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Psychology and design processes ☆

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Abstract

The paper is concerned with the way in which designers tackle the process of design and the insights which can be gained from a psychological approach to this question. It discusses and advocates more research into the process of design decision-making, into creativity and design and problem solving in design as an individual and group activity.

Keywords: Psychology and designers; Design process; Creativity; Problem solving

1. Introduction

In writing about the topic of design and psychology, I find myself in a situation which I call the "reversed Jonas trap"; I am attempting to swallow the whale. After all, design is such a prolific human activity and psychology has an important say in all human endeavours. If we define design as a human activity "where the physical artefact or a part of it, which is under design, is not currently existent, but is believed to be so in the future" (Pohjola, 2003, p. 181), then basically any future planning is encompassed herein. Even the planning of a vacation falls into this definition. But also such heroic or mundane activities as infrastructure and city planning, architectural design, design of everyday products, interior

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design of furniture and apartments, motor car design, organisational structuring, creating fashions, planning and construction of complex nuclear and chemical installations.

There is a large body of literature concerning aesthetic design; a small example is formed by the many publications by members of the Bauhaus tradition and its offshoot in the US: Black Mountain College. But psychology also addressed the topic early on. In Hugo Münsterberg's Berlin lectures of 1912 (Münsterberg, 1913) he addressed, in one of his last chapters, the issues of shop window display from a design angle. General psychology, more specifically psychology of thinking, followed suit in the early 1920s in developing what was called "construction rules" such as "be critical", "stick to proven solutions", "be careful with rule of thumb solutions" (Meyer, 1926). Furthermore there was the important contribution of gestalt psychology in relation to the creative elements of design.

It should be quite evident from this short list that it is impossible to treat all these aspects in one paper or even one book. Hence, self-restriction is inevitable. The most fundamental issue for any design is to pursue a strategy which guarantees that the final design product matches user expectations in terms of the product's usability, functionality, safety, and requisite user competencies. This paper limits itself by illustrating this problem with reference to three separate but interrelated major themes, which draw on the earlier papers in this special issue, so forming a first reflection on its themes, in a psychological context:

1. The design of highly complex socio-technical systems with high hazard characteristics.
2. The processes of everyday product design in teams.
3. The theoretical aspects of design and creative problem finding/solving.

2. Design for safety: design of complex high hazard systems

During the second part of the 20th century the number and complexity of very large technical installations expanded to a hitherto unknown degree (Hughes, 1987; LaPorte, 1996). Hand in hand with their growth and spread went the increased possibility to bring peril and danger for people and environment. Examples include installations of the (petro)chemical industry, civil and military aviation, railway systems, the space industry and nuclear energy production. These are all installations in unforgiving environments where the accumulation of high energy or toxic substances must be controlled in order to avoid catastrophic consequences. Their characteristic features comprise the involvement of multiple actors, high levels of complexity, tightly coupled sub-systems and production processes with their concomitant opaqueness and control problems, coupled with comparatively high hazards. The thorough analysis of any major industrial accident – be it Three Mile Island, Chernobyl, the Challenger accident, the collision of two jumbo jets on the air strip in Tenerife, the train accident in Eschede (Germany) – invariably their analysis proves the point that it is never a single component failure or a single human error that breaches the necessary containment of concentrations of high energy or toxic substances. Rather, it is the often little understood interaction of factors emanating from various system levels which "cause" accidents: failures on the technical (component) level, erroneous individual (operator) action, inadequate work team activities, dysfunctional relations within the organisation or with the extra-organisational environment combine in ways not expected by the designers of the systems or their managers.

Safety in work systems has from its very beginning been a preoccupation of applied psychology (Münsterberg, 1913). However, its focus tended to be the occupational safety of