Editorial

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André Liem has been teaching at the Norwegian University of Science and Technology, Department of Design, since January 2005. He has an MSc in Industrial Design Engineering from TU Delft, a PhD in Ergonomics from the University of Lorraine and a Docent (Reader) at Luleå University of Technology. His research interests include design processes and methods, design education, strategic design and management and design thinking, and social innovation and place making. He is currently coordinating and participating in two EU Erasmus+ projects on Youth Community Consultation. He has published widely in conferences and journals, such as *International Journal of Product Development*, *Design & Technology, Journal of Usability Studies*, *Journal of Design Research*, and *Travail Humain*.

Design research, design thinking, and design practice, as vehicles for embodying intuition and evidence, are becoming more seamlessly intertwined owing to a common agenda, which is about innovating the future, from a business, ecology or social sustainability perspective. The core of designers' work therefore not only revolves around the subjectively experienced and perceived, but also needs to consider structuring and

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problematising complex interactions when developing new products, services and contexts. As such, designers are required to adopt abductive stands to develop a sound understanding of different stakeholder mindsets, attitudes and behaviours in specific and systemic contexts.

Practically, this implies that the contributions of designers are pragmatic, and expected to include a 'wow' factor, that uniquely sets something apart from something else. In this sense, design combines dimensions of functionality, aesthetics, empathy, pleasure, and usefulness, and, in wider terms, meaning, desirability, identity, culture and contextuality.

As such, the work of the designer is constantly evolving, and, in line with the human concerns it addresses, also finds itself, or is forced into, new avenues of application. Designers of today work not only with enhancing the subjective qualities of physical artefacts, but also with creating solutions involving services, organisations, environments and systems in various contexts, and for meeting a diverse range of needs. These may be in places, situations, and times far from the personal and well-known territory of the individual designer.

Design as a discipline may be described as oscillating in a continuum between the artistic, the humanistic, and the scientific. None of them can be removed without eliminating the essence of design. Yet, a designer can be anyone trained in crafts, arts, engineering, architecture, or in fields of science and technology. In fact, design as a term has become so loosely defined that anyone who employs a human-centric approach to solving problems or exploring opportunities may be called a designer. These developments have led to the popularisation of 'design' and vast emergence of approaches referred to as 'design thinking'.

However, our approaches to addressing change, including anticipating needs, framing problems, and creating innovative solutions, vary widely depending on how we understand and value design. Designers may on one hand be the sole locus, ideator and creator of change, or, as we increasingly experience, take the role of the facilitator and moderator in nurturing such processes of change. Regardless, in their role, designers need to negotiate the movement from one condition to the other, and thus need the tools to argue for the appropriateness and quality of the solution, whether sensory, cognitive, emotional, instrumental, or in other ways defined, in the social, cultural, environmental or economic context.

In this special issue of the *Journal of Design Research*, design will be discussed as an activity and practice, which involves a particular mindset: a 'third way' to regard and address problems, which balances the need for (creative) intuition and (logical) rationality. Intuition may be a powerful force when instigating change, but it cannot roam free. We need evidence to support what we do. However, if what we do is in the domain of the experienced, perceived, and interpreted, how do we know that our solution, whether individually or collaboratively created, 'works'? What can we know about relevant and valid principles of design, and how may we find out? On the other hand, searching for 'too much' evidence may restrain our creativity and reduce our sensitivity towards valuable design outcomes generated from micro practices, and denounce the fact that we are bounded by rationality.

In the issue at hand, we address the multifaceted and complex aspects of balancing intuition and evidence through a collection of papers, which explore the practices and processes of design from various perspectives. The four articles urge design practitioners

to balance intuition and evidence in cultivating a flexible mindset, which enables creativity to flourish, facilitating collaboration among different stakeholders.

This special issue contains in total four papers on the topic of 'Intuition and Evidence in Design'. Three of these papers, written by Christoforidou et al., Halldórsson et al. and Proulx, are included in this issue. The fourth paper of this special issue, written by Andersson et al., is part of issue JDR Vol. 18, Nos. 5/6, pp.410–433. Although distributed in two issues, they should be seen as part of the same special issue.

Besides the papers published as part of our special issue, this issue also contains some regularly submitted papers. These are 'Optimal design method for orthopaedic footwear insole customisation based on anthropometric data and NURBS system', by Ipaki et al., 'Design for sustainability on inclusive post-disaster recovery: gamification techniques for collecting survivors' experiences', by Cubelos et al., 'Using the multi-level perspective for problem articulation, leverage point identification, and systems storytelling in design', by Wallace, 'Fostering creativity through co-design and making: case studies of makerspaces in the UK', by Lam et al. and 'A ladder-truss of citizen participation: re-imagining Arnstein's ladder to bridge between the community and sustainable urban design outcomes', by White and Langenheim.

Intuition and evidence in design

We now move on to presenting the four papers of this special issue on 'Intuition and Evidence in Design'.

Starting with the practices of the designer, Christoforidou et al., in their paper 'Monolithic vs. polylithic design cultures? designers' accounts of professional practices in Sweden and New Zealand', asks: What is a designer? What shapes the profession, the identity of the designer, and the idea of the contribution of the designer to society? In the text, we get a unique glimpse into the practice of industrial designers in two seemingly similar, yet characteristically different, contexts. Albeit defining themselves as just that, 'industrial designers', their ways of defining their profession may in some ways be described as opposing extremities, while at the same time overlapping in other ways. The taste of the two professions, one flavoured by the can-do mentality required by the hardships of new-world settlement, and the other by the sometimes-heavy burden of the old-world modernist dogma, has led to two distinctly different and contrasting mentalities of design, flavoured by the tension of evidence and intuition. Both carry the traditions, skill-sets and ideas of renewal forward into the future, but in very different ways. This may be seen in the notion of design innovation. While it may be achieved by radically questioning and challenging the status quo, it may also be done with incremental refinement, strictly adhering to established and expected traditions, but refined in its reinterpretation within the classic paradigm. Using the ideas of Bourdieu (1977), the habitus of the profession rests on the long tradition of design practice and expression. In her paper, Christoforidou shows how this takes distinctive shapes because of the local conditions in the particular contexts. What we see echoes with the reasoning of Muratovski (2017, p.8), in that designers have moved from operating 'on the surface of the problem' towards engaging with complex problems requiring strategic planning, involving problem-finding and problem-solving. As this happens, the role of the designer in society is also changing, which is reflected in what is today widely referred to as 'design thinking'. The collective and socially shaped environment allow us to innovate

based on gut feeling and intuition; the idea of what the contribution of designers is and should be, becomes very evident in this study.

In his paper 'How did you do that? The value of externalising knowledge in graphic design', Halldórsson et al. dives into the largely unexplored territory of graphic design. He aims to explicate the value of externalising knowledge in order to better navigate the ever-changing landscape of modern-day graphic design and to build a solid identity as a professional designer, by understanding "what really happens in practice". The externalisation of knowledge with respect to professional practice, which falls within the realm of practice theory, emphasises the tacit and informal, the routine and the non-routine, the formal and the informal, as well as the growing engagement with activity, reflecting its origins in the sociology of everyday life (Cetina et al., 2005; Johnson and Huff, 1997). By affirming the significance of individual and explicit micro-activities within society (Whittington, 2006, p.614), significant attention should be paid to the detailed, idiosyncratic "murmurings of the everyday" (De Certeau, 1984, p.70). In this sense, "what is done" is equally important to "how it is done". This implies that to understand "what practice is all about": intuition and rationalisation should guide activity, or should be embedded in the activity itself, based upon shared understandings, cultural rules, languages and procedures.

Moreover, Halldórsson discusses the value of graphical knowledge when applying manual design methods, which is disappearing when using digital design tools. What are the skills and knowledge possessed by graphic designers that make their work worthwhile? How do graphic designers describe their skills and knowledge? By revisiting and elaborating the characteristics and challenges, which the graphic design profession faces with respect to 'Intuition and Evidence', Halldórsson argues for the need to theorise and verbalise knowledge and skills a graphic designer should possess. To prevent the "degradation of the graphic design profession", interviewed designers stressed the importance of engagement and confidence by showing their work through manual means of representation, as well as to provide solid arguments for a typical design when presenting to clients.

Halldórsson claims that externalising design knowledge is essential to prevent the loss of identity and devaluation of the graphic design profession. Acknowledging that failure and success, trial and error, experiment and experience, are behind every intuitive decision could inspire and lead to understanding within the graphic design community. Intuition, rationality and evidence are thus highly intertwined within the field of graphic design.

While Christoforidou and Halldórsson attempt to uncover some of the cultural characteristics embedded within the practices of industrial and graphic designers, we are offered insights into actual design practices in the works by Proulx and Andersson.

Moving on with the inquiry into the nature of intuition and evidence, the work of Proulx presents a deep dive into the very nature of how designers may proceed to identify, understand and address complex problems. In his paper, 'Between gut feeling and structured reflective process: the *Art* of diagnosis', Proulx builds on the practices of clinical research, acknowledging the need to understand the root cause before devising a treatment as a solution. By demonstrating how differential diagnosis can be applied in an undergraduate design studio assignment to support front-end research and problem identification, Proulx suggests that a similar approach may be adopted in the field of design.

As argued by Dorst (2015), restructuring and framing of problems is an essential part of the design process; however, designers are sometimes too eager to frame the problem (Cross, 2011), relying on conjectures and intuition rather than turning to available evidence. Furthermore, scholars emphasise the importance of 'dual-process' theories of the mind when aiming for an equilibrium between intuitive and reflective thinking and reasoning (Cecchini, 2021).

Suggesting the introduction of a methodological framework based on the differential diagnosis method borrowed from clinical medicine to provide design students with tools to tackle the problem identification phase of the design process, Proulx aims to comprehend the roles of intuition and reflective reasoning in design activity by advocating a structured and evidence-informed approach to think about problem identification.

In his paper, Proulx addresses the advantages and disadvantages of intuitive reasoning versus a diagnostic approach towards problem identification and decision making. He outlines the challenges with respect to "thinking about the problem", thereby calling for a structured and evidence-informed approach to think and identify problems from its signs and symptoms, as well as the outcomes of an analysis of the cause or nature of a condition, situation, or problem. Furthermore, Proulx revisits the analogy between diagnostic, medical and analytical design practices from a cognitive skills and abilities perspective, suggesting that the demands of specific cognitive process diagnosis align with the abductive mode of reasoning and logic of discovery.

The abductive logic of reasoning and discovery is elaborated and discussed using a five-step differential diagnostic process. The purpose of this process is to provide a frame of reference to mitigate the risk of pursing avenues based on ill-informed intuition, while allowing conjectural interventions to iteratively take place. The application of differential diagnostics is illustrated using an example from second year industrial design studio teaching, where students are presented with an open-ended purposely ill-defined challenge from an innovation focused task force, working within their university Office of Distance Education and E-Learning. As described in the concluding section, differential diagnostics has proven to be invaluable in offering students a learning structure for approaching complex information and appraising the limits of intuition.

Finally, the text by Andersson examines the organisation of the design function in mature "original equipment manufacturing" industries. It also explores how decision making is done in design work. These two perspectives may at a first glance seem to be rather unrelated; however, it appears that they are not. In his paper 'Design judgement processes in mature Swedish manufacturing companies', Andersson suggests that the way designers make decisions, and how they argue for these, depends on who they work with. Andersson turns to decision making theory suggested by Evans and Stanovich (2013) to explain designers' decision-making rationale in terms of type 1 and type 2 thinking. While working with like-minded peers, designers largely rely on type 1 processes, which are predominantly intuitive in character. In fact, they are often described as decisions being made on 'gut-feeling'; a type of low-cognitive effort, experience-based contextualised decision making that rarely has to be explained. However, when working with other 'non-design' functions, designers have to turn to type 2 processing, which relies on rational, explicit and rule-based knowledge.

As suggested by Catalano et al. (2006), designers change the way they communicate depending on who they interact with. Andersson argues that this leads to different types of compromise. If the design function is required to negotiate with other functions, this

leads to evidence-based compromises, often based on metric-based evaluation methods. This makes it more difficult to argue for design proposals using emotional or subjective criteria. However, if the design function has a high level of autonomy and support and is therefore 'protected' by management, design decision making is often more intuitive, leading to design proposals with a higher 'wow' level. The four ways of organising the design function proposed by Andersson contribute to a deeper understanding of how the design function can contribute to strategic design decision-making and whether these decisions are more or less intuitive or rational in nature.

The four papers presented in this special edition each cast a different light on how we may understand the complex relationship between intuition and evidence in design. Together, they suggest variety and opportunity in different contexts and cultures, and through different methods and processes. We hope that the texts will inspire and inform, and perhaps assist, in understanding the transitions and oscillations between these inherent aspects of the profession and making of design.

Further reading

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