

Generic abstraction in design creativity: the case of Staatsgalerie by James Stirling

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This study examines the role of generic abstraction in architectural design, specifically how it facilitates exploration through formulation of a family of design schemes. We maintain that exploration in design, as it is in scientific discovery, is not solely based on serendipity, but that designers often strategically structure their explorations. We single out three instances of structuring through 'generic abstraction' in the case study of Staatsgalerie by Stirling. We hypothesize that generic abstractions help designers to mentally simulate different spatial components which lead to the generation of a novel design conceptualization. In the case at hand, the abstraction processes were sustained within a distributed cognitive system that consisted of one senior and two junior designers together with external representations in the form of sketches and diagrams.

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Design cognition studies emphasize the facilitating role of sketches in the process of creative discovery (Goel, 1995; Goldschmidt, 1991; Schön, 1992). Some of these accounts describe the design process via sketching almost exclusively either in terms of 'serendipity' (Suwa, Gero, & Purcell, 2000) or of 'piecemeal evolution' of design ideas through localized changes (Maher & Tang, 2003). In the area of scientific discovery, although some researchers also point to the significance of serendipitous discovery in science (see, e.g., Thagard, 2002), numerous others show that creative ideas are often the outcomes of processes of reasoning through extended structured explorations (Darden, 1991; Giere, 1992; Gooding, 1990; Holmes, 1985; Nersessian, 2008). These explorations involve a variety of reasoning strategies, and here we focus on one we think particularly relevant to design. Nersessian (1999, 2008) has shown how a process of what she called 'reasoning via *generic*

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abstraction’ was central to the scientific discoveries of both Maxwell and Faraday, and can be seen in the work of numerous other scientists. Generic abstraction consists of ‘selectively suppressing information instantiated in a representation, so as to make inferences that pertain only to the generic case’ (Nersessian, 2008, p. 193). In this paper we argue that reasoning via generic abstraction is also an exploration strategy that fosters creativity in architectural design.

We highlight the salient features of generic abstraction in a significant case study: James Stirling’s Staatsgalerie Museum extension project using cognitive-historical analysis of archival records (Nersessian, 1992, 1995). Cognitive-historical analysis interprets and explains the generativity of reasoning practices in light of salient cognitive science investigations and findings of mundane cognition. Saliency is determined by the nature of the practices under scrutiny. The objective of cognitive–historical analysis is both to enrich historical interpretation and to enrich understanding of cognition in context through examining how these practices originate, develop, and are used in creative thinking. The practices can be examined over time spans of varying length, ranging from shorter spans defined by the activity itself to spans of decades or more.

Further, in the Stirling project, the abstraction processes were sustained through a collaborative effort within a distributed cognitive system (Hutchins, 1995) that consisted of one senior and two junior designers, and representations in the form of sketches and diagrams, and spanned the course of a five months. Lawson writes that ‘until the untimely and tragic death of James Stirling, he and Michael Wilford shared a room, which in turn looked onto the general office through a large and normally open doorway. These two partners both worked on the same projects and hardly divided at all, even overhearing each other’s telephone conversations and discussions with other staff’ (Lawson, 2006, p. 249). Even though there are conflicting ideas about the extent to which Wilford was influential in the initial design phase of the projects, the particular setting in which Stirling positioned himself in the office tells us that he never was a loner as a designer and that he worked side-by-side with others. As we have reconstructed, each designer in this distributed cognitive system had specific roles and each representational system had a corresponding cognitive function following the notion of coupled representational systems as suggested by Zhang and Norman (1994). Zhang and Norman studied problem solving in terms of specific cognitive roles of internal representations and external representations in a distributed cognitive system. Studying the effect of the use of different representational systems on problem solving, they found that external representations with different characteristics have significantly different facilitative roles in cognition. They claim that external representations activate the perceptual processes and internal representations activate the cognitive processes. In general, the totality of the research on diagrams supports the contention that diagrams,

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