Argumentation and Reasoning in Design: An Empirical Analysis of the Effects of Verbal Reasoning on Idea Value in Group Idea Generation

Reasoning is argumentative and is at the core of design activity and thinking. Understanding the influence of reasoning on the value of ideas is key to support design practice. The paper aims to show the effect of verbal reasoning on the value of ideas. Protocol analyses of four industry cases doing idea generation shows that framing by certainty and deductive reasoning lead to useful incremental ideas while framing by uncertainty and abductive reasoning lead to radical ideas. The paper concludes that the way of framing ideas is indicative of how ideas add value to on-going design processes.

SMART product innovation: a process manual for implementing and completing the SMART process

Among the inspirations for the SMART process is “design to customer value,” where products are modified based on a thorough understanding of customers that allows product developers to eliminate features that do not affect customer satisfaction while including only the elements and functionality that customers really appreciate. The SMART process includes methods to understand product value for the customer and the user; analyse the cost of components and processes; combine customer value and cost reduction potentials into feasible, high-value concepts; and generate prototypes that can be tested with users and customers.
SMART Product Innovation: a process for higher value and lower price to improve margins

The Danish Industry Foundation has spent years working on projects in Denmark and abroad. The focal point has always been the same – to support Danish competitiveness. However, all the projects had different focuses, different approaches and different participants. As a result of the many lessons learned from these projects, the Danish Industry Foundation experienced that Danish companies are often challenged on nearby markets. For obvious reasons, these markets have always been essential for Danish companies and Danish export. These markets are still very important. However, sometimes the price competition can be a challenge. The price of the Danish products is often too high in relation to the competitors’ prices regardless of the fact that quality or functionality coincides with the price. In a time still dominated by the European crisis – financial, economic or debt related - the export of Danish products to our neighboring countries continues to suffer. The customers’ financial capacity has been reduced and cheaper products from Asia and other regions have found their way into our local markets. Competition is fierce – especially pricewise. This was the starting point for the SMART project. The ambition of The Danish Industry Foundation and The Kata Foundation was to develop a method; a robust and specific approach to ensure that product innovation in Danish enterprises in practice would result in products of the highest quality, producible at lower costs and profitable at competitive prices. Together with the Technical University of Denmark, we have documented the method in this booklet. The booklet also presents three Danish companies explaining how the SMART-model has led to less expensive products, higher customer satisfaction and improved earnings.

An Experimental Study of Reasoning in Design: Testing the Pattern of Reasoning in Conceptual Design

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Relations
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Reasoning in Design: Idea Generation Condition Effects on Reasoning Processes and Evaluation of Ideas

Reasoning is at the core of design activity and thinking. Thus, understanding and explaining reasoning in design is fundamental to understand and support design practice. This paper investigates reasoning in design and its relationship to varying foci at the stage of idea generation and subsequent performance of ideas developed. Understanding reasoning in design and its relationship to the performance of ideas generated is important to understand design activity, which can be used to develop tools or methods that can improve the effectiveness of design teams. Protocol analyses were conducted to investigate idea generation sessions of two industry cases. Reasoning was found to appear in sequences of alternating reasoning types where the initiating reasoning type was decisive. The study found that abductive reasoning led to more radical ideas, whereas deductive reasoning led to ideas being for project requirements, but having a higher proportion being rejected as not valuable. The study sheds light on the conditions that promote these reasoning types. The study is one of the first of its kind and advances an understanding of reasoning in design by empirical means and suggests a relationship between reasoning and idea performance. Findings of the study further allows for a way to analyse and improve the performance of idea generation in design teams.

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Demonstration projects in transition processes to sustainable energy and transport

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Inventory of demonstration and trial projects in sustainable energy and transport in Scandinavia: INNODEMO Work Package 2 Report

This report documents the work of work package 2 of the InnoDemo research project funded by the Research Council of Norway. Partners in the project are The Nordic Institute for Studies in Innovation, Research and Education (NIFU) (project leader), DTU Management Engineering at Technical University of Denmark, and CIRCLE at Lund’s University.
From a state-of-the-art study in the project's work package 1, a set of characteristics have been specified to be collected in an inventory of demonstration projects and funding programmes. This data was collected in parallel in Denmark, Norway and Sweden in the second half of 2013.
Between generative prototyping and work of synthesis in design: Interplay and adding value in the early concept development

The paper analyzes a case in which generative prototypes are applied as part of a participatory design methodology to elicit insights from practitioners, and how these insights are translated and represented, to inform the following work of synthesis in design.

In literature, arguments are made for the value of involving practitioners as active participants in the development process, which holds the potential to develop innovative products. The paper unfolds a discussion on how knowledge from different sources can be qualified and re-qualified through a methodology of generative iterations, creating a valuable interplay between participatory sessions and background development work. Through an empirical study, it is analyzed how this can be achieved through intermediate methods informing decisions in design to be made based on practitioner wishes and desires, but necessitating re-qualification through iterations.

The paper concludes, that the methodology can frame a process of eliciting explicit and implicit knowledge from different sources, but that the designer, as being part of the entire process, comes to hold ‘sticky’ knowledge that difficult to transfer, which implicitly influences the design process. It is considered how such brokering of knowledge by the designer can have a role in the further downstream of product development.

Between participants, props and stage: Eliciting insights through interaction

How can we develop innovative concepts? The purpose of this paper is to investigate how generative prototype sessions can elicit so-called tacit and latent knowledge from participants through interaction and play. To illustrate this, a session from the design process will be described along with a brief take on current theories. It is discussed how practical tools and methods along with the dynamics occurring during such a session can translate actor knowledge to become useful throughout a the entire design process. The paper concludes that knowledge gained from generative prototype sessions is an indiscernible blend of different types of knowledge, but that tacit and latent constitutes an important part.
**Projects:**

**Methods to support creative processes at the early stages of product development**

Department of Management Engineering  
Period: 01/12/2013 → 30/09/2018  
Number of participants: 3  
PhD Student:  
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Project: PhD

**Activities:**

**Design Computing and Cognition**  
Claus L. Cramer-Petersen (Participant)  
Department of Management Engineering  
Technology and Innovation Management

**Description**

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Documents:  
An Experimental Study of Reasoning in Design: Testing the Pattern of Reasoning in Conceptual Design

**Related event**

**Design Computing and Cognition: Bringing artificial intelligence, cognitive science and computational theories to design research**  
21/06/2014 → 25/06/2014  
London, United Kingdom  
Activity: Attending an event › Participating in or organising workshops, courses, seminars etc.
Nordic Science and Technology Studies  
Period: 24 Apr 2014 → 26 Apr 2014  
Claus L. Cramer-Petersen (Participant)  
Department of Management Engineering  
Technology and Innovation Management

Related event

Nordic Science and Technology Studies  
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Trondheim, Norway  
Activity: Attending an event › Participating in or organising a conference