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The Three Visions of Design in the Field of Cognitive Design Studies

Willemien Visser, Guest editor

Introduction to issue 2 of *Collection*, on "Art + Design & Psychology"

The field in which we situate ourselves is that of *cognitive design studies*. It is a field that not only encompasses the cognitive ergonomics of design, but also goes beyond it. We have adopted the perspective of cognitive psychology in undertaking our studies—even if we have enlarged this perspective with elements of a socio-cultural nature, specifically in our analyses of design in collaborative situations.

Cognitive psychology focuses on "cognition": it studies the processes and structures concerning the manner in which people think, reason, and act in a variety of different ways, drawing from their experiences, representations, and knowledge. In addition, studies in cognitive psychology bring elements that respond to questions of training, the nature of expertise, and the possible evolution from novice to expert in the field of design.

Cognitive psychology analyzes these activities from different angles, in particular the mental processes at work, the strategies adopted, and the types of knowledge used. It also examines how learning takes place and what differentiates the experts from the novices.

Cognition is implemented in both work and leisure activities, which require people, for example, to: use language, understand others, use objects, interpret situations, plan tasks, resolve problems, pass judgments, and take decisions.

It is for numerous reasons that cognitive psychology studies design, as all of the processes and activities cited above are mobilized for this task. Experience, knowledge, and representations play a central role in the activity of design.

Until very recently, there was a clear separation between studies on cognition and studies on emotion; these two fundamental aspects of human functioning were considered quite distinct. Today, there is a growing amount of research that adopts an approach integrating these two facets. This is also the case in studies on design, as we will see in two texts within this issue.

Cognitive psychology is heavily centered in the laboratory, where it examines cognition through experimental studies. It is equally in such well-controlled situations that the activity of design has been studied. There is, however, increasing research on design that has been undertaken in "natural" situations, in working conditions such as design offices and agencies. In these studies, researchers generally make observations (often qualified as "ethnographic"), taking notes, collecting discarded materials, and/or making video recordings of the activity of designers at work (in order to refer to them in consecutive analyses).

The following are two examples of studies that we have conducted on industrial design projects (software design and mechanical design):

- The planning and organization of the activity of design. We showed how designers plan (before its actual implementation) and organize (in reality) their activity, and how the actual organization of the activity is different from the plans that the designers had developed (more or less deliberately). We have characterized this actual organization as "opportunistic", for designers deviate from their plans and/or abandon them—often temporarily—to take advantage of situations that constitute "opportunities" from a cognitive point of view. Some situations can, in effect, be interesting cognitively when they allow us to benefit from information obtained in an unexpected way (for example, suggestions from colleagues) or to use ideas developed for another part or facet of the artifact.

- Reuse in the activity of design. We have examined how designers reuse solutions developed for previous projects, realized by themselves or by their colleagues. In fact, even in the most creative or innovative cases, design concepts are never developed from scratch. In these activities of reuse, analogical reasoning is central: it is in adapting solutions developed for other projects (similar or analogous solutions) that designers advance on their current projects.

As we show in the following passages, taken from our book *The Cognitive Artifacts of Designing*, design was analyzed in cognitive design studies from three angles, which will be dealt with successively in this issue (figure 1):

1. Classically, it was analyzed as an activity of problem solving: the position introduced by Herbert Simon, presented in the first passage.

2. As a reflective practice: Donald Schön (presented in the second passage) opposed the vision that "design=problem solving". As a representative of the approach to design that has been qualified as "situated", he analyzes design as a reflective practice: the designer acts AND takes his actions as the object of reflection in his subsequent actions.

3. As a construction of representations: this is the approach that we have proposed (third passage). These representations may take different forms, and consist not only of external representations, such as drawings or maquettes, but also of mental representations—in other words, interpretations and other (more or less precise) ideas.

The first three articles of this journal will review these three visions of the activity of design.

Translated from French by Rebecca Cavanaugh