Transdisciplinary Ecosystem of Methods

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Abstract. While engineering products have combined software and hardware for the last 50 years, the way engineers from different disciplines approach design is still very different and their activities in organisations are not well integrated. One of the big challenges over the next decades is to integrate different engineering disciplines with different traditions into coherent and effective processes. With the increasing importance of data and AI in engineering processes, engineering companies also have to integrate data scientists and mathematicians. Many companies are still dominated by the original discipline of the product, e.g. car companies are largely managed by mechanical engineers or construction projects by civil engineers. With this comes a dominance of the tools and methods of these domains; and an unbalanced power relationship between what is still seen as the "home discipline" and the new disciplines. Methods work best when they don't stand alone, but operate in an ecosystem with coherent terminology and clear links between the input and output of different methods. This requires a radical rethinking about methods to accommodate the different life cycles of the elements of a complex product and the specific properties of physical and digital elements of systems. Developing a transdisciplinary ecosystem of methods is an epistemic as well as a sociotechnical problem, that requires a holistic understanding of engineering and an objective look at the strength and weaknesses of existing approaches. However, it is not enough just to integrate the professional participants; users and clients also need to be able to interact with the representations generated by methods to enable them to play an active role or give timely feedback.

Claudia Eckert is Professor of Design at the Open University, the British distance education university, where she also carried out her doctoral research on design processes in the knitwear industry, before spending nearly 10 years in the Engineering Design Centre at the University of Cambridge. Her research interests are in understanding and supporting design processes. She is also working on comparisons between design domains.

Transdisciplinarity is a lived experience for Prof Eckert. She studied mathematics in Augsburg, Oxford and Munich and obtained an undergraduate degree in Philosophy from the Munich School of Philosophy. She has an MSc in Applied Artificial Intelligence from the University of Aberdeen and a PhD in Design from the Open University. Her research has applied techniques drawn from sociology and cognitive science. She has always been fascinated by design as a complex human endeavour where large and diverse groups of people come to together to achieve common goals. She studies with equal passion future trends in engineering, sustainability in fashion, overdesign in building services, and the epistemology of engineering design.

She has published widely and serves as an area editor for Research in Engineering Design and Design Science. She is chair of the advisory board of the Design Society.