Editorial

Relating Systems Thinking and Design I
Practical Advances in Systemic Design

This issue, *Relating Systems Thinking and Design I – Practical Advances in Systemic Design*, along with Issue 7:4, *Relating Systems Thinking and Design II – Theoretical Evolution in Systemic Design*, together form a double special issue of *FORMakademisk* on the theory and practice of Systemic Design.

The two special issues are manifestations of a particular context. In 2005, one of the editors, Birger Sevaldson, initiated a research project on Systems Oriented Design at the Oslo School of Architecture and Design. The purpose of the project was to explore the contribution of systems thinking to help better cope with the challenges to the design profession of extreme complexity. Systems Oriented Design was developed as a practice and taught as a set of skills and tools rather than a body of theories and methodology. During this process of developing a new practice, the connection to former theories of systems thinking in design and to systems theories in general became apparent. To connect to this larger world, a wider circle of international scholars and designers committed to integrating systems thinking into their practice were engaged. This started with the likes of Harold Nelson and Peter Jones and soon included others such as Alex Ryan, Peter Coughlan and Wolfgang Jonas. The Systemic Design Research Network would be formed from within this circle.

In 2012, the first symposium on Relating Systems Thinking and Design was held at the Oslo School of Architecture and Design. The success of this event and the enthusiasm it generated became obvious through the increasing global attention and attendance the symposium attracted in 2013, and once again in 2014. Although the symposia began as an integrated part of the Systems Oriented Design project, it soon became clear that this project was too narrow to accommodate the full variety of syntheses between systems and design. A term used by Harold Nelson, Systemic Design, provided a more encompassing and welcoming label for our emerging field. In 2013, the second symposium on Relating Systems Thinking and Design (RSD2) adopted the broader frame of Systemic Design, which allowed for a more diverse range of perspectives and approaches.

The two special issues at hand were developed in a rather unconventional way from the 2013 symposium. The speakers were selected based on peer review of submitted abstracts. After the symposium the speakers were invited to submit working papers to further develop their work to incorporate discussions during RSD2. These working papers together with the original abstracts and the conference presentations and sketch notes formed the RSD2 proceedings as published on the Systemic Design (2013) website (http://systemic-design.net/rsd2/proceedings/). Next, the speakers were invited to submit a full paper to *FORMakademisk*. These went through another full blind peer review process and rewrite. This iterative process resulted in enough content for two special issues. We have organized the special issues around the theory and practice of Systemic Design respectively, not to encourage their separation, but to provide some coherence to the collection.

Practical Advances in Systemic Design spans real world applications of systemic design to government policy, organizational transformation, sustainable development, disaster recovery, service design, and business information systems education. Collectively, these examples illustrate how in systemic design, it is not possible to separate learning and

education from systems intervention, product design from the services, ecosystems, and cultural contexts they are embedded within, or economic interests from environmental and social goals. Rather than decomposing complex problematiques into simpler components viewed through narrow disciplinary lenses in isolation, the systemic designer must hold all of this complexity in view. This pushes the limits of individuals to cope with cognitive complexity and of teams to cope with social complexity. Yet when the tools of systemic design are employed to embrace more of the complexity, the payoff is often breakthrough innovations with a capacity for transformation at the organizational and societal scales.

Reviewing the Contents of the Issue

Jonathan Veale documents an application of systemic design to anticipate the range of possible futures for social licence and engagement for the Government of Alberta towards 2042. Completed in one year by eight core team members and engaging over 100 participants from across the government, the project is notable for its scale and novel application of systemic design from within the architecture of government. The case study is used by the author to reflect on the role of the systemic designer within government seeking to effect systemic change. Systemic design adds value to government policy development processes through an increased awareness of user needs, reduced unintended consequences, and more holistic decisions. Yet the civil servant designer, who often introduces innovative and radical ideas within the bureaucracy, the must continually mediate tensions between the government's culture and a culture of systemic design. Veale identifies the capabilities and qualities required of a civil servant systemic designer to navigate this often treacherous territory. He also conceives of government systemic design as a system, mapping the inputs, activities and outputs needed to develop a systemic design capability within government.

Alex Ryan and Mark Leung present a comparative analysis between another case study from within the Government of Alberta to integrate the system for natural resources and environmental management, and a procurement system redesign challenge within the University of Toronto. The case studies both integrate systems thinking and design thinking to understand and then intervene in large scale management systems. Both led to successful outcomes that significantly reframed the way that their clients were approaching their challenges. However, the two methodologies were developed independently, and integrated systems thinking and design thinking in different ways. The comparison identifies key features that both methodologies share: a holistic view of the challenge that triggers reframing; encouraging unconventional paths to goals, as well as questioning the goals themselves; embracing complexity to find opportunities for profound simplicity; and surfacing worldviews and mental models of users and stakeholders. Differences between the methodologies are used to inform improvements to both approaches that may lead to a more balanced synthesis of systems thinking and design. Both case studies support the hypothesis that the strengths of systems thinking and design thinking are highly complementary, and when combined, systemic design can be qualitatively more powerful than either component applied in isolation.

The lack of access to electricity in developing nations leads to poor health, environmental, and economic outcomes. A transition from centralized and non-renewable fossil fuels to distributed renewable energies has the potential to reduce environmental impacts while increasing social equity and inclusion. ***Carlo Vezzoli, Emanuela Delfino, and Lorraine Ambole*** bring the creative and generative impulse of design to bear on this challenge at the level of product-service system (PSS) design. PSS is about innovation of the entire system, through an integrated mix of products and services to satisfy a particular customer's demand. At this level, innovation often occurs by reconfiguring stakeholder interaction networks. The authors provide examples from Brazil and Tanzania of how for-

profit companies can offer solar power as a service from as low as $1.20 per week. Providing solar power as a service rather than a product simplifies and de-risks the purchasing process (which increases accessibility), creates opportunities for entrepreneurship and local employment, and promotes renewable energy sources. In South Africa, the Sunride sustainable mobility system pilot demonstrates how solar, electric, and human powered vehicles can be made available as a service on a pay per move basis, which again increases accessibility and reconfigures economic incentives to encourage reduced environmental impact. The authors' Method for System Design for Sustainability toolkit is illustrated throughout the paper and also shared online.

Ana Santos and Linda Wauben examine the challenges of healthcare provision in developing countries under the conditions of emergency relief. During disasters and emergencies, medical equipment designed for one context is transferred to a very different context to meet an urgent short term need. After the disaster recovery operation, the equipment is often donated to local entities, yet half of this equipment lies idle and can result in threats to safety and performance. This is a systemic issue because short term action motivated by good intentions can lead to unintended harm and misallocation of scarce resources. Using a multilevel design model, Santos and Wauben examine the product-technology design challenge in the context of product-service, socio-technical, and societal levels of design. This layered approach to socio-technical systems design enables the authors to diagnose the issue in a deep way. It also provides a basis for prescribing an integration of systems thinking, product service systems, and human factors and ergonomics to overcome some of the current barriers to effective medical equipment transfer. This demonstrates how systems thinking can broaden the aperture to identify high-leverage design interventions beyond the scope of traditional product innovation.

Globally, industrialized economies have experienced a shift from products to services, while the service sector is also key to growth in developing countries. This broader transformation has been reflected in the migration or expansion of many design firms from product to service design. Whereas product design has often been framed as a form of problem solving, ***Liliana Rodriguez and Carlos Peralta*** argue that service design is better conceived of as a form of systems thinking to cope with complexity, fuzziness, unpredictability, and pluralistic stakeholder values. This paper presents the results of semi-structured interviews with designers from five consultancies that have made the shift from product to service design. Interviewees regarded service design as more complex and dynamic than product design, leading to an expansion in the scope of their profession and a changing role relative to users and stakeholders. However, rather than viewing systems thinking as replacing problem solving, it was seen as a complement to design as problem solving. Other competencies, such as research skills and collaborative skills, were also seen as important to successfully navigating the shift from product to service design.

Andrea Resmini and Bertil Carlsson share their experience in curriculum design for two Masters courses at the Jönköping International Business School that together introduce the idea that managing, designing, and innovating business information systems is a systemic activity. Their courses depart significantly from traditional Masters courses, in the structure of the classes, the evaluation framework used to grade student performance, the selection of course readings, and the emphasis on experiential team learning. Students were required to select and frame their major group project from five large-scale problematic situations: public transportation systems, healthcare information systems, cross-border public services, multi-agent systems and social networks, educational solutions for children in primary school, and ambient or pervasive systems. They were then introduced to a number of tools and methods from systems thinking and design thinking, but no single approach was mandated in working towards the deliverables. Students were encouraged to make mistakes and to fail along the

way, with final course scores a reflection of their individual journey of learning. The open and fuzzy nature of the course design caused some students to feel insecure and express concerns on how they could be assessed fairly. However, a majority of students appreciated the liberating course design and its relevance to messy real-world challenges. Resmini and Carlsson's experience demonstrates the need for and the potential of redesigning some of the fundamental structures of tertiary education in order to teach systemic design in a way that is more consistent with its theory and practice.

Gordon Rowland documents twenty years of teaching and researching systemic design in the Communication Management and Design program at Ithaca College at the undergraduate level. Two courses, Systems Thinking and Design and Critical Issues in Organizations act as bookends that integrate the program and connect communication with broader societal and organizational concerns. Rowland offers deep insights into how to integrate systems thinking and design through experiential learning and reflective practice, presenting a model that flips conventional instructional design pedagogy on its head. In this article, the structure of each course is articulated and then rationalized by Rowland's personal research journey into systems theory and design. He presents a model for how to integrate design-AND-research to address increasingly complex problems, and develops the Enhanced Design Inquiry System (EDISYS), which provides a framework for students in the Critical Issues course to initiate team-based, intertwined design-AND-research inquiry. Rowland's experiences demonstrate that systemic design can be made accessible to and applied within undergraduate education to engage complex, real-world issues.

Manuela Aguirre Ulloa reviews *Design for Care: Innovating Healthcare Experience* by Peter Jones (who is editor of Issue 7:4). Ulloa notes the timely publication of this work, as unsustainable provider-centred healthcare systems around the world are facing major redesigns. In such a massive and fragmented sector, *Design for Care* is unique in crossing and connecting scales and continua of care, from the macro view (policy innovation) to the micro level (care experiences). Ulloa explains how Jones uses an empathic user story to connect interventions at multiple scales, showing how systemic design complements service design. As a designer, Ulloa recommends *Design for Care* for providing the reader with a systemic mindset, along with theories, case studies, methods and approaches for research and practice in the healthcare environment.

The intention of the Systemic Design Research Network, the Relating Systems Thinking and Design Symposia, and these two special issues is to maintain attention to design even as we integrate the systems idea. Behind this lies the observation that systems thinking, in spite of its great pioneers like Alexander, Ackoff, Banathy, Churchman, Glanville and others, never achieved a permanent place in the theories or practices of designing. Possible explanations for this are many, but perhaps previous generations of systems approaches have appeared to be too difficult, too technical, too abstract, and too often when adopted whole they came at the cost of abandoning a designerly way of going about things. We believe that this designerly way is well-suited as a working mode and practice to deal with very complex issues and relationships. The failure of the earlier attempts might have come to a large degree of the failure to integrate systems thinking properly with design thinking and design practice. When systems thinking is not just grafted onto design processes, but truly integrated into design, we expect the potential of this union may finally be realized.

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