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## Introduction: Embodied Making and Learning

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## Introduction: Embodied Making and Learning

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Theory on the embodied mind has evolved rapidly in the past decade, influencing research on cognition in all strands of science. Also the field of Design has started to investigate the implications of understanding the *Mind* as fundamentally dependent on the embodied interaction with our environment for development. Design- and craft researchers have for long consulted theories close to phenomenology in the search to understand the implicit and experiential knowledge that emerges in the act of making.

Theories on *Tacit Knowledge* (Polanyi, 1958, 1966), *Affordances* (Gibson, 1986; Norman, 1988) and *Knowing-in-action* (Schön, 1983) may all be directly linked to the theory on the embodied mind (Damasio, 1999; Johnson, 2007, Lakoff & Johnson, 1980, 1999; Noë, 2004, 2009; Thompson, 2010; Varela, Thompson, & Rosch, 1991). Although there are different strands, the general theory on the embodied mind may be summed up to the following four E:s - The mind is *Embodied*, thus we are situated and our understandings are *Embedded*. Our mind is *Enacted* through the body. We offload meaning on external objects, thus our mind is *Extended* (Damasio, 1999; Johnson, 2007).

For design research, this theoretical framework opens up issues of practice for theoretical pondering. If all knowing is facilitated by the body and emerges in interaction with the environment, making with materials appear as a fundamental way of gaining knowledge. As making is contributing to intrapersonal sense making and development it may be used as a platform also for interpersonal sense making and communication in education as well as in the design practice.

In this thematic session papers explore the phenomenon of embodied making and the conditions for it within the wide spectrum of design processes, and how embodied making contribute to learning during the design process. Papers presented in this additional theme considers the basic conditions and consequences of being a body in the world, experiencing



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and learning through working in materials. The term ‘design processes’ is used in a broad sense: the focus is on the act of making, and the maker could thus be everyone engaged in creative processes making objects in a material.

Understanding making processes and cognitive processes as embodied, has consequences for our understanding of learning and knowledge, supporting previous research drawing on an epistemological stand of knowledge as activity (Dewey, 1958; Eisner, 2002; Molander, 2015; Schön, 1983). Such accounts can now be referred to as embodied learning (Juelskjær, Moser, & Schilhab, 2008). An embodied learning perspective highlights the link between the body’s activity and cognitive development in learning, expanding the traditional view of learning as an abstract, mental process (Bengtsson, 2013; Engelsrud, 2006; Moser, 2014). This has the potential to contribute to the debate in the present global educational situation, where engagement in making processes is not readily aligned to international tests, standardization, or educational accountability (Bamford, 2006).

The thematic session provides both an incitement and a platform for presenting and discussing various aspects of embodied making and learning. The papers presented in this track discuss core issues of embodied making and learning through various theoretical and methodological means.

The first presentation, *The role of sensory experiences and emotion in craft practice* by Camilla Groth, links sensory experiences with emotion and sense making in craft practice. Drawing on new knowledge on embodied cognition that upgrades the importance of emotions in risk assessment and decision making process, she presents a practice-led study in clay throwing. Groth’s analysis of how emotions and experience guided her risk assessment, decision making and problem solving expand current knowledge of the role of emotions and sensory experiences in the embodied making processes in craft practice.

In our second presentation, *Learning what it means to learn: first-hand experience in the process of material transformations*, By Biljana Fredriksen we dive into the sense making process of children and learn how their embodied material exploration aids in new understandings. The paper present specific examples of three year old children’s first-hand experiences in material transformation, and discusses how these experiences relate to their learning. Fredriksen proposes that even adult learn through such experiences, and that it even could be an arena for learning how to learn.

After these two introductory presentations we will hear about two research projects that combine design research with neuroscience. Traditionally the mind has been studied separately from the body, but as a new understanding about the embodied mind has emerged there is a need to research the embodied mind in action. The first of these two presentations, *Why making matters—developing an interdisciplinary research project on how embodied making may contribute to learning* by Marte S. Gulliksen, envisions a new project development that would be truly interdisciplinary. Knowledge from the rapidly developing neurosciences shows promise to generate insight that could be useful for confirming and expanding current knowledge on how embodied making contribute to

learning. Gulliksen has taken on the challenge to write about relevant neurobiological knowledge from a woodcarver and craft teacher perspective through a series of articles. In her paper, she presents this strategy and the aims for such a project development, tentative ideas for future interdisciplinary studies that has been put forth in the series of articles and the methodological framework for the project: an integrative applied research approach.

The next paper presents a project combining the study of mind and body in design and craft practice, the Handling Mind project. The results of this three year project are presented by Marianne Leinikka, in the session on *Physiological measurements of drawing and forming activities*. In the Handling Mind project, psychophysiological experiments were designed and conducted to study the relationship between making and feeling, handling creative situations and the embodied mind. Through a careful design comprising visual and material design in three different tasks, the study's findings present new knowledge expanding current knowledge on embodied activities.

In the following three presentations the theme of embodied making are further expanding the topic from other perspectives. In her presentation *Constructing, deconstructing and reconstructing knowledge through making* Anna Louise Piper bridges the gap between implicit and explicit knowledge. The paper presents a practice-led study of the development of composite woven garments, and uses this study to demonstrate how process object analysis advance creative practice, in particular in regards to the transition from hand production to digital production. Piper's paper is in the form of a 'visual essay' to bridge the gap between implicit and explicit knowledge.

The situatedness of a practice put demands on the design process to be embedded in real world situations and to consider the lived experiences of the users. The following presentation; *Experience Labs: co-creating health and care innovations using design tools and artefacts* by Tara French, Gemma Teal, and Sneha Raman, presents the project "Experience Labs". Experience labs are an approach developed to facilitate meetings between those receiving and delivering healthcare. The labs are means of co-creating new solutions by shared insights from participants from both ends of the health care, to engage in the design process and experience new concepts. This paper brings in a new perspective on embodied making through design for healthcare.

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