Collaboration in Design: Evolving Conceptual Diagrams

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This study presents the results of cognitive-historical analysis (Nersessian, 1995) of two case studies from architectural practice: the First Unitarian Church of Rochester by Louis I. Kahn and the New Staatsgalerie by Stirling and Wilford Associates. The investigations trace the evolution of the cognitive system in each case through studying sketches and focusing on one particular kind of external representation: the conceptual diagrams.

What we mean by a 'conceptual diagram' is an abstract representation that embeds a conceptualization of a design situation (Dogan & Nersessian, 2002). These diagrams are concise, yet powerful in that they provide high-level commitments constraining potential solutions. They embed generic characteristics and convey the form of possible specific design schemes. That they are not detailed prevents early commitment to a specific scheme and, thus, they facilitate exploratory reasoning. At the same time they are not ambiguous in the way other kinds of sketches are in that they fix meaning and constrain a set of related solutions.

In the design process of the Unitarian Church, Khan's conceptual diagram became a socially agreed upon conceptualization facilitating and regulating communication between client and architect. Kahn's commitment to his form concept specified constraints that simplified the search for a satisfactory design. His individual commitment to the form concept, however, did not block design flexibility. His client's contributions were made effective by the joint use of Kahn's conceptual diagram. The client appreciated the conceptualization represented in diagram, which provided criteria for assessment of later schemes that could meet their additional constraints.

In the case of Kahn, the conceptual diagram was instrumental in collaboration with the client, whereas in the case of Staatsgalerie it became instrumental facilitating the collaboration among peer designers.

For the Staatsgalerie project, Stirling designed a satisfying scheme only after re-sketching earlier drawings of junior designers in his office. Stirling's re-sketching helped him to understand the design ideas involved in the earlier schemes and to advance those ideas.

The junior designers in the office worked together side by side and they presented their ideas through sketches to Stirling. This was a collaboration conducted largely through sketches. According to the historical records, this significant collaborative effort evolved mainly through sketches with few discussions and conversations. The collaboration evolved in terms of successive stages. First, "a wide ranging diagrammatic exercise carried out to establish all possible ways of configuring the building." The alternatives produced at the end of this stage would then be presented to Stirling who would work on these sketches to "select, edit, alter, add." He would do this by "taking the A4 photocopied clip and putting an A4 tracing paper on top and doodling." Finally, "the concept thereby results from a myriad of ideas" (Wilford, 1996, p. 14). This was a process of simplification of the complexity through re-sketching to leave only what is deemed necessary and sufficient for achieving a design solution.

The process of collaboration in both projects is an informative example of distributed cognition within either a group of professional designers or between a designer and his client. The design collaboration is a problem-solving effort that is sustained in time and space through external representations that are in the form of abstract, simplified drawings, sketches or diagrams.

In both cases conceptual diagrams helped the designers represent complex relationships through perceptual characteristics of diagrams. Studies in diagrammatic reasoning have shown that diagrams facilitate reasoning and problem solving by elucidating complex relationships (See, e.g., (Bauer & Johnson-Laird, 1993)). Conceptual diagrams in design simplify the complexity of conceptualizations by embodying the most salient, constraining features of design situations and their relationship to one another. Through these kinds of diagrams, conflicting constraints are resolved through establishing dependency relationships between them or by modifying them. This serves to enhance collaboration.

References

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