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7th International Workshop on the Design & Semantics of Form & Movement  
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## Abstracts DeSForM 2012

### **Paper Presentation I: Immersive Environments: Smart Systems and Interactive Spaces**

*Semantic Connections: A New Interaction Paradigm* by Bram van der Vlist, Gerrit Niezen, Jun Hu, Loe Feijs

As the environments we inhabit contain a growing number of networked, interactive products, both users and designers need a better understanding of how these products can potentially work together. User interaction is changing from interaction with single products into interaction with a larger system of products. This trend faces designers with a challenge: to create meaningful interactions for users to deal with the complexity of the larger ecosystem of technologies users function in. In this article we introduce an interaction paradigm, where we view smart environments in terms of connections and associations between the actors and artefacts within the environment. In this notion of Semantic Connections, meaning is pivotal. We report on a search for a theoretical foundation for our approach in existing semantic theories. We attempt to use and extend these theories beyond their traditional focus on the appearance of objects and interaction with them in isolation, towards designing for systems of interoperating products. We illustrate our contribution by providing examples of products and design prototypes that implement our ideas. Although our research is ongoing and the theory unfinished, we believe that sharing our work can fuel the discussion on how designers may deal with the challenges in contemporary interaction design.

*Table Manners: The Influence of Context on Gestural Meaning* by Tom Djajadiningrat, Luc Geurts, Jeanne De Bont

We investigated the activation of gesture control for a dining room table lamp. Using video scenarios which show a user interacting with the lamp during a dinner with friends, we carried out an online user test comparing the existing activation through hand gesture with three new alternatives: clapping, finger snapping and voice. Though we had expected users to prefer these alternatives for being more fluid, easier and faster than the existing initiation through hand gesture, the opposite turned out to be true. They were considered intrusive since they disturb through sound, through their connotations and by violating the personal space of others. We argue that the appropriateness of gestures is strongly dependent upon socio-cultural context and should be evaluated in the final use context.

*Persuasive Design for Energy Saving Behavior through Social Gaming* by Vaijayanthi Iyengar and Madhusudhan Marur

This paper proposes to use social network gaming as a persuasive tool to adapt energy saving practices amongst the Millennial Generation while using connected devices or appliances. The proposed solution leverages the power of connected devices and social networking principles to bring behavioral changes for efficient energy consumption among users aged 18-25 years. The paper is based on the insights gained through the research we conducted to understand the motivations of users regarding energy saving in devices, capabilities of connected devices and the role of future web. Insights from our research revealed that a solution that is an extension of user's daily energy consumption behavior, could lead to sustained behavioral changes for energy conservation. We suggest a system that captures the energy consumption of users, analyses and provides recommendations for efficient consumption on a social networking game. This paper

reports on the work in progress of a gaming solution called 'Wattever'. Wattever is a social networking game which maps users' devices in the real world to a game in the virtual world.

### *Four Installations Inviting Playful Interaction* by Daniel Cermak- Sassenrath

The course Embodiment, Tangible Interaction and Games was offered as an elective in the Bachelor of Creative Technologies (BCT) programme at Auckland University of Technology, New Zealand in semester 1/2011. It was open to year two and three students. We discussed ideas of phenomenology and attempted to apply them to the design of interactive installations. The installations integrated space, movement and artefacts in collaborative and competitive settings and in playful ways. A number of the installations appear suited for exhibition and are presented here. The Eight-Bit Mirror, Deimous and [sol] are student works<sup>1</sup>, Box Me Dumb Human was developed by the author while preparing the course. The installations focus on different sides of the bodily experience, and on different aspects of playful interaction.

### **Paper Presentation II: The Emotive**

#### *Fluenci: The Expression of Expressing* by Jaap Knoester, Tom Djajadiningrat, Philip Ross

In this paper, we discuss the design process of a breast pump which celebrates expressing as a natural, intimate and emotional experience. Through interviews with mothers and breastfeeding experts, the psychological and physiological factors which may inhibit or stimulate the milk let-down reflex were identified. Based on this information, a concept called Fluenci was developed which, in its interaction and behavior, mimics many of the stimulating triggers provided by a baby. In an evaluation of an experience prototype of this concept, users preferred Fluenci over a conventional breast pump both on a pragmatic and a hedonic level. We discuss our design rationale in which the product's functionality benefits from anthropomorphic interaction and behavior yet does not result in a potentially disturbing anthropomorphic product appearance. Lastly we propose an additional form of anthropomorphism, Embodied Anthropomorphic Form, which invites the user to engage with a product as if it were human.

#### *Fictional Emotions within Emotion Driven Design* by Eva Knutz

The aim of this paper is to address imaginative experiences of emotions by drawing Kendall Walton's theory of make-believe. Moreover, we use a design case as means for investigating how a child's felt emotions towards a hospital situation relates to his or her imaginative experiences of emotions towards a fictive character in a computer game simulating the real-world situation. In so doing, we contribute with new insights to existing theories of emotions in design, which tend to focus narrowly on felt and measurable emotions.

#### *Co-Authored Narrative Experience: Affective, Embodied Interaction through Combining the Diachronic with the Synchronistic* by Carol MacGillivray, Bruno Mathez

Examination of perception tends to look at senses in isolation, but Neuroaesthetics and Gestalt design principles treat perception as an embodied synaesthetic experience. The Diasynchronoscope project takes timebased techniques from animation and converts them to spatiality, animating static objects through projected light and creating transient visual cues that, when combined with sound, demand selective attention. The work challenges the use of passive nouns to describe participants such as 'user' or 'audience' or 'viewer' and instead asks participants to recognise their true position to be that of 'exegete', reading and interpreting the gaps in space and time. Their interaction with the work provides narrative meaning transcending the static and hidden, to create a Gestalt systemic whole, making each participant a truly immersed co-creator. Using audience analysis, the paper evaluates the work against more traditional media such as screen-based visuals and makes the case for further research into somatic perception of dynamics.

#### *The Semantics of Surprise in Industrial Design* by Edgar Rodríguez Ramírez

This paper reports on the role of semantics in the strategies industrial designers use when attempting to elicit surprise. Surprise is the emotion people experience when they appraise a stimulus as "novel". While "novelty" is one of the main factors that designers can bring into a product, little has been reported about what strategies designers use when they intend to surprise.

Thirty senior representatives from influential design organisations were interviewed with the intention of uncovering strategies that designers use in their process. The analysis of the responses suggests the strategies are often connected to the semantics of the product, and that a common factor in order to elicit surprise is to challenge the expected semantics of an object on different levels: social, cultural and emotional. The suggested strategies are analysed in comparison with current literature. The research suggests that the strategies suggested in this paper represent explicit ways in which designers attempt to elicit surprise. The paper concludes suggesting that further research should be carried out in a research through design approach to uncover further strategies that designers use implicitly and did not explicitly mention during the interviews.

### **Paper Presentation III: Metaphors, Agency and Semantics**

*The Role of Expertise in Source Selection During Product Metaphor Generation* by Nazli Cila, Paul Hekkert, Valentijn Visch

Metaphors have a communicative role in design that entails a transfer of meaning from an entity (i.e. source) to the designed product (i.e. target). In this paper, we investigate the effect of the expertise of designer on the accessibility of the sources that they employ in metaphors. In the study conducted, novice and expert designers were asked to generate metaphors and the sources they selected were used for analysis. The results indicated that, (1) novices tended to select easily accessible sources whose similarity with the target were obvious, and (2) experts tended to use sources that were less similar with the target and more difficult-to-access in the first place. These results were then discussed in the light of metaphor theories and product design knowledge.

*The Actions of Things: Design, Materiality and Agency of Things* by Jorn Guldborg

The semiotic problematic to be addressed in this paper is the construction of meaning in serial objects or multiples. At least three 'thing-identities' are in play during the lifetime of a merchandise, and the question is how things actually attain meaning in their different contexts of design, production and consumption and how to differentiate methodologically between stages within the commercial and cultural trajectories of one particular item (a thing). Since Jean Baudrillard posed the question of the model-series relation as defining "a perpetual dynamic which is in fact the very ideology of our society" [1], it has been a permanent challenge to design studies to address the question of how meaning is construed in mass produced objects for use. There seems to be three levels or stages of meaning production; in relation to, respectively, (1) the model or prototype for a series, (2) any produced item in the series, and (3) any singular object in the series. New approaches to the problematic have, by employing terms such as 'indication', 'affordance' and 'agency', furthermore emphasized the differentiations in regard to the ambivalent statuses and meanings of mass products, especially the relation of model to singular objects. This paper will consider the possibility of differentiation between the three levels mentioned above, by introducing the semiotics of Charles S. Peirce's, and, more specifically, his so-called first trichotomy and the concepts of legisign, sinsign, and qualisign. This modeling, so it will be claimed, provides a theoretically satisfying conception of how and 'where' and by whom the multiple meanings in design objects are being produced, as well as the consequences of this for appropriate analytical strategies with regard to the processes of design, production, distribution and consumption.

*Embracing Relational Agency in Design Process* by A. Baki Kocaballi, Petra Gemeinboeck, Rob Saunders, Lian Loke, Andy Dong

Our research investigates how the design process can accommodate a relational view of agency. According to the relational view, agency - or capacities of action - is neither an attribute of subjects nor of objects. The relational view of agency in design may allow designers to recognize and support the diversity and richness involved in human agency. To this end, we developed six design qualities to embrace the relational view of agency in design process. Using these qualities, we have created design inscriptions in the forms of materials and process constructs and applied them in a series of participatory design workshops, focusing on the notion of connectedness. We present how effective our inscriptions were in supporting the ASD qualities in each workshop.

## *Beyond Metaphor in Product Use and Interaction* by Thomas Markussen, Elif Özcan, Nazli Cila

The overall aim of this paper is to demonstrate that there is a need for supplementing the theory of product metaphor with a more elaborate theory of product meaning. More specifically, we argue that the notion of product metaphor neglects three critically important aspects of meaning making in product use. First, the notion of product metaphor usually accounts for how the visual form and appearance of a product might cue people to conceive of the product in terms of another conceptual source (e.g. a coffee maker as a butler), while leaving the role of cross-modal sensory experience in product meaning out of consideration. Secondly, like other theoretical frameworks in design semantics, the notion of product metaphor primarily accounts for the semantic operations that are involved in the first initial phase of product categorization and interpretation, while eschewing the question as to how product interpretation might evolve over time as people interact with and use the product. Finally, in product use there often emerge more complex and even ambiguous forms of meaning, which fall outside the explanatory scope of the source-target construal principle – the key semantic principle of product metaphor. In order to remedy these limitations inherent in the theory of product metaphor we introduce a new semantic framework based upon Fauconnier and Turner's theory of conceptual blends.

## *Graphic Design and the Tyranny of Connoisseurship: An Argument for a Semiotic Approach to Graphic Design Pedagogy* by Alan Young

In design pedagogy, a connoisseurship model prevails, while semiotics has struggled to become a significant pedagogical tool outside of the theory class. Yet whilst it has much to offer, connoisseurship is a limited approach that struggles with current philosophical and political concerns. This paper describes its historical trajectory and influence on design discourse and then suggests how semiotics can be an important addition to this system. Foregrounding the relationship between forms, perception and social communication, semiotics can provide more effective approaches to design instruction. More importantly, its robust theoretical framework allows for in-depth enquiry into the social and cultural meanings that spring from and traverse graphic media. I argue that semiotics should be approached in design pedagogy, not as a minor area of theory, but as a larger system through which many other design issues can be explored – in effect to generate a 'semiotic sensibility'. This can help to impart a richer awareness and deeper understanding of how design works, resulting in more informed, responsible and professionally capable design practitioners.

## **Paper Presentation IV: Immaterial Forces: Light, Sound, Gesture**

### *Grace: A Gesture Controlled Wake-Up Light* by Tom Djajadiningrat, Luc Geurts, Jeanne De Bont, Pei-Yin Chao

We investigated the use of a deviceless gesture control for a wake-up light, a type of alarm clock which wakes the user through both light and sound. We explain the interaction design challenges for the wake-up light and discuss the drawbacks of deviceless gesture control. These challenges and issues were explored through an experience prototype which we call Grace. We argue that deviceless gesture controls fit the sleepy interaction associated with the wake-up light and help in realizing a calm product appearance. Our key finding is that gesture control needs continuous guidance: realtime, augmented feedforward and feedback, which helps to increase the user's confidence during interaction and to improve gesture recognition.

### *The Aesthetics of Immateriality in Design* by Mads Folkmann

The paper is a philosophical-theoretical contribution to the conceptualization of the span of material extension and immaterial impact in artifacts employing digital technology. Using the smartphone as an example of a widely distributed type of material artifact that operates with immaterial structures of information, the paper offers a theoretical discussion of how immateriality can be conceptualized as a matter of aesthetics in the face of the challenge that digital artifacts pose to the role and understanding of materiality in design objects. The paper proposes a framework of aesthetics that describes sensual, conceptual, and cultural levels of meaning in and through the object. Further, the paper discusses how this connects to a notion of possibility in design. Thus, the paper contributes to a discussion of the sensuous character and impact of artifacts that are on the verge of immateriality. The relevance to design practice is motivated through the discussion of central concepts of design ontology and the proposal of a framework of aesthetics that in its discussion and structuring of levels of meaning in design can inform the process of developing design.

## *In Pursuit of the Extraordinary* by Cassie Hester

From fleeting interactions to long affairs, our relationships with things are diverse and complex. Like people, designed objects and environments are close companions in our lives. A constant source of comfort and delight, frustration and anxiety, their personalities inform our everyday dialogues and experiences. Creating objects with congenial personalities requires careful consideration of semiotics: syntax, semantics, and pragmatics within specific con-texts. Designed artifacts assume engaging and pleasurable personalities when they transcend materials, challenge perceptions, and garner active, reflective interactions. By constructing friendly and intriguing personalities through de-familiarization/recontextualization and human-centered designs, everyday interactions and experiences are elevated as users invest in pleasurable forays and relationships.

## *Tradition and Innovation: A Study on Reconfiguration of Product Language Through Innovative Approaches* by Ozge Merzali Celikoglu

Based on the subject – object relationship which is reflected as user and product, this paper deals with the concepts of tradition and innovation where craftsmanship and redesign are included. Thereby, the reconfiguration of product language is examined within innovative design approaches to traditional cultural products as sample cases: Iznik tiles, nargile and coffee pot, where different layers of this reconfiguration can be observed.

## **Paper Presentation V: Gestures and Touch**

### *Controlling Smart Home Environments with Semantic Connections* by Bram van der Vlist, Gerrit Niezen, Stefan Rapp, Jun Hu, Loe Feijs

In the transition from a device-oriented paradigm towards a more task-oriented paradigm with increased interoperability, people are struggling with inappropriate user interfaces, competing standards, technical incompatibilities and other difficulties. The current handles for users to explore, make and break connections between devices seem to disappear in overly complex menu structures displayed on small screens. This paper tackles the problem of establishing connections between devices in a smart home environment, by introducing an interaction model that we call semantic connections. Two prototypes are demonstrated that introduce both a tangible and an augmented reality approach towards exploring, making and breaking connections. In the augmented reality approach, connections between real-world objects are visualised by displaying visible lines and icons from a mobile device containing a pico-projector. In the tangible approach, objects are tagged and can be scanned to explore connection possibilities and manipulate the connections.

### *An aesthetics of touch: Investigating the language of design relating to form* by Victoria Teinaki, Gilbert Cockton, Nicholas Spencer, Bruce Montgomery

How well can designers communicate qualities of touch? This paper presents evidence that they have some capability to do so, much of which appears to have been learned, but at present make limited use of such language. Interviews with graduate designer-makers suggest that they are aware of and value the importance of touch and materiality in their work, but lack a vocabulary to fully relate to their detailed explanations of other aspects such as their intent or selection of materials. We believe that more attention should be paid to the verbal dialogue that happens in the design process, particularly as other researchers show that even making-based learning also has a strong verbal element to it. However, verbal language alone does not appear to be adequate for a comprehensive language of touch. Graduate designers-makers' descriptive practices combined non-verbal manipulation within verbal accounts. We thus argue that haptic vocabularies do not simply describe material qualities, but rather are situated competences that physically demonstrate the presence of haptic qualities. Such competencies are more important than groups of verbal vocabularies in isolation. Design support for developing and extending haptic competences must take this wide range of considerations into account to comprehensively improve designers' capabilities.

## *Learn to Make, Make to Learn: Reflections from Sketching Haptics Workshops* by Camille Moussette

This paper presents results, observations and insights from four workshops on the design of haptic interfaces. The workshop series was called Sketching Haptics, and the primary objective was to explore how the fields of Haptics and Design can come together for educational purposes during 4-5 days. The current haptic advances tend to favor technological refinements over other forms of inquiries. The initial premise is that designers, with their creativity and user-centered perspective, can contribute, along roboticists and engineers, to evolve the next generation of haptic interfaces. Designers might not have the technical affinity to develop cutting edge haptic technology, but they possess skills, processes and expertise that can definitely bring new perspectives, applications and considerations for haptics. The main takeaway from the workshops reveals that quick, creative, explorative works is not only possible but can be valuable and rewarding. The observations also stress the necessity of making, prototyping, materializing ideas and sketching in hardware when dealing with our sense of touch. By communicating the structure, activities and outcomes from the workshops, I hope to inspire educators and designers to survey and embrace the nascent field of haptic design, help develop our haptic design toolbox, and ultimately democratize haptic interfaces.

## *A Study on a Tangible Interaction Approach to Managing Wireless Connections in a Smart Home Environment* by Jeroen Peeters, Bram van der Vlist, Gerrit Niezen, Jun Hu, Loe Feijs

Technological advances in computational, networking and sensing abilities are leading towards a future in which our daily lives are immersed with interactive devices that are networked and interoperable. Design has an important role in facilitating users to make sense of the many connections between devices in a networked environment. Two design solutions based on a tangible interaction approach have been developed, that allow users to manage wireless connections between devices in a smart living room context. One design (Interaction Tiles) is a centralized approach based on a high level of semantic abstraction. The second design (Nodes) employs a distributed and localized approach, building upon laws of grouping from Gestalt psychology. A user experiment (n=15) was conducted, comparing both design solutions in the form of video prototypes, to gain insights into the mental models users construct when using the methods. Findings suggest that users' mental models of the Nodes design are more accurate representations of the actual structure of the network and that it allows for the projection of different mental models. Furthermore, findings also suggest that this does not necessarily lead to increased usability or increased perceived value.

## **Paper Presentation VI: Fabricating Futures: Digital Manipulation, Fabrication and the Craft of Design**

### *Yeti: Designing Geometric Tools with Interactive Programming* by Daniel Davis, Jane Burry, Mark Burry

Designers scripting geometric tools have had two options: either use an interactive visual script, or forgo interactivity to use a text-based script. Within this paper we consider a third option: interactively writing text-based scripts. Described is an interactive scripting environment created for this purpose, which manages geometry with a Directed Acyclic Graph generated from the text-based relational markup language, YAML. The environment is compared to the two existing scripting options by using them to draw three geometric compositions. We argue it is possible to interactively script geometric tools, and that interactivity is a vital component in making scripting intuitive.

### *Towards a Responsive Architectural Morphing Skin* by Chin Koi Khoo

The typical application of responsive architecture is in the facade or skin of a building with mechanical joints actuating the kinetic transformation. This paper investigates the unexplored 'soft' approach using lightweight elastic form-changing materials provides an opportunity for designing responsive Architectural Morphing Skin (AMS). This idea is inspired by the current morphing technologies of aerospace engineering especially in the area of morphing wing research. The research aims to develop a method for designing an AMS with a passive and active design strategy to minimise mechanical operation and reduce weight. Using a practice-based methodology, an AMS prototype is generated through a development process namely soft kinetic system (SKS). AMS serves as a 'second skin' brise-soleil in the form of a canopy to an existing courtyard space. It responds in real-time to environmental stimuli to address two fundamental criteria: comfort and visual.

*Digital-Physical Hybrid Design: Harmonizing the Real World and the Virtual World* by Mizuki Sakamoto, Tatsuo Nakajima, Todorka Alexandrova

Embodied interaction technologies make it possible to enhance our real artifacts. Various displays and projectors are already embedded into the artifacts, which makes it possible to create virtual forms into them. The virtual forms present dynamically generated visual expressions containing information that ascribes some additional values to the artifacts, and enables users to consider them as being more attractive. Using virtual forms is a very promising way to enhance artifacts surrounding us, and to make our daily life and business richer and more enjoyable. Recently, many people are anxious about the future that is why increasing daily pleasure is one of the most important social issues to be considered. In this paper, after presenting an overview of three case studies that enhance traditional artifacts with virtual forms, we extract five values that define a frame how a user feels about them. We describe the values and explain how they are used in the case studies. Then, we propose a framework to design digitally enhanced artifacts with these five values. Moreover, we show that the values are of significant importance in order to make a user's activities with them richer and more enjoyable by adding virtual forms or changing values dynamically with virtual forms.

*Digital Craft in Digital Space: A Paradigm Shift in the Making* by Maxe Fisher, Simon Fraser, Tim Miller, Ross Stevens, Jerad Tinnin, Annelies Zwaan

With every technological innovation in Industrial Design there is an accompanying conceptual change about how materials are used, how forms are put together, what they symbolize and how their existence changes the way we reflect upon the design and the design process. We are currently in the midst of such a change. Digital technologies offer designers a new context to challenge the methods of mass production with inventive and very different means of making, forms of manufacture, and avenues of distribution within the broader context of virtual systems, services and networks. This paper documents an ongoing sequence of projects by both design academics and students from Victoria University of Wellington seeking to explore these issues. Through the process of practice-based research we demonstrate that digital technologies are capable of both expressing and expanding traditional notions of workmanship and craftsmanship – to revive and embody its emotive and meaningful qualities within these new emerging social contexts and systems of making.

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