced in design research methodology. Therefore the intention of this inquiry was to elaborate on some practical insights. In order to optimize content and structures for the student’s motivation and learning the curriculum was developed through prototyping and testing of models just as in design practice. Referring to the learning outcomes after the first iteration of the course it was restructured following the SECI Model for knowledge management. This led to a dramatic increase in the overall student’s achievements and satisfaction as reflected in questionnaires and student’s performance.

KEYWORDS Industrial Design, Design Research Education, SECI Model
DESIGN FOR HAPPINESS; FOUR INGREDIENTS FOR DESIGNING MEANINGFUL ACTIVITIES

Happiness theorists are generally skeptical about the contribution of consumer products to user well-being. We may experience moments of happiness in response to our new pair of shoes, smart phone, or watch. These moments, however, are short-lived because we quickly adapt to the new situation. In an attempt to revive these moments, we can get trapped in a ‘hedonic treadmill,’ buying more and more products: running and running, but not really getting anywhere. A more lasting strategy is to engage in new activities that have personal relevance. Based on this proposition, this paper proposes a ‘happiness-driven design approach’ that deliberately aims to design products that enable and inspire people to engage in activities that are personally meaningful. A questionnaire study is reported that explored how people perceive the effects of products on their happiness. In order to interpret the findings, some contemporary happiness theory is briefly reviewed. The resulting insights were the basis for a preliminary strategy for ‘happiness-driven design’, in which four ingredients are used to conceptualize new meaningful activities. Two design cases are presented in which the strategy was explored, and some scientific and methodological challenges involved in the study of happiness-driven design are discussed. The belief underlying this work is that the design discipline has the possibility to profoundly contribute to the well-being of individuals and communities. Although still in an explorative stage, this (and similar) happiness-driven design strategies can support designers in creating products that stimulate people to flourish and to ‘become their best possible selves.’

KEYWORDS  Subjective Well-Being; User-Centered Design; Design Approach; Happiness

A FRAMEWORK FOR EXPLORATION PHASE OF EXPERIENCE DESIGN AND A CASE STUDY IN LIGHTING DESIGN

Despite apparent benefits of Experience Sampling (ES) for experience design and research, it has been scarcely used in the field. Among the reasons, the conventional ES uses generic questions which are often irrelevant to the context of ES in the form of open-end questions demanding minutes of time to respond. Likewise, its subjective and ununiformed qualitative data from participants are difficult to apply for practical design guide. As to these issues, the present paper suggests that some preparations prior to the conduct of ES can help to make the method a useful design research tool. This adapted ES is entitled 99 Context-Specific Experience Sampling which incorporates a small scale user-experience data collection and process prior to the actual conduct of ES. The preparation process consists of experience 99 pooling, 99 sorting, and 99 extracting phases which are to generate pertinent a
This paper is based on empirically revealed doubts on the universal preference of the golden ratio proportion. An empirical study has been conducted in order to examine differences about ‘preferences of proportions’ on the golden ratio between South Korean and Western preceding studies by Kimberly Elam’s “Geometry of Design: Studies in Proportion and Composition”. Proportions are determined by mathematical logic, however ‘preferred proportions’ arise from cultural influences and experience. The research was conducted with two hundred subjects between the ages of twenty to thirty in Korea, with questions that showed ten choices of different proportions of rectangles. The data of comparisons clearly revealed that Korean had a preference to root proportion (1:1.414). These results obviously contradict previous studies conducted in the Western culture showed preferences of the golden ratio (1:1.618) (Benjafield, 1979, 2010; Pittard, 2007). The aspect of the results will provide deeper insights of the influence of the design process in specifically on the design form. The paper continues to examine and introduce various Korean traditional and modern objects, architectural structures that exemplify the research results. The paper concludes that various examples of root proportions can be found in Korean design environment showing a Korean preference for root ratio reflecting the here presented results.

KEYWORDS
Root ratio, Golden ratio, Cultural preference, Preferred proportions, Design form

A STRATEGY TYPOLOGY FOR DECISIONS ON BRAND STYLES

In this paper, we present a strategy typology for decisions on brand styles. Specifically, we map clusters of styling decisions, and discuss how they are embedded in organizational decision making on styling in the automotive industry. The typology originates in a study on styling in the German car market in which we empirically analyzed the style decisions for more than 170 car models.

KEYWORDS
Styling, style management

DESIGN AS A SYNTHESIS OF SPACES: USING THE P-S FRAMEWORK

Designing is a multi-dimensional phenomenon and is difficult to describe through one disciplinary research lens only. This paper uses a framework within which multiple theories of designing could be informed of their role and explanatory power. The Product space and Social Space framework describes the scope of designing activities and it allows for incorporating insights from cognition sciences. This framework is the basis for analysis of the three case studies presented in this paper. The analysis illustrates the power of the framework to integrate insights from role of cognitive structures to explain the failures or successes in the case study. These case studies are a beginning of an effort to prove the utility of the framework for pragmatic use in being able to draw insights from a multiplicity of theories of human activity to understand designing.

KEYWORDS
Designing, research lenses, integrated theories
COLLABORATIVE VIDEOING - A REFLEXIVE ACCOUNT

Abhigyan Singh
TU Delft

In this paper, I present collaborative videoing exercise conducted during an ethnographic field research conducted at Sudarshan Layout, an urban slum in Bangalore, IN. AC3 Members, a group of local youth of Sudarshan Layout were the participant-collaborators in the collaborative videoing exercise. In this paper, I discuss collaborative videoing within the discourse of collaboration and reflexivity from the domains of visual anthropology and design research. I argue that collaborative videoing is an informally structured approach which served as a boundary object during the research process. I reflect on how collaborative videoing, as boundary object, facilitated this design research at Sudarshan Layout and assisted in collaboration, communication and cooperation between participant-collaborators and me. I also reflect on how collaborative videoing facilitated trust between the local residents ('insiders') and me ('outsider'). I discuss how the interpretation and meaning generation of collaborative videoing is a dynamic process. In the paper, I further discuss that collaborative videoing with AC3 Members embody a dialectic between the reality of their social worlds and the views, representations and notions as authored by AC3 Members and me.

KEYWORDS Video, Collaboration, Boundary Objects, Reflexivity

CRITICAL METALS: WHAT ARE THE EFFECTS ON PRODUCT DEVELOPMENT APPROACHES?

Meike Brehmer
TU Delft

Frido E.H.M. Smulders
TU Delft

David P. Peck
TU Delft

Raw material criticality, whether through limitations of natural resources or political maneuvering is increasingly exposing different product developing industries to a range of adverse risk scenarios. Exploratory research was conducted to gain an insight into the awareness of companies to the challenges critical raw materials can present and to ascertain if action is being taken. The study clearly demonstrates a need for more research to gain a deeper insight into mitigating adverse critical metal risk throughout the different stages of the product development process. The conclusion provides an insight as to the implications for further research.

KEYWORDS material scarcity, critical metals, critical raw materials, resource scarcity, collaborative design, value chain integration, eco-design, risk management

DESIGNING THE TOTAL EXPERIENCE

Jeroen van Erp
Fabrique [brands, design & interaction]

This paper introduces a model for designing the total experience of a product and/or service. In most research and models the user takes a central place. The so-called cone model alsointegrates strategic company concerns. The model shows what the role of the designer can be in order to create more meaningful products or services from a holistic perspective. It gives design thinking, defined in this context as 'creating added value on a strategic and conceptual level', a natural place in the innovation process and it shows why the role of the designer will change rapidly in the coming years.

KEYWORDS design, experience, emotion, storytelling, design thinking
DESIGNING HOME USE MEDICAL DEVICES: THE CHALLENGES AND ITS REQUIREMENTS

Abduselam Cifter
Mimar Sinan Fine Arts University

Hua Dong
Brunel University

Julie Barnett
Brunel University

An emerging trend of the healthcare industry is the huge increase in the number of medical devices being used by lay people at home. Although home healthcare is a fast growing field and home use medical devices are an emerging market, there is surprisingly little information readily available for designers. This paper particularly focuses on the designers’ perspectives on designing home use medical devices. In order to understand the challenges designers encounter during the design process of a home use medical device and their requirements to overcome these challenges, a questionnaire survey was carried out with designers.

KEYWORDS Home use medical devices, Design process, Requirements, Challenges

AGAINST SUSTAINABILITY AS A PRIME DRIVER FOR DESIGN

Walter Alberto Aprile
Delft University of Technology

Over the last decades, sustainability has ensconced itself in design discourse. We can find design for sustainability specializations in Design MSc courses and there are websites and organizations devoted to it. There are very few companies, including oil, car and mining concerns, that do not claim to have a strong focus on sustainability. But how do we go beyond the green and blue logos and the fetishistic use of certain materials like bamboo, paper or wood? In recent years sustainability has become even more visible as a design driver. It is perhaps the time to question critically its status, starting with the definition and looking at the deeper implication of subordinating design to a debatable concept.

KEYWORDS sustainability, contrarian, ecology, slum

MOVING TARGET - WHAT ARE THE KEY ELEMENTS THAT ARE CONDUCIVE TO A CREATIVE ENVIRONMENT FOR INDUSTRIAL/PRODUCT DESIGN STUDY TODAY?

Karl Hurn
Loughborough University

With the worlds design landscape ever shifting due to social, economic, environmental and cultural changes, are the methods and focus of how industrial/product design is taught to undergraduates keeping pace with industries requirements? The research for this paper outlines the writer’s experience of managing the development of the new Product Design undergraduate programmes at the University of Derby in 2010. The research found that there was a degree of ambiguity in the official benchmarking documentation and that this interpretation of the standards leads to variation between programmes at different institutions. The paper concludes that the different emphasis given to design skill sets at different institutions has a direct impact on student employability and that regular revalidation of design programmes is essential to maintain employer confidence.

KEYWORDS Industrial Design, Programme Development, Pedagogy, Learning Environments
785

CHARACTERISTICS OF DESIGNER’S SUBCONSCIOUS EVALUATION AS KANSEI PROCESS IN DESIGNING

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Hiroshi Kasai
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Shino Ida
University of Tsukuba

While evaluating designed products, we imagine different feeling between designers and users, or non-design-educated people. This paper introduces how can the difference described. As the research target, we used chairs as familiar product for everybody. As for the subjective evaluation, semantic differential method was used. For the subconscious measurement, Near Infra-Red Spectroscopy (NIRS), which measures brain function, was used while watching the chair (evaluation) and answering (thinking and expression). As a result, we found specific difference between the evaluation of design educated and non-design educated on the ‘Feasibility of Structure’ in both measurements. This can illustrates the difference of designer’s evaluation as well as the effect of design education.

KEYWORDS Kansei, chair, NIRS, brain science

787

CULTURAL ARTIFACTS AS EMOTIONAL CATALYSTS AND SOCIAL MEDIATORS IN DESIGN RESEARCH

Yadira Ornelas
IIT Institute of Design

Judith Gregory
IIT Institute of Design

This paper is a reflection on the inclusion of Cultural Artifacts in the enhancement of design research methods, particularly probes. A Cultural Artifact is defined as an artifact, - tangible or not - that has imbedded meaning for a socio-cultural group and therefore has potential to elicit emotions in individuals. Ludic by nature, Cultural Artifacts are designed to be creative and inspirational. They consist in the appropriation of artifacts relevant to a group or culture and their deconstruction by a designer with the intention of discovering information traditionally overlooked by other research methods. One of the principal reasons for the inclusion of Cultural Artifacts is their potential to unveil thoughts, ideas, feelings and emotions that would otherwise be complicated for participants to express, explore and elicit. Focus is placed on the artifacts’ significance as emotional catalysts as well as their roles as social mediators between participants and researchers. Cultural Probes, a design research method typically consisting of a collection of self-documentation techniques and instruments serve as initial basis which we extend for cultural significance. Cultural Probes created initially by Gaver and Dunne of the Royal College of Art, were developed with the intention of eliciting emotional responses from participants. This proposal of Cultural Artifacts is based on the first author’s doctoral research in progress, zooming in on a Cultural Artifact developed for Mexican-American communities in Chicago, as well as the authors’ experience teaching Cultural Probes to graduate design students, researchers and participants in the United States, Mexico and Argentina.

KEYWORDS cultural artifact, design research method, user centered design

790

TEACHING CREATIVITY IN MECHANICAL DESIGN

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Delft University of Technology

Just Herder
Delft University of Technology

Tetsuo Tomiyama
Delft University of Technology

A widely used method to obtain design solutions is brainstorming. A drawback of brainstorming alone is that it often results in overall solutions that are sub-optimal on a component level. In our MSc course “Bio-Inspired Design” at Delft University of Technology, we teach students a structured design process that enhances brainstorming with abstracting, reflecting and logic reasoning to find a complete map of the solution space. Our course shows that students come up with much better ideas than after the first brainstorm, showing the power of combining creative brainstorming with logic, abstract reasoning.

KEYWORDS Bionics, biomimetics, creativity, brainstorming, logic reasoning
797

THE INFLUENCE OF SKETCH QUALITY ON PERCEPTION OF PRODUCT-IDEA CREATIVITY

Barry Kudrowitz
University of Minnesota

This paper explores the relationship between the quality of a sketch and how others perceive the creativity of the idea portrayed by the sketch. In this study, sketch quality is characterized through its line work, perspective, and proportions. Four different toaster ideas were each sketched by four people with different backgrounds and levels of sketching proficiency. Then, 360 reviewers ranked the toasters for idea creativity, referring to a set of 4 sketches—one sketch for each toaster concept. The level of sketch quality for each toaster concept was varied, being chosen from one of the 4 quality levels. Higher quality idea sketches were found to correlate with higher creativity rank, and lower quality sketches correlated with a lower creativity rank. A toaster idea portrayed with the highest quality-level of sketch was, on average, 2.6 times more likely to be ranked as the most creative idea within the given set of idea sketches. The results underscore the importance of how an idea is presented, and support the need for sketching instruction in engineering and design curriculum.

KEYWORDS: Sketching, Creativity, Idea Generation, Brainstorming, Product Design

811

CATEGORISING EMOTIONAL EXPERIENCES WITH PORTABLE INTERACTIVE DEVICES

Rafael Gomez
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This paper reports on a six month longitudinal study exploring people's emotional experience with two categories of portable interactive devices (PIDs); media and health related PIDs. The focus is on emotions and how PIDs mediate these experiences in everyday contexts. Previous findings presented by the authors (Gomez, Popovic, Blackler, 2009; 2010) revealed that people's emotional experiences with PIDs over time are influenced by whether interactions were at a personal or social level. This paper presents four categories of activities identified and their relationship to emotional experiences with PIDs that have been developed through further analysis of the data. It concludes with a discussion of the findings and their implications to the field of Design on the design of future PIDs.

KEYWORDS: Design Emotion, Portable Devices, Emotional Experience

812

THE COMPARATIVE ANALYSIS OF THE DESIGN TASTE

Kazuko Sakamoto
Kyoto

This research compares design taste internationally. The countries which compare are Japan, South Korea, and Finland. It is the purpose to consider the difference in the design taste which the culture of east and west brings about.

In order to investigate the taste of a design, the pattern was used in this research. Furthermore, the purchase factor was investigated in this research.

The result of investigation was interesting. It is that the tendency for Japan to differ was shown, although South Korea and Finland were similar. For example, in Japan, purchase factors were a price and a color, in South Korea and Finland were the function and form. These are considered to be the results which cannot be explained only by the conventional geographical and cultural factor.

KEYWORDS: design taste, culture, pattern, purchase factor
This paper will discuss the importance of international study tour programs for undergraduate students studying design disciplines in Australia. To date, there has been no study on the effectiveness of these particular study tours and the impact on graduates. This research is an advancement on work done by Sanders and Ward (1970), Goodwin and Nacht (1988), Opper (1990) and Hutchins (1996), which all reinforce the importance of broadening student experience through their total immersion in another culture, regardless of the duration. Australia is geographically isolated and this paper will highlight the importance of internationalization for design education.

**KEYWORDS** Internationalization, study tour, design

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**822**  
**STIMULI DESIGN FOR AUTOMOTIVE STYLING EXPERIMENTATION**

For automotive design management, a form hierarchy has been designed, that facilitates form manipulation and allows not only to link meaning to form, but also to identify why. Experiments must validate the model. Stimuli design, to minimize visual noise, forms a case on its own and is this paper’s subject. First designs, based on a neutral archetypical car, were inadequate. New stimuli design is now in progress and involves image colors, image context, preserving the leitmotiv and the influence of brand identities. Finalization will match with IASDR deadlines scheme.

**KEYWORDS** meaning of automotive form, design of stimuli, automotive design management

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**826**  
**DESIGN, MEANINGS AND RADICAL INNOVATION: DESIGNING FOR AN INFORMED FUTURE CONTEXT**

This paper discusses radical innovation, more specifically the design of product meanings, in the context of the tendency of companies to realize increase in sales numbers with the minimum amount of changes in (re) design. Two approaches, i.e. design-driven innovation (Verganti, 2008) and Vision in Product design (Hekkert & Van Dijk, 2010), both explicitly posit product meaning as an important concept in innovation. Based on a comparison of both approaches, we suggest that the focus on meaning in design has the potential of benefitting design companies as well as society. When product meaning is put central in both marketing and design, it is possible to establish successful design agencies that realize meaningful and long lasting products.

**KEYWORDS** Product meanings, Radical innovation, Commercial success
828

FROM FIELDWORK TO WEBWORK: ANALYTIC METHODS AND TOOLS FOR EMERGING ONLINE RESEARCH

Kim Erwin
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Emerging online research platforms are bringing new efficiencies to the design research process. But the resulting data is large in scope and dense in nature. And the analytic tools and approaches design teams have come to rely were not designed to manage this scale of inquiry. As design problems expand in complexity and require more inputs, generating big qualitative data sets is likely the new norm. This paper proposes two ways to manage this new condition: (1) adding visual coding techniques to textual coding to counteract “data sameness” and “data sprawl,” and (2) developing new tools to support fast meta explorations of data sets.

KEYWORDS user research, analytic methods, data visualization

836

AGEING AND USE OF COMPLEX PRODUCT INTERFACES

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Vesna Popovic
Queensland University of Technology
Doug Mahar
Queensland University of Technology

This paper discusses outcomes of an experiment designed to investigate if redundancy in an interface has any impact on use of complex interfaces in older people and people with low prior-experience with technology. The important findings of this study are older people (65+ years) completed the tasks on the text only based interface faster than on redundant interface. The rest of the participants completed tasks significantly faster on the redundant interface. From cognitive processing perspective, sustained attention (one of the function of Central Executive) has emerged as one of the important cognitive functions in using complex interfaces.

KEYWORDS Intuitive use, ageing, usability, cognition, design

837

DESIGN PERSPECTIVES ON SOCIAL SAFETY

Ilse Luyk
Eindhoven University of Technology
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University of Technology Sydney

Our current society is confronted with a variety of safety related issues in the public domain that affect personal and/or public well-being. Most of these social safety problems have existed for ages. Relatively new in this field is the designer. Only recently, designers with their unique design approach are involved in many social safety related projects. But what exactly is this design perspective on social safety problems? What makes the approach of these designers different from the earlier approaches of their colleague criminologists and urban planners? This paper explores these questions based on three recent case studies in the area of social safety.

KEYWORDS Social Safety, Design Methodology, Design Research

841

CONCEPTUALIZATION OF PRODUCT SOUNDS: LEARNING FROM MINDMAPS

Elif Ozcan
Delft University of Technology

People are surrounded by products (e.g., shavers, cars, hairdryers) that emit sounds when functioning. These sounds, in principle, can be designed to contribute to the desired experience determined for the product. However, currently, product sounds are actually not properly designed. Designers skip a major creative step, i.e., conceptualization, during sound development due to lack of practice on this topic. This paper discusses what conceptualization means for product sound design and suggests a new but a familiar creative method (i.e., mindmapping) to encourage designers to actually design sounds.

KEYWORDS sound design; conceptual design; sketching; mindmaps
842

DESIGN HARVESTS: A NETWORK OF SOCIAL COLLABORATIVE INNOVATION HUBS

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Studio TAO of TEKTAO

Francesca Valsecchi
Studio TAO of TEKTAO, Indaco, Polimi

The paper introduces an innovative social collaborative design project: “Design Harvests”—Xian Qiao sustainable rural community design project in Chongming. The goal of this project is to create prototypes of sustainable rural-urban interaction and development based on the usage of local resources and strength. One of the most important proposals is to establish a network of innovation hubs together with the local community. Each innovation hub will be a platform of using design thinking to promote series of sustainable solutions for the local development. Moreover, it will incubate and demonstrate new business models based on the resources of the rural communities and interaction between urban and rural. Meanwhile, a systematic network is designed and formed among the hubs to have the holistic and systemic impacts of whole territory. The key principle of this project is co-creation and interdiscipline. Enable the local community through social collaboration is one of the main tasks of this project. Social collaboration in this project is not only the cooperation among different stakeholders such as government, enterprises, designers and communities but also among different disciplines such as economics, sociology, engineering and design. As the conclusion, the paper summarizes the methodologies used in this project and explore more potentials of how design can contribute to such kind of social collaborative process.

KEYWORDS design harvests, rural development, social collaboration

844

INNOVATIVE GRADING FOR DESIGN EXERCISES

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TU Delft

Joris Melkert
TU Delft

An innovative way of grading design exercises is being presented. The third-year design exercise of the Faculty of Aerospace Engineering is such that each year approximately 30 groups of ten students each get a different design assignment. This ranges from aircraft to spaceplanes to satellites. A new way to grade the work of the students in a unified way whilst preserving the diversified nature of the designs is being honoured, was developed. This rubrics-based method has now been used for one year. The paper describes the development and the experience gained with this new method based on a statistical analysis.

KEYWORDS Innovative grading, design education
Precedent analysis is the systematic analysis of plans that enables comparison between plan types and within a plan type. The goal is to generate design knowledge that can be of use in day-to-day practice or in theory development. The term is coined by Tzonis in 1992 (Tzonis, 1992). In architecture, precedent analysis is a rapidly expanding field of research. Guney has set up courses and seminars in precedent analysis at the Faculty of Architecture in Delft in the last decade which is based on the semantic network ‘form / operation / performance’ (Guney, 2008). Part of his research is also focusing on the elaboration of this approach towards landscape architecture. The core issue in this paper is how the successful approach of precedent analysis in architecture developed by Guney, can be partly reworked to make it also applicable for landscape architecture. One of the first issues to be addressed, is how the dynamics of landscape architectural form and design can be integrated into the approach of precedent analysis, that is still very much oriented on architecture. The approach of the research is based on an analytical framework of ‘element, structure and process’ to cover the dynamic aspects of landscape architectural form. Secondly we have introduced in the analysis the distinction between three levels of intervention; the level of strategy for landscape development, the level of creation of landscape structure and finally the level of materialisation of form. Thirdly we have integrated the conceptual approach that seeks a certain coherence between different levels of intervention in the plan as a whole. We will work out this analytical framework in case studies of different plan types to make clear how this can be applied. The paper concludes with the following insights. Precedent analysis can open new viewpoints on plans and the background of plans; abstraction is a core issue to enable this. It is also one of the ways of theory development in landscape architecture that can lead to generic and explicit design knowledge but also to be able to compare the plans and their design backgrounds in a systematic way.
The use of design tools forms a central component of academic study in the creative disciplines, with applications ranging from 3D modelling software to colour specification. The vocational nature of design requires educators to expose students to tools that have been validated through use by designers during professional practice, although an opportunity also exists for academic research to be more pro-active in both the evaluation of emerging tools and development of new resources. This approach enables educational institutions to be at the forefront in the selection and development of new techniques that support teaching and learning. This paper explores this approach through descriptions of two case studies in which PhD research was used to inform educational practice in industrial design education. The first case study, supported by Hewlett Packard USA, evaluated the use of the Tablet PC as a mobile design studio that could integrate sketching with other core design activities, such as computer aided design and data collection via web browsing. The second case study, supported by the Industrial Designers Society of America, developed a compact card-based tool (iD Cards) to support understanding and communication in the use of design representations during new product development. Whilst these studies have contrasting aims, they are linked through the use of substantive academic research to support design education. The paper discusses the methods used in the research and identifies the positive outcomes in the contribution to student learning.

**KEYWORDS** Design tools, PhD, industrial design
POSTER PRESENTATIONS

The following pages contain the abstracts of papers that are presented as poster, arranged by paper id.
19

METHOD FOR APPLYING CULTURAL CHARACTERISTICS TO EMOTIONAL PRODUCT DESIGN

Chien-Kuo Teng
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Ming-Chuen Chuang
Institute of Applied Arts, National Chiao Tung University (NCTU)

Culture brings memories, emotions and inspirations in life, while the conversion process in design is critical in deciding the emotional strength of a cultural product. This study explored how cultural messages in the environment can be absorbed, converted and distilled into cultural characteristics design by the association method for emotion arousal with stimulate and concern was used to deepen the product emotions and arrive at an initial design concept. By going through the three stages of preparation, connection and design & development, the designer was guided to observe the resources and usage behavior in their surrounding environmental. This study proposed a design method by having the designer observe local characteristics before integrating cultural background and emotional characteristics into conceiving design. Finally, “simile” and “metaphor” were used as differential methods to convert the analyzed cultural emotions into product creativity in order to produce two design concepts. The application of this design method then was evaluated and recommendations were made.

KEYWORDS emotional design, culture, environmental observation, emotion arousal, creative thinking

23

DESIGNNOVATION STUDIO - NEW EDUCATIONAL PLATFORM FOR DESIGN AS CONNECTING

Sooshin Choi
University of Cincinnati

The paper describes Designnovation Studio, created to emphasis on design as connecting by providing experience of horizontal and vertical connection and is truly an adaptable design studio. Students from any discipline (design and non-design) and level (undergraduate and graduate) participate in projects on innovation by design. Depending on their level, interest, and experiences, each student plays different role in teams, such as, designer, design manager, design researcher, facilitator, and documenter. This helps students getting better idea about their future career. This also enables students expand their scope of work from the level of product design to design based on strategy.

KEYWORDS Designnovation Studio: New Format of Interdisciplinary Design Studio

25

USER-EXPERIENCE ECOSYSTEMS: A TOOL FOR UNDERSTANDING USER EXPERIENCES FROM THE USER’S VIEWPOINT

Petri Mannonen
Aalto University School of Science

User experience has been established as a valid concept when the user’s viewpoint of interactive products and services is considered. However, the definitions of user experience are currently linked only to the designed product or service. From the user’s perspective, the usage of a product usually includes the use of other resources as well, and all these resources have an effect on the experience of using the product. This article defines the concept of user-experience ecosystems as a network of products, services and information resources the user is experiencing when using a product. The user-experience ecosystem concept takes into account the technology-filled world we are currently living in. The power of the user-experience ecosystem concept is demonstrated via a case study of university students’ e-book reader user experience.

KEYWORDS user experience, user-centered design, ecosystems
**MAPPING MOVEMENT: A HUMAN MOVEMENT-BASED FRAMEWORK FOR THE CREATION OF ORGANISED INTEGRATED EXPERIENCES**

In this paper a framework for mapping human movement that matches the logic of describing corporal action with an organised integrated system of interaction is offered. To achieve this movement constructs that draw on broad terms of movement descriptions required by the language of Labanotation to create movement are used in combination with a noun-verb interaction model to communicate human actions that share a direct relationship to interactive system objects and operations. Underpinned by the development of an idea, as an organising principle, the framework supplies designers with a starting point to create interactions that align corporal motion with emerging uses of technology and product qualities. This allows for the interplay between different forms of interaction that unite movement with objects, actions and product qualities to be documented. The framework is described and illustrated by way of example and is extended to include mobile devices in its formation.

**KEYWORDS** Movement-based interaction, movement constructs, Labanotation

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**STUDY OF THE MEDIUM’S EFFECT ON ACTIVE IMPRESSIONS**

Users are assumed to not only receive impressions from products but also generate impressions within their minds. Furthermore, users are thought to have certain anticipations regarding products. We term the feelings concerned with these anticipations as “active impressions.” The purpose of this study is to investigate how active impressions occur in users’ minds by focusing on how media cause these active impressions. The results show that active impressions are involved in users’ feelings toward the products and may be affected by media wherein the impressions are received and generated.

**KEYWORDS** Active impression, Cognitive process, Emotional design

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**DESIGN FOR RIVER SIGN - A CASE STUDY OF MIKUMAGAWA RIVER**

This project decided upon rules for designing river signs and also designed a case-study. In Japan, a great variety of signs are used at rivers and their surroundings. The information on these signs is diverse. Signs include such information as the name of the river; prohibitions, rules and recommended behavior at the river and its surroundings; and introductions to the history and culture of the river and its locality. The signs are haphazardly placed, and lack rules about the presentation of information. In our opinion, this is a primary cause of people’s difficulty with comprehending the signs, and causes harm to the river landscape. Therefore, this project concerns the design of signs that will be easily understood by the people and prevent damage to the river landscape. In order to resolve these problems, the authors of this paper created the design rules and made them applicable to river signs. These design rules gradually evolved after multiple discussions with river administrators. The agreed-upon design rules were assembled as guidelines for river signs and distributed to river administrators within the Kyushu region. In addition, signs following these design rules were created and set up in a model area at the Mikumagawa River, whose watershed is Hita City in Oita Prefecture.

**KEYWORDS** Sign, River, Pictogram
72

**REGIONAL ORIGINALITY IN STREETSCAPES: A CASE STUDY OF THE URBAN LANDSCAPING DISTRICT IN NAGASAKI, JAPAN**

Yoshitsugu MORITA
Kyushu University

Hirotaka HIRAYAMA
Kyushu University

The objective of this study is to find a streetscape design plan that makes effective use of regional originality. This will be conducted clarifying landscape evaluation indicators that are part of recognized regional originality in urban streetscapes by using survey analysis that employs the Quality Karte evaluation and testing system, and conducting a comparative consideration of design providers and end users. The case study was conducted using landscape evaluation inspections of 4 streets in the Urban Landscaping District of Nagasaki City, Japan. Quantification theory type 2 was used to analyze the inspection results; streetscape evaluation indicators (of regional originality) were used as external criteria; and a separate set of 34 inspection result indicators was used as explanatory variables. These were divided into provider and end user.

**KEYWORDS** Streetscape, Regional Brand, Design Evaluation

84

**INVESTIGATION ON DESIGN METHOD AND THINKING OF CHAINREACTION GAME FOR IMAGE-BASED PROBLEM-SOLVING ABILITY**

Guan-ze Liao
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This study refers to the components of chain reactions assembly as the design concept for designing interactive games. The whole process of chain reaction consists of various scientific components such as gear devices and tool modules. The purpose of this study is to use the procedures in the CPS model (Creative Problem Solving) as the analytical model by Parnes (1967) in order to identify the game design method and comprehend the ability of users in solving image-based problem based on visual information in the whole process of game operation. The research results hope to explore the cognitive processes in image-based problem-solving ability, and can assist the designers to consider the design thinking of interactive games and strengthen problem-solving abilities.

**KEYWORDS** chain reactions, game design method, design thinking, problem-solving ability

87

**HOW TO DO GENDER WITH SHOPPING SPACE DESIGN?**

Li Zhang
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How to do gender with shopping? Gender, is one type of identities attached with consciousness and sense of being subject who as an agent processes autonomy of decision-making. Woman, while she owns right of self-governing to make decision in shopping, becomes an agent, even though she is still regulated and restrained by the structure that existed as enclosure of practice. This article has a triple assignment. First, I will briefly review the body of knowledge on gender performance and practice theory, which pertains to design of shopping space, to present dual nature of shopping and its space. Space design constitutes a physical surrounding for practice of shopping, meanwhile shopping as bodily involvement, occurs as a fluid narrative constituting women’s gender identities. Second, I will locate effective empirical research established on the S-O-R pattern with main findings in fields of consumer’s psychology and behavior related with environment design. Environmental stimuli in shopping space are converted into the following three aspects: lighting & color, layout & wayfinding, and display & decoration. Last, and of the most challenge, my specific intent is to clarify the network weaved by three dimensions, involving women’s gender identity as pleasure hunter, space design as acting stage and consumption as social practice. Space designers, with gender awareness highlighted here, would be more sensible and caring in future projects. Design, in this case, can be approaching its maximum value for the our society - humanity and harmony.

**KEYWORDS** shopping space, environmental stimuli, gender, practice
98

CONCEPTUAL DESIGN OF THE INTERACTIVE COMMUNICATION AND CARE ROBOT FOR THE OLDER GENERATION

This research conducted the daily schedule interview and living survey to four families with members of older generation who aged from 65 to 80, firstly. Then, a questionnaire survey to 86 old peoples about their daily schedules, health care problems and demand for interaction with family members and AIOS life style scale was executed. The study finds that elderly stay at home. These old people usually feature physical capability deterioration, long-term medicine taking, emphasis on exercises, etc; they feel lonely and like others company and interactions with their children or relatives. Thus, a scenario was developed to depict the health care and interaction demands for old generations.

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KEYWORDS: Older Generations, Health Care, Intelligent Robot

99

CURRENT PRACTICE OF DESIGN PROMOTION ACTIVITIES AND ITS INFLUENTIAL FACTORS

Design promotion is implemented based on the fundamental assumption that it promotes the use of design in a strategic way. With this assumption, design promotion aims to foster not only sustainable growth of economic competitiveness but also better quality of society. The existing studies in design promotion reveal that most design promotion system and its activities are similar across different nations and DPOs. However, as each DPO faces particular national conditions in social, economic and policy context, the same activity is likely to yield different results from country to county. So it is assumed that there would be certain factors that influence the management of design promotion. These factors can have a strong influence on DPOs’ management of their activities. There is no one ideal system which successfully deals with all design promotion issues. However, it would be possible to suggest what the DPO should consider more in a given situation, and how the barriers to design promotion should be managed by analysing the influential factors that act on the current practice of design promotion. This would help the DPOs strategically develop an appropriate and effective design promotion scheme which can successfully achieve their aims of design promotion. Understanding the relationship between design promotion activities and their influential factors would help manage design promotion activities in more strategic ways. It is expected that this study could become a milestone for DPOs to clarify their situations and help them build a design promotion model optimised for their own conditions.

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KEYWORDS: design promotion, promoting design, design support, design management
LET’S TALK WITH AN ATM: APPLYING HUMAN COMMUNICATION THEORIES TO HUMAN-MACHINE INTERACTION

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With advancement in business and communications infrastructures, artificial systems that require human-machine interaction have become common, be it automatic teller machines (ATM), airport check-in counters or shopping mall direction finders. The information architecture and flow of the interaction, on the screen, is often decided by engineers or programmers. This results in interaction experience that is cold and clinical. This paper describes a pilot research on how Theory of Speech Acts and Theory of Communicative Actions could be applied to improve human interaction with artificial systems such as an Automatic Teller Machine (ATM).

KEYWORDS: human-to-artificial interaction, human communication theories

PSEUDO HAPTIC IN AUGMENTED REALITY ENVIRONMENT BASED ON TOUCH SCREEN

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In Augment Reality (AR), human perception could help virtual object mixing with real environment to intensify its reality. Human’s sensory sometimes make a cross interaction on each other, by controlling visual effects and interactive feedback on touch-screen, we could take advantage of cross-sensory interaction to create an illusion of tactile called pseudo-haptic. In this study, we would implement pseudo-haptic AR system on a Tablet PC. Without any additional device, generate a sense of touch by pushing and pressing operation, probing into the mass and elasticity of augmented objects.

KEYWORDS: Augmented reality, touch screen, perception, cross-sensory, Pseudo-haptic
**123**

**A USER-CENTERED ASSESSMENT OF THE USABILITY OF DIGITAL GAME DEVICES FOR UPPER LIMB REHABILITATION THERAPY**

Rehabilitation device is an essential tool in the process of rehabilitation therapy. Upper extremity motor deficit is one of the main symptoms of stroke patients. In order to increase mental satisfaction and physical vitality in rehabilitation therapy, some therapists have tried to use the existing digital game devices in rehabilitation and found effective treatment outcomes in addition to enhancing the patient’s treatment motivation. However, these existing devices are originally designed for normal people with healthy physical and action conditions, not intended for rehabilitation therapy purposes or for people with physical disabilities. Further confirmation and evaluation is necessary to see if a digital game device can really meet the user’s usability needs in addition to its rehabilitation effectiveness.

The objective of this study is to understand the types of the existing digital game devices which have been used in clinical treatments, and to evaluate their usability in rehabilitation therapy by means of the user-centered design concept, and to summarize a guideline for the improvement design of such devices. 8 senior occupational therapists were interviewed. The main discoveries can be summarized as follows: 1) Therapists have positive opinion about the effectiveness of the digital gaming device intervention in rehabilitation, and the improvement of patient motivation toward the treatment. 2) Therapists consider that patients generally are willing to use the digital game for rehabilitation. 3) From the viewpoint of rehabilitation needs, the existing digital gaming devices still need to be improved in their design. Following are some guidelines for the design improvement related to these devices: a) To increase the response time of the games, b) To increase difficulty levels of the games, c) to expand the sensor’s sensing scope, d) To be able to record movement data, e) To provide a Chinese version of the software interface of the games, f) To improve the ways to fix the controller on the user’s hand, g) To fit the controllers to the different hand dimensions of the patients, h) To provide better correspondence between the games and real-life movements, i) To provide controllers for body control training, such as chest strap andbelt, j) To simplify the controller’s operation.

**KEYWORDS**
upper limb rehabilitation, user-centered design, usability assessment, digital rehabilitation device

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**124**

**CREATING MEANINGFUL BODILY EXPRESSIONS IN VIRTUAL WORLDS**

This paper describes an investigation into possible participatory design methods for creating an avatar’s performance to support meaningful interpersonal interaction in virtual worlds. The questions proposed for this study include how to observe and analyse people’s bodily expression and how to use that material in creation of meaningful animations of bodily expression that might be incorporated in avatar behaviour. Three possible approaches were identified and evaluated in practice: observation in public places, role-play, and analysing movie clips. Observations in public places and role-play appear to be limited and unproductive in this study. Analysing movie clips could be considered as a useful approach to engage people in creating meaningful bodily expression for avatars. This study to date demonstrated two benefits of the use of movie clips: 1. movie clips as artefacts could offer richer, more useful data for analysing bodily expression; 2. movie clips also could provide more reliable reference for designers and engaging participants in creating an avatar’s bodily expression. Besides, a preliminary scheme for understanding people’s experiences and viewpoints on bodily expressions of interpersonal interaction was concluded as follows: the phenomenon of empathy, the balance of status, the effects of environment, and the difference reactions in gender. This is the first stage research programme and the further research will focus on the practical knowledge of transformation of people’s bodily expression into an avatar’s bodily expression with participants. The outcome will include both evaluated practical methods and a theoretical scheme for understanding the interaction between designers and users.

**KEYWORDS**
participatory design methods, meaningful bodily expressions, virtual worlds, movie clips

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127

FROM REAL TO VIRTUAL PETS-THE EVOLUTION OF ARTIFICIAL COMPANIONS AS PET

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Real pets function as companions in human life and most owners believe that pets are family members or friends. However, real pets have problems of cleaning, care, nurturing space constraints, and other issues while the artificial companion, which has real pet function and can be substituted for real pets. The purpose of the study is to find out the design direction, understand the technical and functional changes of artificial companions, as well as the needs of users. The study analyzes the evolution of artificial companions from relevant literature, STS studies, and Need-hierarchy theory, and then infers the developmental trends to help designers develop new products. Finally, the evolution process is divided into five phases: Real interaction→Imagine driving→Mimicry of reality→Multiple activity→Intellectual interaction. The study also concludes that the developmental trends of artificial companions point towards the online virtual pet, and the online virtual pet will emphasize the self-expression and the social interaction on the Internet.

KEYWORDS Artificial companion, real pet, virtual pet

159

ESTABLISHING DESIGN KNOWLEDGE FOR EMERGING INTERACTION PLATFORMS

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While awaiting a variety of innovative interactive products and services to appear in the market in the near future such as interactive tabletops, interactive TVs, public multi-touch walls, and other embedded appliances, this paper calls for preparation for the arrival of such interactive platforms based on their interactivity. We advocate studying, understanding and establishing the foundation for interaction characteristics and affordances and design implications for these platforms which we know will soon emerge and penetrate our everyday lives. We review some of the archetypal interaction platform categories of the future and highlight the current status of the design knowledge-base accumulated to date and the current rate of growth for each of these. We use example designs illustrating design issues and considerations based on the authors’ 12-year experience in pioneering novel applications in various forms and styles.

KEYWORDS Interaction Design, Design Knowledge, Interaction Platforms

161

ECO DESIGN AND CREATIVITY ISSUES

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Eco design research topics concerning methods, models and tools developed for early product development stages are considered in this paper. An overview of Eco design field is presented with an insight into Eco design methods and tools. The paper explores potential of Eco design tools for creativity uplift during concept development. The paper reviews the continuing challenges for boosting up creativity and innovation potential of developing eco-consciousness considering recent findings in creativity and eco-innovation.

KEYWORDS Eco design, early product development design, creativity
167  
**CHILDREN’S ILLUSTRATION DESCRIPTIVE FRAMEWORK: ANALYZING CHILDREN’S PERCEPTION AND REPRESENTATION (4 TO 6 YEARS OLD)**

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This paper aims at disclosing to illustrators and designers the perceptive process in children, so that the creation of children’s books may benefit from it. How messages should be structured and what possible impacts they will have on children, namely in what concerns the enhancement of the child’s creativity and aesthetic sense. In order to make the analysis of the impact illustrations have on children, two distinct categories were identified: conventional and non-conventional illustrations. This categorization is supported by Massironi’s work (1982), whose research allowed us to work out this framework, which conveys an external description of the way perception and representation occur in children. Another reference in our work is Rudolph Arnheim (1954), particularly what concerns the psychological development of children according to different age stages as proposed by Piaget (1951). Based on that, a group of twenty children were asked to make drawings, after the presentation of specific books of both categories. Two experiments were created and the children’s reaction to illustrations in both books and their drawings were analyzed according to different parameters, which made it possible to assess the way the story was assimilated and how it influenced and stimulated children.

**KEYWORDS**  

171  
**CRAFTS AND THE SOUVENIR BUSINESS: TESTIMONY FROM A TOURISTIC CITY IN NORTHEASTERN BRAZIL**

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The paper provides descriptive testimonial on artifacts found in three important craft fairs at Natal, a touristic city in northeastern Brazil. Based on an exploratory observation at the chosen commercial points, the present study documents the status of the souvenirs business in the region as it faces touristic development. The study aims to discuss the role of crafts in the souvenir trade, particularly in the context of the very few formally educated designers at the market. A wide range of techniques, materials and utilities were observed. Symbolic aspects, such as the regional stereotypes and different levels of commitment to vernacular languages, as well as know-how prompted special interest during the observation. It was thus brought to our attention that marketing and legacy preservation should be conciliated if a culturally sustainable business is desired by producers, merchants, visitors and natives.

**KEYWORDS**  
Design, Crafts, Souvenir.

191  
**CREATING UNIFIED DESIGN THINKING THROUGH EXPERIENCE MAPPING**

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When design meets anthropology, user research uncovers the discrepancies between designers’ intended use of products and the everyday practices of cultures and societies. While ethnography has become a powerful observational and data collection tool, designers and researchers often find it challenging to transform instances into behavioral patterns and analytical frameworks so that research findings can live on as actionable design thinking. This article contends that when done collaboratively, experience mapping - a holistic visualization of user experience across time and space - facilitates analysis, and more importantly helps create a unified front among team members in their understanding of human behaviors and design aspirations.

**KEYWORDS**  
Experience mapping, Analytic framework, Collaboration, Design thinking.
**DEVELOPMENT OF MECHATRONIC-SYSTEM-EMBEDDED WOODEN TOYS BASED ON HOKKAIDO REGIONAL ORIGINALITIES**

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**KEYWORDS**  
robot toy, regional originality, building blocks, robot design, PIC processor, mechatronics

Hokkaido is one of the high quality wood production area in Japan, and ‘ezomatsu’ (Picea jezoensis) is one of the most typical wood which has been approved as a ‘Tree of Hokkaido’ from 1966. There are many woodcraft works and traditional toys such as ‘tsumiki’ (building blocks). We proposed value-added products by embedding mechatronic systems into the inside of traditional wooden toys. We described two mechatronic-system-embedded wooden toys applied the “ezomatsu”(Picea jezoensis) materials for these appearances: the mechatronic ‘tsumiki’ toy and the robot toy in the motif of Blakiston’s fish owl.

**GINGER: A SHOPPING CART INTERACTIVE PROGRAM. A CASE STUDY FOR RELATIONAL-CULTURAL THEORY AND ACTIVITY THEORY IN INTERACTION DESIGN**

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**KEYWORDS**  
interaction design, relational-cultural theory, activity theory

Empathy, authenticity and mutuality are three central tenets in relational-cultural theory. Although developed as a therapeutic process, when combined with activity theory, interaction designers can create relationship with users of their designed products. Technology often interferes with the growth of a relationship. Ginger, a shopping cart interactive program, is an application that demonstrates a growth fostering relationship between designer and user. Ginger guides the user through the grocery retail environment. The Ginger application was designed to improve shoppers’ connection with the grocery retail environment. Nutrition is central to human life. Eating the right foods can significantly impact one’s quality of life. With the capabilities of the Ginger application to provide an interface that can display readable nutrition information on a wireless device and tailor to the specific dietary restrictions of its users, it will enable shoppers to have a less frustrating experience while shopping for food.

**THE EVALUATIONS OF WAY-FINDING FOR VISITOR INFORMATION KIOSK IN THE NATIONAL MUSEUM OF PREHISTORY**

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**KEYWORDS**  
Kiosk, way-finding, Cognitive Map, In-depth interview

This study uses the Taiwan National Museum of Prehistory as an example, through the guide platform with 3D perspective diagrams, to evaluate whether such tools can deepen understanding for the movement paths for viewing at the museum. The wayfinding behavior explored in this study conducted through a performance experiment of 3D perspective diagrams wayfinding tasks via the public kiosks, with the goal of wayfinding in the real space of the environment. This study used the observation method on 12 first-time visitors, who use museum kiosks to find their destination in a wayfinding experiment. At the end of the experiment, in-depth interviews were conducted to understand problems that arose when subjects used the kiosks and in the wayfinding process. The results were as follows: It is suggested to decrease the amount of information on a single screen on the guide platform. There were two models that most subjects used in wayfinding: Model 1: Subjects used their memories or indicators to search for the destination. This type of subjects had better sensitivity for direction, and was more correct in identifying orientations. Model 2: according to the viewing paths and the indicators for path guidance, but they may lose their sense of direction in the long slopes. These viewers would use the referential pictures on the kiosks to recall their impressions to find the destination. The enhanced indicator guides in the decision-making points on the floors.
202

BASIC STUDY ON PLANNING OF DESIGN STRATEGY FOR AN AIRLINE - CASE STUDY ON STAR FLYER INC. (SFJ)

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In this study, on the basis of a new airline service between Haneda Airport and Fukuoka Airport, questionnaire surveys were carried out toward college students regarded as one of the customers to obtain the impression of SFJ and three competitive companies and the criteria for choice of the airline, and then a design strategy for SFJ in the future was examined by analyzing survey results. A factor analysis was performed for the evaluation of Image. As a result, two factors were extracted: “good quality” and “advancement”. A factor analysis was also conducted for the evaluation of Experiential Value, and it results in two factors of “Comfort” and “Specialty”. The survey analysis revealed that people regard the evaluation items related to the cost as the most important points when they select airline, followed by the items associated with the image of airline. As a result of Multiple Regression Analysis, for both of Image evaluation and Experiential Value evaluation, it was found that first factor and second factor together give rise to favorableness. As for a design strategy for SFJ in the future, it is concluded that the current directionality should be maintained for “A Design for Tangibles” which reflects in the evaluation of Image. For “A Design for Intangibles” which reflects to evaluation of Experiential Value, it is demanded to develop and push better service that provides comfortable feeling, security and the sense of fulfillment so that the first factor “Comfort” can be shifted more to the positive direction.

KEYWORDS
Airline, Image & Experiential Value, Design Strategy

209

TEACHING EXPERIMENT AND RESEARCH OF VISUAL STORY NARRATION DESIGN

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The popularity of story-telling in design has made it indispensable in the training of college design students. Based on the knowledge of emotional design, scenarios, and the psychology of reception, this research aims to help young designers create visual stories through an understanding of the processes involved in story-making with practical experience in applying various tips. We adopted the research method of teaching experiment, consensus assessment techniques, and evaluation of learning satisfaction, eventually proving that students participating in the experiment outperformed the control students in most of criteria associated with communication and emotional response from ads. The results of the teaching experiment using creative design tips on story-making reference cards could help other young designers to present visual storyness in product design and advertisements, as a means to impress audiences with unique and interesting experiences in developing lasting impressions.

KEYWORDS
Visual story narration, Emotional design, Teaching Experiment, Consensus Assessment Techniques
215  EMOTIONAL EFFECT OF FONTS DURING CHINESE READING PROCESS

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This research addressed how font selections affect reading emotions in Chinese reading. The paper assumed that: (1) font emotions could offer readers enough clues to arouse reader emotions when reading a narrative, which is emotion-absent itself; (2) reader emotions are enhanced or suppressed by font-article combinations. This interaction has also an effect on the speed with which an article segment is read. To examine the assumption, subjects were asked to read several article stimuli with different combination of fonts. By the use of eye-tracking, readers’ eye movements were recorded. After Repeated Measure of ANOVA was adopted, the result shows that font emotions do reach significant level to affect reader emotions, whether font and article emotions may not interact. On the other hand, in physiological, readers’ reading speeds were not affected by font selection. Styles of writing and difficulty might be the prime reason to affect readers’ reading speeds.

KEYWORDS Reading Emotion, Latent Semantic Analysis, Information Mass, Eye-tracking

220  THE APTITUDES OF INDUSTRIAL DESIGN STUDENTS TOWARDS ECODESIGN ACTIVITIES IN ENGINEERING COURSE

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This paper reports the experiences in ecodesign activities of first semester undergraduate students in the engineering course at Chiba University. The students’ concern with environmental issues and the practical works performed were analyzed and discussed. The results of the questionnaires have shown that the students believe the socio-cultural aspects have great impact on the solution of the current environmental issues. Based on the practical design works on the elements of nature (Water, Earth/Terra, Wind and Fire), the students focused on the technology (energy production and use) and social-cultural (message of natural elements) approaches.

KEYWORDS ecodesign, sustainable design, industrial design,

224  MATERIAL-INSPIRED DESIGN OPPORTUNITIES

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This study investigates ways to inspire designers’ creativity and enhance the design process using product materials’ tactility. Based on our previous study that implements a tactile experiment on tactile interactions with common and new product materials, we investigated the associated core emotions of the participants. We found the characteristics of the core emotions elicited by new materials are different from those elicited by existing materials. The new material produced more abstraction-based and original ideas and ways of thinking about material. In this paper we proposed an experiment that would investigate how to inspire original design ideas using materials, focused especially on materials’ tactility. In this experiment, we will confirm the process of inspiration from product materials in detail.

KEYWORDS tactile information, tactile stimuli, materials inspiring thinking and creativity
Composition of pictures is organization and arrangement of shapes and objects. It is a method of visually showing the interrelations between objects. The design of visual illusions is use of the gap in visual experience formed by visual cognition and real situation to display illusions. For understanding organization and arrangement of shapes and objects in visual illusions, composition (an act turning thoughts into pictures) has its significant meaning and value. This study investigates into the design of visual illusions from the angle of visual psychology, painting and design application, with an aim to devise composition methods of visual illusions and explain how they are designed. The survey in this research is divided into two stages. The first stage was done through literature analysis. Object layout in illusion design was discussed with different sources, and composition methods of visual illusions were also developed in this stage. The second stage contains the method of expert interviews by which we surveyed the relations between illusion category and composition method. We finally have the following results: (1) in the design of visual illusions, four composition methods - separation, adjacency, overlap and transference - are defined with the idea of coordinate axis according to the distance, locations and directionality between objects; (2) a survey of expert interviews shows that among all the 115 visual illusions, “overlap” is the main composition of 25 impossible figures, taking up 22 (88%). In the remaining 90 ambiguity images, 37 of them belong to “separation” (41%), 25 to “adjacency” (27.8%), 11 to “overlap” (12.2%) and 17 to “transference” (18.9%). We have offered definite composition methods of visual illusions for reference of graphic designers as they are creating figures.
USABILITY ANALYSES OF IPAD ELECTRONIC PICTUREBOOK

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The 3C products such as iPad, tablet PC, smart phone and e-book reader are unknowingly invading our daily life. For the new-generation of children, the time and opportunities for reading paper books hence become less and less while the time spending on 3C products are more and more. Therefore, the contents provided by those tools become a focus point of concern. The new reading equipments not necessarily enable the children to love learning and reading, but undeniably, equipped by e-book reader and combined with multimedia elements, the reading contents have provided a different reading experience. iPad, combined touch screen and multimedia, provide an experience of more intuitive operation than web pages and CD versions. The main purpose of the research is to understand the current situation of design and development of iPad electronic picturebooks and analyze their usability. The researcher used the ranking lists search and browsing in Apple Store for browsing various electronic picturebooks in great number. In the final stage, we screened out six different models to be used in iPad electronic picturebooks and conducted the analyses of usability. We selected by purposive sampling 12 adults (including six teachers and six mothers) and four six-year-old children (2 boys and 2 girls) who had experiences of using iPad. The subjects at first browsed six electronic picturebooks. Then 12 adults filled out the questionnaires, four children were interviewed and their operations were observed to understand their preferences and the uses of the products. The research of research found that the commonalities of the design of iPad electronic picturebooks a) dominated by page style; b) focused on linear development; c) most of interactive designs of story contents are clicking the objects on the screen; d) provided different languages and audio versions; e) most of them adopted the design of limited animation in which they used zoom-in and zoom-out and diversion techniques to show animations. Besides, both the adult and child subjects suggested: a) iPad electronic picturebooks are more lively and interesting than the printing picturebooks; b) the readers could involve the decisions of font sizes and placement; and c) the story contents could have more dynamic effects and designs of interactive games. The recommendations for future publishers and designers were: a) take advantage of elements of interactive design in multimedia; b) increase the interaction of the story; c) strengthen the control power of users; d) create all-new e-picture books.

KEYWORDS  
e-PictureBook, e-Storybook, e-Book, iPad Picturebook, Usability
INVESTIGATING HOW THE FMCG INDUSTRY EMPLOYS DESIGN-DRIVEN APPROACHES: THE DICHOTOMY BETWEEN LITERATURE AND PRACTICE.

In recent years there has been a growing discourse regarding the emergence of a new role for design - one that involves design thinking and design-driven innovation. This new role affirms design integration into all the organisational activities required for strategic deployment. However, there has been little research looking at how such approaches are employed and can influence the transformation of culture within a specific industry situation. According to the fast moving consumer goods (FMCG) industry status quo, organisations demand fuel to ignite the transformation of brand development. Therefore, this paper discusses the features of design-driven approaches identified within contemporary literature via content analysis and provides a framework for how FMCG corporations employ design-driven approaches when developing brands. The research was conducted in three phases: Firstly, through content analysis, design-driven features at different levels - cultural, strategic, and tactical/operational - are identified. Secondly, based on the identified features, a survey (conducted with corporations and consultancies) explicates how design-driven approaches are employed in FMCG industry. Thirdly, a comparative analysis of theoretical and empirical findings supports the development of a framework for employing design-driven approaches in FMCG industry. The findings demonstrate a distinct gap between the theoretical and applied use of design within FMCG brand development. The main argument of this paper involves diagnosing current phenomena as comparing the literature and practice. Then, a framework from the comparative analysis explains how an organisation can embrace design-driven approaches in its brand development system.

KEYWORDS Design Thinking, Design-Driven Approaches, FMCG Brand development, Design Management

PRECEDENT PRODUCT FORM STYLES OF CONSUMER TYPE DIGITAL CAMERA SERIES OF DIFFERENT BRANDS

This study is aimed at revealing the underlying factors of precedent product form and the roles different design elements and their form treatments play in the product form styles. In this study, the semantic differential experiments are undertaken to explore the underlying factors of precedent product forms so as to uplift the quality of product from design. Product image samples of Canon IXUS, Sony Cyber-shot T, and Nikon COOLPIX series from 2000 to 2010 were collected for the perceptual and purchase intention tests.

KEYWORDS product form, precedent products, purchase intention, Kansei engineering
274

**EXTREME SURGICAL CONTEXTS: THE PERSPECTIVE OF INDUSTRIAL DESIGN ENGINEERING**

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Healthcare has an increasing presence in the agenda of both design practice and design research. In the particular case of surgical care, the specialized products designed to be used in advanced operating rooms (OR), sometimes have specific characteristics that do not allow for proper functioning in poor-resourced settings or in contexts of emergencies such as natural disasters. Diverse literature identifies barriers to healthcare and medical device innovation that are relevant for designers and ought to be considered throughout all product development process. In this paper, the reviewed contextual barriers to the use of medical devices are translated into examples of design relevant interventions. From business approaches to technical details, design engineering practice has within its domain the potential to overcome some barriers. Most importantly this research attempts to contribute to the practice of design by 1) enriching existing literature about methodological approaches to design for complex contexts and 2) creating an information platform that supports the stakeholders involved in the development of surgical equipment, designing more context adequate products.

**KEYWORDS**  
Research-by-design; Surgical design engineering; Barriers to emergency surgery;

280

**EFFECTIVENESS OF DESIGN-BASED LEARNING IN ENGINEERING EDUCATION**

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Design-based learning (DBL) has been introduced as an educational concept at Eindhoven University of Technology (TU/e) in 1997, in which students work co-operatively and actively on multidisciplinary design tasks (Wijnen, 2000). Theoretically DBL is not well underpinned. It has been researched empirically in secondary education (e.g. Apedoe et al. 2008), but hardly in higher engineering education. Therefore, research is needed. Especially, it is relevant to characterize the specific features of DBL that contribute to DBL as an effective learning environment in design education. The aim of this study is to characterize DBL as an approach to effective higher engineering education.

**KEYWORDS**  
design-based learning engineering education
281

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USING SCHEMATA AS A COGNITIVE DESIGN PROCESS: A CASE STUDY OF DRAWN COGNITIVE MAPS AND ENVIRONMENTAL PERCEPTIONS AND EXPECTATIONS

An issue that is rarely focused on in design education is the psychology of design. How does one discover how to design? Is it based upon experience and prior knowledge? Is it based on the exposure one receives from exposure to so called “good design?” Or is the ability of design instincutal? This research dedicantes how individuals know what to do in a specific interior spaced based upon previous experiences and spatial knowledge. A conceptual taxonomy and methodology are created based upon the projection prior to the specific event, while in the actual event, and recall after the event. Using drawn maps and content analysis, this study addressed and evaluated the statistical results and relationships between: (a) The amount of travel experience a person has and the impact of this experience to upcoming travel experiences, and (b) Identified the objects and events one indicated as a significant element - however defined by the participant - within the airport terminal. Significant results showed events after the travel experience, identified as POSTceptions, (based upon a projected and drawn mental maps of specific environmental spaces, utilizing schemata from projected mental maps and previous, although not always similar, user experiences) were greater in frequency and significance than those who anticipated specific events prior to the travel experience, identified as PREceptions (similar to POSTception, but based on anticipated events that could occur within the space). These experiences, especially those significant in nature include: circulation paths, wayfinding signage, indication and location of restrooms, queues, and airport employees.

KEYWORDS Design process, schemata, cognitive maps, perception, experience

284

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AN INTEGRATED LABORATORY ON PRODUCT DESIGN AS A LOCAL DEVELOPMENT FACTOR: A BRAZILIAN CASE STUDY

The Brazilian industry, strongly bound in the south and southeast of the country lacks a systemic action for the development of new products in other regions, contributing to the reduction of economic and social regional differences. This proposal presents the experience of an Integrated Laboratory for Product Design and Engineering (LIDEP), with a multidisciplinary and systemic approach, whether in product design from the local demands presented, as in technology transfer of product design, prototyping and design management for businesses and institutions in the region of Montes Claros, in the northern of Minas Gerais state, Brazil.

KEYWORDS Design methodology; local development; sustainable development.

295

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A STUDY ON COLOR SCHEME IN CHINESE COMMERCIAL INTERIOR SPACE

Chinese building trade is developing rapidly now. Chinese local color scheme should be investigated to make international design communication go on smoothly. The objective of this research is to investigate the characteristics of color scheme in Chinese Commercial interior Space. A field survey was done in 6 major cities in China, 240 samples were collected. Color distribution and Comparison of different cities and different type of commercial space are being analyzed with color hue, chroma and value of each sample. As the conclusion, characteristics of color scheme in Chinese commercial interior space will be arrived.

KEYWORDS Color Scheme, Local Culture, Commercial Space
THE SOCIAL INTERFACES DEVELOPMENT FOR CULTURAL CREATIVITY INDUSTRY: A USER-CENTRED DESIGN CASE STUDY ON CHINESE SHADOW PUPPETRY

Since many exhibitions are not designed as convivial experiences, many people have all experienced not being able to take part during group interaction. Social interfaces support people working, learning, playing, and discussing together. The study aims to design and validate prototypes of social interface based on a design case study of the digital shadow play exhibited in a museum. This paper will answer the basic research questions of the design: the context of use, the role of usability, the mode of the social interaction, and the influence of the contextual affordances. This study will stimulate creativity through understanding the culture context of the heritage. The findings will provide the design principle that is devoted to the creation of intuitive, user-friendly interfaces.

KEYWORDS: social interfaces, cultural creativity industry, digital shadow play

STUDY ON SEMIOSIS OF HUMAN BEHAVIORS AFFORDED BY ARCHITECTURE AND URBAN SPACE USING MULTI AGENT SYSTEM

The purposes of research are to show a way to analyze architectural/urban space and to consider a spatial design method, through human behaviors in a daily situation. In architectural or urban space, there are infinite elements like people, buildings, trees, and so on. They interact constantly with each other and the composition is changing perpetually. So in this study, architectural/urban space is understood as a discrete system, where all the elements continuously interact and change in discrete time. The system is analyzed focusing on the human behavior, in order to understand the interrelation between people and architectural space. These 4 steps are followed; 1) Observation and description of human behaviors 2) Analysis of the description and extraction of main spatial behavioral rules 3) Spatial behavior modeling and simulations with Cellular Automaton based on the extracted rules 4) Consideration of a space design resulting from the comparison of the spatial characteristics of the simulated and the observed spaces.

KEYWORDS: human behavior, architectural and urban space, semiosis, multiagent-based system, Cellular Automaton

PLAYFUL ACCESSORIES. DESIGN PROCESS OF TWO OBJECTS TO ENCOURAGE FREE-PLAY EXPERIENCES

In this paper we describe the design process of two playful accessories for children to play anywhere and anytime. We explain ethnographic phase to define a General Design Concept to design objects to encouraging free-play. We describe the two interactive designs emerged from this concept and the preliminary results of user's evaluation. The General Design Concept propose the use of playful accessories for children; simple interaction systems embedded in eve

KEYWORDS: free-play, accessories, augmented.
WHAT DOES IT MEAN TO USE A METHOD? THE ROLES OF METHODS FOR EXPERTS AND NOVICES DEALING WITH UNCERTAINTY: A QUALITATIVE ANALYSIS

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Petra Badke-Schaub  
Delft University of Technology

Design is inherently uncertain. Therefore - aiming to support the designer - it is important to know how expert and novice designers deal with uncertainty. Historically, design methods have been proposed as a way for designers to solve complex and complicated problems systematically, thus reducing uncertainty. But do designers use methods like this? In this paper, we describe a study, which aimed to investigate how designers experience uncertainty in a design planning activity under time pressure. We assessed the design behavior of experts (more than 10 years of experience in practice) and advanced beginners (between 1 and 3 years of experience in practice). The results suggest that designers - novices and experts - articulate different purposes for the use of methods that go beyond the use of method as systematic instructions.

KEYWORDS design methods, designer-centered, uncertainty, practice

GAME-PLAYING IN INTERDISCIPLINARY DESIGN AND PLANNING TEAMS

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In this paper we present our experiences in setting up and fulfilling a role-play simulation in an academic context. This simulation was set up three times now with about 250 students each time. The students involved are in their final semester in the Bachelor of the Faculty of Architecture and learn how to work in interdisciplinary design and planning teams. Main goal was to teach them how to deal with expert targets in relation to interdisciplinary negotiations in a decision arena. Students had to optimize different expert sub solutions to come to an integral Master Plan for an outdated industrial area of 130 ha in The Hague.

KEYWORDS Interdisciplinary design and planning teams, inter organisational collaboration in multi actor decision arenas, gaming, simulation.

THE VALUE OF OPEN-ENDED PROBLEMS IN DESIGN PEDAGOGY

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In a traditional design studio, students are assigned framed problems with a stated solution at the start of a project. Students approach the problem knowing the outcome will be a brochure, logo, website, etc. However, as the student enters the design field, they will not solve prescribed problems, but approach problems from a variety of angles. To move away from artifact based problem solving, this paper presents a case study using open-ended problems. Open-ended problems focus on research, strategy and process. No deliverables were stated, rather questions were asked to enhance student exploration. Students became self-learners and self-starters, using critical thinking skills to evaluate possible solutions. Posing an open-ended problem resulted in research-driven diverse solutions.

KEYWORDS design pedagogy, open-ended problems, design research
335

‘I DON’T UNDERSTAND WHAT KWH MEANS’ SIMULATE ELECTRICITY CONSUMPTION DATA PROVISION TO HOUSEHOLDS

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Deit University of Technology

The smart metering technology is currently being implemented in European households. This technology offers a possibility to record and retrieve energy consumption data in real time. This provides a technical foundation to develop new type of home energy monitoring devices; a device presents this data to households may influence the inhabitants’ energy consumption behaviour. This paper presents the study on how inhabitants would understand their consumption data. The authors carried out research with 16 participants from four households in The Netherlands regarding what the consumption data means to people’s living. This study demonstrated that people could not grasp the raw data from a whole household but had a better understanding of detailed information associated with certain appliances and periods of routine. The paper describes the user study, results, and discusses recommendations on designing for products manipulating the energy consumption data in home.

KEYWORDS design research, behavior change, smart meter

336

SIMULATIONS: HANDS-ON EDUCATION AS A SPATIAL LEARNING TOOL.

Andrew Phillip Payne
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The Sight, Sound + Movement accessibility workshop offers architecture students the opportunity to simulate various disabilities. Simulations include reduced/loss of vision and mobility impairments such as a single user wheelchair, companion wheelchair and temporary impairments including a leg brace with crutches. The exercises conducted during this multi-day workshop are not intended to convey the actual experience of the impairment or “what it's like to be blind” but rather how the built environment and routine design decisions impact the user’s ability to use, experience and navigate space. Interactions with toilet stalls, sinks and accessories, entry doors, stairs, elevators, ramps, parking and building materials are just a few of the opportunities students are exposed to during the simulations.

KEYWORDS Usability, Inclusive Design, Architecture, Design Education, User-Centered Design

337

REACHING INCLUSIVITY BY RE-DESIGNING EXISTING FACILITIES FOR THE HANDICAPPED ; WITH THE CASE OF TEXTURED PAVING BLOCKS

Hyejung Park
Individual

This paper aims to raise awareness to the importance of inclusive way finding methods in public spaces. I propose an inclusive solution using textured paving blocks at the site of COEX mall the largest entertainment mall in Seoul, South Korea. To begin, I have researched the accessibility, availability and affordability of the COEX mall in order to assess its inclusivity. I then surveyed the current way finding conditions of this site. From these studies I found that COEX mall lacking in its facilities for visually impaired visitors. Textured paving blocks are needed as they hold the potential to be an inclusive indoor way finding. The blocks orientation in space, size, spacing, color and pattern have been carefully considered to be safe, informative, and comprehensive for all types of users: the visually impaired, wheelchair users and able-bodied people.

KEYWORDS Inclusivity, Way-finding, Diverse Types of Users, Textured Paving Blocks
FOSTERING TOMORROW DESIGNERS: AN APPROACH TO INCORPORATE SUSTAINABILITY INTO THAI DESIGN EDUCATION

Although designers could cause ecological, economical, social and cultural problems threatening us, they could also direct us to a sustainable direction. Sustainability education for design students - our future lifestyle shapers - is undoubtedly crucial to ensure our sustainable future. This paper investigates whether a design project-based approach improves or deteriorates sustainability education. The paper presents methodologies employed to collect information and discusses key findings from the comparison and analysis of three sustainable design projects for undergraduate industrial design students in terms of key factors influencing each project learning outcomes - the students’ knowledge and understanding of sustainability and sustainable design. The paper concludes with results and recommendations for preparing more effective design studio courses on sustainability for the future that may be applicable to other pedagogic approaches for sustainability education. The results have demonstrated that within an appropriate setting, ‘project-based’ approach considered as ‘experiential learning’ can be beneficial for sustainability study in undergraduate industrial design education by allowing students to build up their knowledge and understanding of sustainability as well as sustainable design skills through their learning by doing experience. Moreover, to achieve sustainability learning outcomes of design project-based learning, not only appropriate teaching and learning strategies are required, but also the sustainability topic’s contents. Furthermore, the project’s scope and complexity need to be consistent with the students’ maturity, knowledge, experience and design skills; otherwise, students’ proposed sustainable design solution will be rather conceptual. Sustainability will remain theoretical for students and difficult to integrate into their professional practice.

KEYWORDS Sustainability Education, Sustainable Design, Project-Based Learning

EXPLORING THE EFFECTS OF STUDENT-TEACHER INTERACTION IN INTERDISCIPLINARY EDUCATION FROM ART AND TECHNOLOGY WORKSHOP

The purpose of this research is to probe how student-teacher interaction, especially in arts and technology workshops held in Taiwan, influences interdisciplinary collaboration and learning. Using interactive theory, observations made during the workshops were analyzed individually to find recurring themes and cross-comparisons between workshops made, conclusions based on analysis of the data were then drawn. In order to ensure validity and reliability, triangulation was used to cross-examine collected data. The results show that five factors affect student/instructor interactions: differing backgrounds, language differences, teaching content and purpose of the workshop, requirements of the workshop, and the influence of new relationships.

KEYWORDS interdisciplinary, art and technology, student-teacher interaction, workshops
**EVALUATION OF MOBILE DIARY TOOL’S RECORDING MEDIA FOR SELF-REPORTING IN OBSERVATIONAL SITUATIONS**

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We provided a mobile phone application, Mobile Activity Probes 3 (Mobile AP3), based on the Android smart-phone platform, to support collecting data in different media formats for subject self-reporting: notes including photos, text, drawings and audio. The aim was to gather a rich harvest of data from the field, to yield insight into the immediately perceived reality of the user’s experience. The primary purpose of this study was to understand how the media used in different observational situations affect the self-reporting of subjects, and to clarify the full constellation of subject responses and behavior as they relate to conditions in the field.

**COMPARE AND EVALUATE FORMATS FOR USING A MOBILE PHONE TO SELF REPORT MOMENTARY EXPERIENCES**

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In this study, we constructed the Mobile Activity Probes II system (Mobile AP II). It allows a participant to use the “Sha-Mail” function of their mobile phone, with a recording format, to post momentary awareness and experiences to Mobile AP II in real time. In this way we hoped to reduce the burden on the participant of becoming familiar with new equipment, to decrease compliance problems, and to improve the quality of participants’ descriptions. The purpose of this study was to examine differences in the effect of the reporting format by using Sha-Mail to report moment-by-moment experiences in the field.

**DESIGNING AS DEMONSTRATION: INTEGRATING INDUSTRIAL DESIGN PROJECTS WITHIN PHD RESEARCH**

miles park  
UNSW

PhD research that integrates modes of design practice has gained popularity and acceptance in the art and design sector in recent years. Correspondingly, a body of literature and debate has developed around its distinctiveness, legitimacy and qualities. Disagreement still abounds on many fronts including the use and meaning of certain terminology, distinctiveness of design research practice compared to other fields of research and other forms of design practice; as well as debate on appropriate modes of practice methods, quality and rigor. In the meantime an increasing number of completed Design PhDs offer researchers examples of how design practice can be mobilised in Doctoral research. This paper discusses a recently completed PhD in context to distinctiveness and a particular mode of design research practice. The example PhD investigates the role and potential of Industrial Design to confront product obsolescence in consumer electronics sectors. The adopted research methodology contains design projects that are best described as ‘design as demonstration’.

**KEYWORDS**  
User experience, Self-reporting, Activity Probes  
Experience Sampling Method, momentary experiences, Mobile Activity Probe  
Design projects in PhD research
372

INTRODUCTION OF A NEW METHOD FOR PRODUCING CUT PAPER STENCILS FOR DYING -- AS AN APPLIED CASE OF LASER CUTTER --

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Kimonos are traditional Japanese garments. Several types of dyeing artifacts have evolved through the process of printing traditional patterns on cloth in Japan. Paper stencils can be considered merely tools used at an intermediary stage of the dyeing process. And yet another problem is that most stencil cutting craftsmen are getting older, and thus the traditional art of paper stencil cutting may be lost under present circumstances. In this study, we explored the possibility of replacing paper stencils produced by traditional techniques with those produced by a laser cutter. And we compared actually dyed textiles by using existing and new techniques, in an attempt to achieve a quality of paper stencils produced by a different method that is closer to the superb quality of traditional artifacts. Judging from the results, reproducing the technique of consecutively cutting numerous dots like kiri-bori (which has 100 holes cut within the space of under 1) or patterns comprising consecutive straight lines in pursuit of the beauty of micro patterns like shima-bori (which has 11hairline stripe (22 knife cut) to lie within the width of 1cm) was deemed difficult using laser-cut paper stencils. As a result, we were able to suggest the guidelines on materials and patterns to exceed the condition mentioned above for producing the stencils with a laser cutter.

KEYWORDS Paper Stencil, Printing, Laser Cut

376

WHAT EVOGES YOUR EXPERIESCES?

Hyangah Kim
KAIST

For the last several decades, User Experience (UX) has been dealt with as the interaction between a single user and a product. Even though some studies have started to consider the social interaction of User Experience, there have been few studies that have focused on the process of sharing experience through internet. This study investigates how experiences shared through internet evoke the viewer’s experiences. We discovered that characteristics of shared experience have an influence on the evoking of a viewer’s experiences.

KEYWORDS Use Experience, Sharing experience, Co-experience

400

AN INVESTIGATION ON THE INFLUENCE OF EMOTIONAL APPEALS ON PURCHASE INTENTIONS IN OUTSTANDING PRINT ADVERTISEMENTS

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In terms of emotional appeals, both positive and negative emotional appeals in award-winning advertisements can trigger the intention to make a purchase. The advertisement recall for negative emotional appeals in both award-winning advertisements and in regular advertisements was found to be stronger than that for positive emotional appeals. As a result, this study suggested that creative advertisements with negative emotional appeals could successfully attract the curiosity and attention of consumers. Used creatively, the impressions caused by negative emotions could be reduced to increase consumers’ purchase intentions and advertisement recall. This study also analyzed the design forms and contents of both award-winning advertisements and regular advertisements. It is hoped that the results can be used as a reference for the design of print advertisements.

KEYWORDS creative advertisements, emotional appeal,
# SIMPLE, COMPLEX, INNOVATIVE: DESIGN EDUCATION AT CIVIL ENGINEERING

In faculties such as Civil Engineering, design is not a core activity. Core activities at Civil Engineering are structural engineering, structural analysis, mechanics, fluid dynamics, etc. Design education has a relatively small share in the curriculum, compared to faculties such as Industrial Design or Architecture. Against this background, our group has developed a design track within the Civil Engineering curriculum. This design track starts in the Bachelor phase with design fundamentals, continues with methods and skills for dealing with complexity, and culminates in the Master phase with innovative design approaches based on concepts such as living systems, parametric design, product development and life cycle thinking.

**KEYWORDS**
- design education
- civil engineering
- living building concept

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# APPLYING VIRTUAL REALITY FOR PARTICIPATORY DESIGN: SUPPORTING END-USERS IN THE DESIGN PROCESS OF AN ENDOSCOPIC OPERATING THEATRE

This paper describes the design and testing of a Virtual Reality design tool for operating theatres. The Virtual Reality design tool supports stakeholders of dedicated endoscopic operating theatres, such as surgeons, nurses and anaesthetists, with the design of operating rooms arrangements. It enables them to create new concepts regarding ceiling mounted arm (CMA) systems in a virtual environment and makes consequences of design decisions visible early in the design process. The tool comprises a dedicated Virtual Reality environment that is used in a Participatory Design workshop especially developed for this purpose. Participants can create room arrangements by the use of miniature representations of the ceiling mounted arm systems. These concepts can immediately be tested for usability in a virtual environment. Stakeholders can immerse into the created operating theatre concepts by the use of moveable avatars and gain insight into the consequences of the design decisions they have made. A facilitating team of designers can gain information about the stakeholders’ preferences, needs and priorities during the workshop discussions.

**KEYWORDS**
- healthcare design
- virtual reality
- participatory design
- dedicated operating theatre
- operating room
- endoscopy

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# DESIGNER EXPERIENCE - DESIGNING IN EXPERIENCE

In this paper, we introduce a new paradigm for performing user-centered product or service design on an experiential level. We call this approach Designer Experience, meaning design activity that takes place within an experiential system similar to the one that the eventual product or service will be used in. After a brief discussion of the inadequacies of user-centred design and experience in general, we explore the various aspects of Designer Experience and the ways to invoke it. A case study regarding the representation of users’ contextual systems to designers is presented. Our experiences with the UCD Holodeck system acted as an inspiration for the definition of Designer Experience and as a validation in order to illustrate one potential path towards Designer Experience.

**KEYWORDS**
- user-centered design
- user experience
- designer experience
421

PRODUCT-INTEGRATED SUSTAINABLE ENERGY TECHNOLOGIES - SIX YEARS OF EXPERIENCE WITH INNOVATION IN DESIGN PROCESSES

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Our paper shows the effects of different industrial design methods on 91 product concepts that have been developed during six design cases executed from 2005 until 2010 by students of Industrial Design Engineering in the Netherlands. It is shown that the application of 9 differently selected industrial design methods can yield innovative products with sustainable energy technologies that could be technically feasible. By an evaluation of the appreciation of the resulting product concepts it is found that the following three methods apparently are most beneficial: platform-driven product development, TRIZ and Innovative Design&BStyling. Certain combinations of methods tend to lead to a higher appreciation for a resulting product concept. Seemly Innovative Design&BStyling plays a key role in finding appropriate product applications for integrated renewable energy technologies and energy-saving technologies.

KEYWORDS Design for Sustainability, Design processes, Renewable Energy

429

SUSTAINABILITY IN A CARPENTRY FACTORY OF AN ASSOCIATION OF SCAVENGERS CHARACTERIZED BY SOCIAL RISK: A CASE STUDY

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This article presents a research done at ASMARE (Paper, Cardboard and Reusable Material Collectors Association), in Belo Horizonte, Brazil. ASMARE is a “scavengers” association that screens recyclable waste to sell it to recycling companies. Our purpose was to evaluate the potential for sustainability and the current practices of one sector of this organization, a Carpentry Factory. Among the many activities that take place within ASMARE, this analysis focused on its small carpentry factory, a place where workers manufacture objects from reused and recycled materials.

KEYWORDS social risk, reuse of materials, “ecoplacas”, sustainable design procedure

433

IDEA-BROKERING WORKSHOP - A RAPID INNOVATION METHOD THROUGH INTERCONNECTING DIFFERENT CONTEXTS

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The paper describes the significance of disruptive innovations in the corporate world today, and how workshops can be effective to achieve this. We developed a method called idea-brokering workshop, which a group of people with relatively high homogeneity could gain rich and diverse perspectives and be able to generate new product ideas in a short period of time. We applied this method and organized ‘Innovation Workshop for IN’, where majority of the participants were Japanese and generated product ideas aiming IN. As a result, many novel ideas were generated and have received positive comments from observers from Japan and IN, and participants. Deficiency in two core sessions, namely Download and Inspiration Session, were discussed for future development.

KEYWORDS idea-brokering, design workshop, human-centered innovation
437

A COMPARISON OF CONTEXTUAL EXPLORATION AND MENU NAVIGATION INTERFACE DESIGNS IN CHILDREN’S ARTS LEARNING WEBSITE

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Most of the children’s websites nowadays have gradually transformed from data and text content to story and image focus, but menu list is still the principal guideline for the interface design. However, in view of different psychological characteristics between adults and children, can we break the structural criteria for children to freely explore the website? The present study created a children’s art learning website to examine the question. Two different simulated navigation ways: Contextual Exploration and Menu Navigation were designed. The participants were enrolled from public elementary school in northern Taiwan. Their ages ranged from 10 to 13 years. A series of expert interview, participant observation and experimental questionnaire were adopted for the comparison of the findings, and qualitative and quantitative data analyses were performed. Both navigation ways are enjoyable, but the findings showed a mixed situation. The results of expert interview and questionnaire showed that the design of Menu Navigation may be superior to that of Contextual Exploration in the children’s art learning website. However, we were not sure to this point according to the views of experts of children’s education and the result of participant observation. Further studies are needed to corroborate these findings.

KEYWORDS user centered design, interface design, contextual exploration, menu navigation

448

A STUDY OF THE LEARNING PROBLEMS OF UNDERGRADUATE INDUSTRIAL DESIGN STUDENTS IN STUDIO COURSES

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The purpose of this study is to explore the learning problems of undergraduate industrial design students in studio courses. A questionnaire consisting of both closed and open questions was designed to collect data. The results of the survey illustrated that 1) the students regarded concept generation the most difficult task; 2) the major problems that students experienced were organizing and structuring design documentation, physical model making for design presentation, and selection of the design direction in the design research phase; 3) these main problems were related to personal issues. The results can serve as a reference point for future research and design education.

KEYWORDS Industrial design, learning problems, design studio
461

PROTOTYPE EVALUATION IN SERVICE DESIGN: A CASE STUDY AT AN EMERGENCY WARD

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Prototypes based on user research are embodiments of hypotheses about how behaviour and experiences will change. The purpose of prototypes has been discussed in academic literature but in the case of service design, some of that knowledge needs to be re-examined. In Service design, one of the problems is that the impact of prototypes is complex and difficult to predict. A way to counter this dilemma is to put more focus on making the hypotheses explicit and testable. This paper presents a practical process for using designers’ hypotheses to generate survey tools for evaluating the impact of prototypes in service systems. This is also a way for designers to verbalize the purpose of service prototypes in a contextual and situated way. The tool was designed to be quick, easy, and light-weight, to suit the needs of design consultants, and it focused on measuring the experiences of a waiting room from the perspective of the visitors. The process has been applied to a project where the waiting room of an emergency ward was redesigned. The three-step process started with building up the hypothesis structure, where the designers’ assumptions and intentions were used to make a representation of the hypothesis. The next step was formulating questions, where questions that tested the hypothesis were formulated. The last step – making the questionnaire – included the selection of what information to gather and iterative testing of the questions. It was found that the designers did not have a well-defined hypothesis. The suggested process can help designers identify a contextual and situated purpose for prototypes.

KEYWORDS
Service Prototyping, Prototype Evaluation, Case Study, Service Design

465

MAPPING PERFUME FRAGRANCES FOR PACKAGING DESIGN: THE USE OF ARCHETYPICAL DESIGN CHARACTERISTICS IN CONCEPT DEVELOPMENT

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Claessens Cartils

Oscar Person
Delft University of Technology

Jan Schoormans
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A method is introduced that underscore the design process of perfume bottles. This method defines bottle characteristics that correspond to specific odors. We designed 32 systematically varied non-branded bottles that differ in roundness, elongation, material and color. 450 Female participants rated the bottles on anticipated scent (‘floral’ - ‘less floral’; ‘light’ - ‘heavy’). They also rated to what degree the bottles fitted with the metaphors of romance, sensuality, elegance and activity. Results show the perceived association between bottle characteristics and odors. The method was successfully used to design a new perfume bottle for a well-know fashion brand.

KEYWORDS
Perfume, packaging design, design approach
DIVERSITY AND UNITY: MORPHOLOGY OF ARCHITECTS AND ENGINEERS

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The new demands for a more sustainable built environment, as well as the need for a comfortable and healthier indoor environment, lead to a more complex design process. This has consequences for the role of the different designers involved in the building design process. Their different expertise must be used more effectively to reach together better solutions. In this research the effect of using morphological overviews was investigated, as well as the relation of morphological overview as a kind of mental model of the design team. The effect of application of morphological overviews was positive on the overall team performance. However the results were different for architects, they evaluated the appropriateness positive but still it was found that there was decrease in the number of functions and solutions generated by them. Unifying different disciplines is complex given the diversity of the building design team members. More research is necessary to determine if it could prove to be useful to use of morphological chart in combination with a mental model of the design team.

KEYWORDS architects, engineers, culture differences, morphology

ORNAMENT AS A DOMINANT TENDENCY OF HOUSEHOLD PRODUCT DESIGN IN KOREA

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One of the extraordinary phenomena of product design in Korea lately is ornamental tendency and its surface treatment. It is curious why industrial design, which traditionally has posed as a favorite of machine aesthetics, is interested in decoration and even tries to resemble works of art. Of course, it is certain that this must be a solution of emotional marketing to artificially create a new demand by breaking through the saturated market. However, this may not be accurate as an answer to “why ornaments, especially surface ones?” Probably, surface ornaments are the content or substance that implies a cultural archetype that can be caught from the base of the Korean design phenomenon. This paper proposes a deductive supposition that at the very point which is difficult to grasp by the epistemic frame of dominant discourse, the ‘grammar of ornament’ manifested in the history of western design, the DNA of Korean design will be revealed.

KEYWORDS Ornament, Product Design, Korea

ACTIVISM, EVENT AND THE TRANSMISSION OF PRACTICES DESIGNING WITH BEHAVIOR FOR BEHAVIOR

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In Helsinki, summer 2010, a group of friends challenged each other to just consume at local independent stores for two weeks long. This challenge became an event of public calling for controversy, rallying support for small independent shop owners, in opposition to large retail chains. This forms the premise of a case study, according which this paper will argue that the design of an event as such is not only relevant in forms of activism, but is also relevant for design in general, especially when design addresses behavior change or lifestyle change. A qualitative study based on Maffesoli’s theory of neo-tribalism identifies this event as mediated and designed. It suggests the fostering of a certain image, social cohesion, the transmission of practices and ultimately behavior change. As such, it is a powerful means for design when it comes to behavior change: Designing with behavior for behavior.

KEYWORDS Food consumption, Activism, Diet change, Behaviour change, Ethical consumerism
504

THEVISITORS: DESIGNING MEDIA FAÇADES TO SUPPORT LINKS BETWEEN PEOPLE A PLACES

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The pervasive integration of media façades in the urban environment challenges designers on how to use this new communication medium. There is a need for a framework to understand and approach this emergent field. This paper presents advances in our research work investigating how interaction, information interpretation and aesthetics interplay to influence and shape the way people perceive and understand the urban space digitally mediated by media façades. The article introduces theVISITORS, a design case that investigates how the links between people and places can be mediated by abstract audio-visual representations of people’s presence and activity on a media façade. Our findings indicate that visually aesthetic, ambient, metaphoric, and artistically enhanced representations, which allow for sense-making, versatility, and openness for interpretation could be a valuable resource of design.

KEYWORDS  
shared spaces, media façades, interaction and information design

525

A CASE OF THE APPLICATION OF CUSTOMIZED STANDARDIZATION ON FLORAL DESIGN AT CN FLOWER

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National Taiwan University of Science and Technology

Yi-Ting Hou  
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Recently, floral design and decorations have been closely related in our lives. However, how a floral design firm adopts an appropriate strategy to strengthen its competitive advantage in a highly competitive market environment is an issue that needs urgent exploration. This paper aims to conduct a case study on a successful floral design firm, CN Flower (hereafter CN), which has the highest sales volume in Taiwan. Why and how the CN floral design could be successfully achieved is the focus of this study. By adopting customized standardization as a service mode, the study found that CN can not only satisfy the needs of the customer, but also offer direct benefits for the company. Thus, the results of this study may help to uncover the possible benefits of adopting the customized standardization as a feasible service design strategy.

KEYWORDS  
Floral Design, customized standardization, customization, standardization, case study

537

FUZZY FRONT END AND DESIGNING TOWARDS A RAISON D’ÊTRE

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Matthijs van Dijk  
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Presenting a newly implemented 2nd year design course emphasizing the development of a product development business strategy for a client company and a vision on product user interaction prior to the actual concept design. Assumptions and design considerations for the development of this course are being presented and reflected upon, on the basis of student feedback.

KEYWORDS  
design, vision, raison d’etre, design education
542  A STUDY ON ELDERLY BEHAVIOUR - AN ANALYSIS OF EXHIBITION VIEWING AT SUZHOU MUSEUM IN CHINA

Luolan Shen
Kyushu University

Yoshitsugu Morita
Kyushu University

Nermin Elokla
Kyushu University

Currently, museum is becoming the center of Chinese's life. However little research has been conducted about exhibit visiting in China, especially for elderly visitors. The purpose of this study was to make a reference, which allows designers and curators to cope with the complex planning and meet elderly’s needs. For a 4-week period in 2011, behavioral data of elderly were collected from 165 visitors who moved through the Suzhou Museum in China. It is predicted that both observed and reported data in this study would be related to elderly behavior areas which were emphasized in the visitor research and more effectively achieve the goal of convey messages.

KEYWORDS Elderly behavior, Exhibit viewing, Museum study

584  PREDICTING DESIGN STUDENT SUCCESS ACROSS THE DESIGN DISCIPLINES: A LOOK AT ARCHITECTURE, GRAPHIC DESIGN, INTERIOR DESIGN, AND LANDSCAPE ARCHITECTURE

Lori Brunner
Iowa State University

Paul Bruski
Iowa State University

The focus of this paper is to answer the question, ‘what measures are the best in predicting a student’s success in college.’ In particular, this paper addresses a student who is interested in one of the design disciplines (architecture, graphic design, interior design, or landscape architecture) within a College of Design at a university in the United States. Data from three predictor domains in college admissions were collected and analyzed, including: 1) cognitive measures, 2) noncognitive scales such as personality tests, creativity tests, and motivation, and 3) personal qualities found in portfolios, essays, and extracurricular activities and leadership activities.

KEYWORDS predicting student success, design program selection criteria, multi-disciplinary design
THE EFFECT OF COLOR VARIATION ON CONSUMERS’ SATISFACTION WITH CHOICE: CASE OF FASHION AND STYLING ORIENTED PRODUCTS

Iyengar and Lepper (2000) demonstrated that consumers are more likely to purchase gourmet jams or chocolates when offered a limited array of six choices, rather than a more extensive array of 24 or 30 choices; this finding appears, somewhat, to contradict the assumption that providing consumers with more choices is better. Moreover, those participants actually reported greater subsequent satisfaction with their selections when their original set of options had been limited. The present study analyzed the effect of color-variation offering in fashion- and style-oriented products (e.g., bags, sandals, and fountain pens) on consumer satisfaction. Our preliminary results showed that in terms of catering to participant preference, the optimal color-variation offering of a fashion- and style-oriented product was approximately 12-18 colors.

Hisayoshi Kobayashi
Design Psychology Unit, Graduate School of Engineering, Chiba University, Chiba, Japan

Miki Yoshitake
Design Psychology Unit, Graduate School of Engineering, Chiba University, Chiba, Japan

Hiroyasu Tsuchiya
Design Psychology Unit, Graduate School of Engineering, Chiba University, Chiba, Japan

Yu Tanaka
Design Psychology Unit, Graduate School of Engineering, Chiba University, Chiba, Japan

Vinai Norakkunkit
Kokoro Research Center, Kyoto University, Kyoto, Japan / Department of Psychology, Minnesota State University, Mankato, Minnesota, USA

KEYWORDS color variation, consumer, satisfaction, product

A STUDY ON COGNITIVE ACTIONS AND IMAGERY DEVELOPMENT SKILL: TOWARDS A PATTERN LANGUAGE FOR NOVICE DESIGNERS

The theme of this thesis is to evaluate the possibility of utilizing pattern language to assist designer’s preliminary idea. According to Alexander’s proposition, the concept of pattern language is to help novice architects to study design through the systematic process. This study is to investigate whether novices would have a great improvement in idea sketching toward a pattern language. The experiment in this study includes two principal parts. The first part is to find a systematizing method to generalize pattern language by inviting experts to join a design workshop to edit a series of systematic pattern language through the discussion. The pattern language is made by the picture card, containing four key elements: 1 Name, 2.Picture 3.Question 4.Solution, it make novice easier to learn by it. The second part is to prove pattern language could promote its picture idea and develop novices’ ability through the process of studying. By dividing into the experiment group and the contrast group, the experiment group sketch pattern language; and the contrast group chooses the catalog method by watching a large number of pictures. We would compare and analyze the difference between these two methods through the information what video camera recorded. The result of this investigation finds that the cognitive actions in both groups are similar; it may be because the both groups are all novices. However, there is a huge diversity of the cognitive thinking way organized by the cognitive action in both groups. The novices utilizing pattern language have the continuous and systematic cognitive thinking that consisted of the cognitive action. The thinking of the other novices on catalog method is discontinuous and inefficient. According to the evaluation of the experts’ assessment, the novices utilizing pattern language is more efficient than the novice designers on catalog method.

Yu-Ming CHANG
Southern Taiwan university

Leon CHYOU
National Cheng Kung University

KEYWORDS Pattern Language, Cognitive Action, Imagery Development
610  REINVENTING MATURE PRODUCTS THROUGH COLORS, MATERIALS, AND FINISHES

Chih-Feng Li  
National Taiwan University of Science and Technology

Jin-Dean Cheng  
National Taiwan University of Science and Technology

Lin-Lin Chen  
National Taiwan University of Science and Technology

In this paper, we review the role of colors, materials and finishes (CMF) in reinventing the notebook computer (NB) product, and report two case studies of CMF practices in two large NB manufacturers in Taiwan. By in-depth interviews of CMF professionals and product designers, we documented and analyzed the role of CMF in NB product development process, contents and sources of CMF database, services provided by CMF professionals, development of new CMF, and interaction between designers, engineers and CMF professionals.

KEYWORDS  Colors, Materials, Finishes, CMF, Design Practices, Product Surface Appearance

614  GARDENS OF THE MIND: NATURE, POWER AND DESIGN FOR MENTAL HEALTH

Kathleen Connellan  
University of South Australia

Nature, gardens and greenery are necessary to the healing of the mind. This paper discusses the integration and use of open spaces and ‘gardens’ in mental health units. There is ample evidence that gardens and gardening can relieve stress but how are gardens designed into mental health units to facilitate this known fact? (Marcus and Barnes, 1999; Pretty, 2006; Simpson, 1998). The results of an ethnographic observational study in a purpose built mental health unit in Australia form the basis for the discussion but this study is also situated within global debates on design for improving mental health.

KEYWORDS  gardens; mental health; power; healing;

634  3D-VISUALIZATIONS AS A MEANS FOR ENGAGING USERS AND ACTORS AS CO-DESIGNERS IN THE FUZZY FRONT-END OF PRODUCT DEVELOPMENT

Snorre Hjelseth  
Oslo School of Architecture and Design, Vestfold University College

This paper explores the role of photorealistic images created by computer generated 3D models when designing complex systems in the fuzzy front-end of innovation. It discusses how realistic visualizations can engage users and actors as co-designers in early stages of product development. The paper introduces the SimSam project as a case where participation from expert-users and stakeholders has been critical for the decisions made in the design process and the ability to implement the selected design. The computer generated visualizations were a key element in engaging these participants in the front-end of the process. This paper takes up this position with reference to computer generated 3D representations and their potential in helping realize complex relations between tools, participants and representations in product development. The results show that the 3D-visualizations had an impact on involving participants in the design tasks and when implementing the concept on internal and external levels.

KEYWORDS  Photorealistic representations, co-design, product development.
ENHANCING THE USABILITY OF GRAPHICAL USER INTERFACE BY USER MANIPULATIVE AUDITORY DISPLAY

Human Computer Interaction (HCI) research supports the proposition that the addition of audio displays can reduce subjective workload. With the growing use of touchscreen displays and the increasing complexity of interface, the addition of audio display is expected to reduce users’ workload. This study intended to develop an additional audio system which can be handily manipulated by users who need. A dedicated graphic audio switch was adapted at the corner of screen. Users may initiate audio output by dragging the audio switch to the icon where he/she would like to listen to the audio instructions. Farther detail instructions will be prompted if the user ‘long press’ the transparently overlapped audio switch. To test the feasibility of the additional audio system, an experiment was carried out by testing 15 respondents including different visual status groups. The result indicates that there are 13 respondents consider the auditory interface is an effective auxiliary and confirm its feasibility.

KEYWORDS: auditory display; usability; touchscreen displays
THE ROLE OF EXPERIMENTATION IN CREATING AND SUSTAINING MOTIVATION IN DESIGN WORK

Tua Bjorklund  
Aalto University

Satu Luukkonen  
Aalto University

Maria Clavert  
Aalto University

Senni Kirjavainen  
Aalto University

Miko Laakso  
Aalto University

The nature of design and development work requires self-directed proactive and persistent efforts from both the design team and other stakeholders. However, the question of how to enhance development motivation can be a daunting one to answer, as the literature is dispersed, partial answers being presented in multiple fields of research. This paper specifically examines the role that experimentation, a typical and widely supported approach to design, can play in awakening and sustaining development motivation. The paper reviews literature from several streams of research and discusses findings from a recent attempt to realize support for these mechanisms within a university setting, at the Aalto University Design Factory platform.

ANALYSIS OF DECISION MAKING PROCESS FOR A SYSTEMATIC ENGINEERING DESIGN

Mohammadreza Rajabalinejad  
TUDelft

Christos Spitas  
TUDelft

In this paper, we present a new methodology for a systematic design process that shows if the acquired knowledge, modeled in the K-space, is enough or further exploration of the C-space is required. We treat the uncertainty [4] and apply it to the Cold Facts project [5] as a distinguished project with contribution of different scientific disciplines.

REMEDIYING A FORM: IMPROVING A PATIENT/CLINIC NARRATIVE

Paul Bruski  
Iowa State University

Forms are a necessary, though often frustrating and tedious part of the contemporary world. In the healthcare narrative, one must begin to acknowledge that many of these forms are frequently designed to address the needs of the healthcare provider, and not necessarily that of the patient, though both ostensibly have the same goal: patient health. In this study, issues in a university student health immunization form are brought to light through a qualitative analysis of its look, content and task structure. This paper examines a redesign with the user in mind, and shows in quantitative and qualitative terms the improvements made, and through a reiterative design process that ultimately eliminated the form.
145

BOOK OF ABSTRACTS

POSTER PRESENTATIONS

198

INTERPERSONAL DIMENSION OF SERVICES

Unlike goods, in most services customers are part of the production process. As a result, interpersonal interactions that occur during service production influence on the service outcome. Although evidences of the influential role of human interaction in services are often found in previous studies, the focus has been on the interactions between service providers and customers, and how to serve customers to provide satisfying user experience. This paper pays more attention on the interactions among customers. The rationale is twofold. First, not only interactions between service providers and customers, but also interactions between customers influence on the service outcome. Second, in case of certain types of services, such as ‘collaborative services’, service outcome is highly dependent on interaction between customers. As an example of collaborative services, online-based carpooling services were analyzed. The result of case studies shows a positive correlation between the degree of sociability of services and the success of the service.

KEYWORDS Service design, Human-to-human interaction, Carpooling

759

SERVICE DESIGN FOR PRODUCT-SERVICE SYSTEMS USING CONTEXT-BASED ACTIVITY MODELING

Yong Se Kim
Sungkyunkwan University

Sang Won Lee
Sungkyunkwan University

The integrated design capability for people-centered value is essential in industry competitiveness as well as in people’s living. Here, integrated design stands for systematically integrated planning, concept design and realization design reflecting diverse viewpoints. Recently, the value creation paradigm in industry is shifting toward value creation through Product-Service Systems (PSS) where product and service elements are tightly integrated as systems. Ideally, in PSS, service issues should lead product issues. That is, services are now dominant as products and technologies are rather saturated. Thus the key in PSS design would be designing activities of various stakeholders considering interaction with other stakeholders as well as products. Orchestrating activities of diverse stakeholders and defining and realizing PSS functions and structures would require systematic design methodologies and tools as well as creative design reasoning capabilities. In this paper, a systematic methodology for designing services using context-based activity modeling method is presented together with examples of new activity designs.

KEYWORDS Service Design, Activity Design, Context-Based Activity Modeling, Product-Service Systems

779

INTERPERSONAL DIMENSION OF SERVICES

Unlike goods, in most services customers are part of the production process. As a result, interpersonal interactions that occur during service production influence on the service outcome. Although evidences of the influential role of human interaction in services are often found in previous studies, the focus has been on the interactions between service providers and customers, and how to serve customers to provide satisfying user experience. This paper pays more attention on the interactions among customers. The rationale is twofold. First, not only interactions between service providers and customers, but also interactions between customers influence on the service outcome. Second, in case of certain types of services, such as ‘collaborative services’, service outcome is highly dependent on interaction between customers. As an example of collaborative services, online-based carpooling services were analyzed. The result of case studies shows a positive correlation between the degree of sociability of services and the success of the service.

KEYWORDS Service design, Human-to-human interaction, Carpooling

780

UBIQUITOUS URBAN GAME-BETWEEN MEANING PRODUCTION AND THE PRODUCTION OF PRESENCE

Simona Sofronie
University of Hasselt

During translation from the realm of reality into that of the mind, substantial reality is distorted, having as result a schematized environmental image, constructed from the alteration of presence phenomena into meaning. By attaching meaning to all their experiences, people build up a personalized system of interpretation of the world, which, in return, produces tension, whenever interacting with another individually- or culturally-defined system or with the substantial reality. By means of a ubiquitous urban game, this paper aims to investigate the effects of locative and media technologies on the relation between presence and meaning, and from here, on the emerging tension. Subsequently, it will explore the tactics people develop in order to tackle tension and to attain an enhanced coping with their living environment.

KEYWORDS ubiquitous game, presence, meaning
802

HOW MAY DESIGNERS CREATE FURNITURE THAT ALLOWS MEANINGFUL PLACE-MAKING IN MODERN OFFICE

Mohd Shahrizal Dolah
Sheffield hallam university

Chris Rust
Sheffield hallam university

There have been many discussions on office environments, but there have been few studies on the designer relationship with the workplace that they are designing. Given the benefit of the findings of this research, designers might create opportunities for the user to express their emotions through their workplace personalization. In my early field work, I used a participatory design approach and used mock-ups to investigate the main problems and to explore design opportunities in developing new office environments. The findings revealed that meaningful workplaces can be achieved in different ways and for different reasons according to different needs.

KEYWORDS Meaningful place making, personalization, furniture design, workplace and participatory design

809

INFORM ME: DESIGNING AN AGENT-BASED WEB INFORMATION RETRIEVAL SERVICE IN THE CONTEXT OF URBAN MOBILE USERS

Kyungho Lee
Seoul National University

Juhyun Eune
Seoul National University

Hyungmo Kang
NC Soft Japan

Thanks for the further development of ubiquitous computing technology and the advent of smart phone, the user behaviors are becoming more and more dynamic and diverse in terms of their access, gather and use of information within the urban areas. However, current web based information retrieval services still use the same methodologies and processes that were developed in a decade ago and these perspectives requires heavy cognitive loads with continuous strategic decision in order to get appropriate search results. To address this problem, we designed a smart agent-based information retrieval service focusing on the context of mobile phone users in crowded, complex urban areas.

KEYWORDS Information retrieval, intelligent agent, ontology, adaptiveness, user interface design

815

COMPARISONS OF JAPANESE AND U.S. CONSUMERS’ EYE MOVEMENTS WHEN CHOOSING OVER-THE-COUNTER DRUGS: “NAME AND BENEFITS” VS. “INGREDIENTS AND RISKS”

Ayako KAWASE
Graduate School of Chiba University

Eunike Tiara SEMBRING
Graduate School of Chiba University

JeongSeo CHOI
Graduate School of Chiba University

Shinichi KOYAMA
Graduate School of Chiba University

Megumi IZUMISAWA
College of Pharmacy, Nihon University

In Japan, package design of over-the-counter (OTC) drugs changed in 2009 because of changes to the Pharmaceutical Affairs Law. The revised Law expects consumers to choose an OTC drug at their own risk; for this reason, consumers should carefully read the information on OTC drug packages. The present study examined the eye movements of Japanese and U.S. consumers while choosing an OTC drug, and examined how much attention they paid to each item on the package. The subjects were 28 Japanese (13 females and 15 males; 20-39 years old) and 23 Americans (8 females and 15 males; 18-39 years old). In the experiment, three packages of cold medicine were presented horizontally on a computer display, and each participant was asked to choose her/his favorite drug. Three Japanese cold medicines were presented for the Japanese participants, and three U.S. cold medicines were presented for the U.S. participants. Eye movements were recorded on a personal computer, with the length of time the participants spent examining 10 items on the OTC package—drug name, pharmaceutical company, uses, ingredients, warnings, etc. The results suggested that Japanese consumers paid more attention to the names than ingredients, and more attention to benefits (i.e., uses) than on risks (i.e., warnings). On the other hand, U.S. consumers place more emphasis on ingredients than do their Japanese counterparts, and that they place equal emphasis on risks and benefits.

KEYWORDS over-the-counter drug, labeling information, culture
830 KANSEI EVALUATION OF JEWELRY’S SHININESS

Seunggi Hong  
University of Tsukuba

Seunghoe Lee  
University of Tsukuba

In this research, we focus on first, how people feel when they see jewelry. Second, how people feel when jewelry have different degree of shininess. Feelings are described as the Japanese word, Kansei, and which are collected from interviews with employees of jewelry shops and general public. For this research, four images of silver rings are used as stimuli and the experiment is conducted by Semantic Differential Method. We tried to reproduce the shininess of rings in some ways. With these images of rings, we attempted to explore how shininess affects feelings. Throughout the course of the experiment, we received comments from participants. Mostly, the comments concerned images of stimuli and the method of experiment. Results of the study revealed, differences between genders and rings, but it was not significant. However, the strongest shininess has its own unique curve. We also found some characteristics of feelings of shininess by the Kansei evaluation through Semantic Differential Method, but more research is needed to find other factors.

KEYWORDS Metal, Jewelry, shininess, reflection
## MISCELLANEOUS

<table>
<thead>
<tr>
<th>Official language</th>
<th>For IASDR2011, English is the official language. No simultaneous translation will be provided.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time difference</td>
<td>The Netherlands is in the Central European Time Zone. Central European Standard Time (CET) is 1 hour ahead of Greenwich Mean Time (GMT+1).</td>
</tr>
<tr>
<td>Climate</td>
<td>The weather in The Netherlands in October/November can be quite rainy, so please do not forget to bring a raincoat. The average temperature is around 5 - 12 degrees Celsius.</td>
</tr>
<tr>
<td>Currency &amp; Banking</td>
<td>The currency in The Netherlands is the euro (€). Credit cards are accepted at most restaurants and shops. An ATM is located near the conference venue.</td>
</tr>
<tr>
<td>Electricity</td>
<td>Standard power supply in The Netherlands is 220V/50Hz (two-pin power outlet, type C or F).</td>
</tr>
<tr>
<td>Emergency services</td>
<td>Police - Ambulance - Fire brigade; dial 112.</td>
</tr>
<tr>
<td>Delft University of Technology</td>
<td>Of the 95,000 people who live in Delft, 21,000 study and work at Delft University of Technology. It is the largest, and most comprehensive university of technology in the Netherlands. Delft University of Technology’s eight faculties offer 14 bachelor programmes and more than 30 master programmes.</td>
</tr>
<tr>
<td>Faculty of Industrial Design Engineering</td>
<td>Started in 1964, the faculty of Industrial Design Engineering has become one of the best known product design schools in the world, and is among the largest university design programmes in the world. It now has over 2000 students enrolled in bachelor and master programmes and about 200 members of staff divided into three departments: Industrial Design, Product Innovation Management, and Design Engineering.</td>
</tr>
<tr>
<td>Delft</td>
<td>City of Delft Blue, the House of Orange and Johannes Vermeer. A city of great charm with the best Holland has to offer. Delft is an absolute ‘must-see’ during your visit to the Netherlands. It is home to 95,000 people, 21,000 of which study and work at Delft University of Technology, the largest, and most comprehensive university of technology in the Netherlands.</td>
</tr>
<tr>
<td>Things to see</td>
<td>You can see many interesting things in Delft. Modern architecture like the building of the TU Delft Library, the Science Centre and the Faculty of Architecture, historical buildings like the old City Hall and the two famous old churches (where the Dutch Royal Family is buried).</td>
</tr>
<tr>
<td>Culture</td>
<td>If you are interested in art, you can visit one of the many museums in Delft or for example the Vermeer Centre, which offers a fascinating voyage of discovery through the life and work of the famous 17th-century Dutch painter Johannes Vermeer.</td>
</tr>
<tr>
<td>Active leisure</td>
<td>Do you like to be more active, maybe a trip by bike, step or a boat trip through the canals is something for you. You can find all the information you need on the official tourist information website for Delft (<a href="http://www.delft.nl/delften/Tourists">http://www.delft.nl/delften/Tourists</a>).</td>
</tr>
<tr>
<td>Walking routes</td>
<td>Distances are small in The Netherlands. Walking and cycling is an efficient way to move around in Delft.</td>
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(PARTIAL) MAP OF DELFT
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<tr>
<th>Time</th>
<th>Monday 31st October</th>
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<th>Wednesday 2nd November</th>
<th>Thursday 3rd November</th>
<th>Friday 4th November</th>
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<td>Registration/Welcome coffee</td>
<td>08:30 Opening session</td>
<td>08:30 Keynote 1</td>
<td>08:30 Keynote 2</td>
<td>08:30 Doctoral colloquium</td>
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<td>10:00 Keynote 5</td>
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<tr>
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<td>10:30 Doctoral colloquium</td>
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<td>11:30 Lunch</td>
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<td>21:00 Orals &amp; Workshops</td>
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</table>

**Conference at a Glance**

- **Ground floor**: Entrance, Hall Registration, Cantina, Elevator, Stairs, Stairs Floor 2, Floor 1, Floor 2, AB, CD, G, D, Foyer, Auditorium, Entrance, Stairs, Elevator, WC, WC.
- **Floor 1**: Foyer, Vide 1, Vide 2, location A, location B, location C, location D, location E, location F, location G, Auditorium, Entrance, WC, WC, Back entrances of locations A, B, C, D.
- **Floor 2**: Auditorium, Vide 2, location E, location F, location G.
- **Toilets**: can be found in the basement and on floor 2.
Diversity and unity

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