

## Editorial: Physical and Digital Materials in Creative Design Practice

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Physical and digital materials are in design practice used both as the material out of which designers craft products but also as catalysts that are only part of the design process. The latter kind of materials are used as externalizations (Dix and Gongorra 2011) while developing ideas. For example, Post-It notes on whiteboards are used for brainstorming, grouping and organising idea during the early part of the design process. Designers also use cardboard and paper to sketch out a proposed solution, each sketch building on the previous ones as she/he works through the design space. The successive sketches are temporarily used materials that designers discard at some point in the design process. Another example is the use of prototypes, which are used to explore alternatives, or illustrate ideas, much like an architect uses his sketchpad to explore and communicate alternatives for the design of a building. In other phases the architects may experiment with different materials like concrete, wood and glass in order to examine the qualities of the materials.

Key components of design methods for creative design practice may be organized around three main aspects: concrete aspect, conceptual aspects and aspects related to managing the design space (Biskjaer, Dalsgaard, & Halskov 2017). The concrete aspects includes the materials, which is the key theme of this track, that are employed as part of the design process, as well as tool applied in the process. Of particular relevance for creative process are the conceptual aspects, which include use of analogy, metaphor and combination. Design space may be defined as a conceptual space that bound all potential designs and which is framed, constructed and transformed through a complex process of divergence and convergence (Dove, Biskjaer and Halskov 2016).

To advance the understanding of the role of materials in creative design processes the track *Physical and Digital Materials in Creative Design Practice* examines and discusses the role and nature of materials in creative work, and explore how to use material to support and augment creative design processes.

More specifically, the objective of the track is to 1) to explore the potentials of integrating multiple digital devices and physical materials in a shared environment to support individual and collaborative creativity, and 2) to develop the theoretical foundation for generative design materials, including, creativity constraints, emergence of design ideas, and creative methods in design



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processes. More broadly the track contributes to a set of key creativity research questions, see also (CIBIS 2018):

- What kind of software infrastructure can handle a dynamic mix of personal and shared devices?
- How can we conceptualize the emergence and transformation of design ideas across devices in creative design processes?
- How can generative design materials, digital as well as physical, spur ideation and create momentum in a creative process?
- How can creativity methods be supported and augmented by digital tools and materials?
- What is the nature of creativity constraints in generative design materials and how can they be balanced and managed in a creative process?

The track opens with the paper 'How Materials Support Conceptual Blending in Ideation' by Biskjaer, Fischel, Dove and Halskov, which investigates how conceptual blending supported by digital design material unfold during a design workshop. The authors show empirically how the design materials help stabilize the conceptual blend as it emerges during the workshop.

In 'Co-located Team Designing' Christensen and Abildgaard dive into 23 hours of team activity amongst 25 high-school students and provide us with detailed insight into how joint attention is established through physical and digital materials during creative sub-processes, such as information search, problem defining, idea generation, and decision-making.

In 'Designing Idea Management Tools' Inie, Dalsgaard and Dove identify a set of challenges for designers working with idea managements tools based on an interview study with 16 professional designers, which they us a platform for offering directions for the development of next-generation idea management tools.

In the final paper 'How Emerging Technologies Influence Designing' Ward, Stoltermann and Beck broaden the scope of the track and present and discuss a series of studies of the design and use of conversational agent. One of the key findings is that interaction design must be observant and willing to change its practice in relation to changes in its material, i.e. technology.

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