

System Design and Explanation

A. Have motivated the need for a design system that enables us to represent empirical and theoretical knowledge about a physical system. Currently have no satisfactory way to cope with non-logical aspects? cf controversial status of what is not expressed in words (cf Gooding pre-articulate world). In fact, much concern in design circles with prescribing and sharing knowledge about the design object. More appropriate focus in some circumstances is not why the design object is how it is. The eye-test as a case study.

B. Functions served by formal spec of knowledge re design object: communication, precision, reasoning

communication and precision with reference to information that is presumed to be representable by logic e.g. "quantifiable"
interpretable via universally agreed convention

cf the letter which doesn't presume possibility of direct interaction with the communicator

but I can I teach you to play the violin by mail? or make a violin?

cf communication between Faraday and his contemporaries pre the electromagnetic theory

reasoning is supplying information that is implicit in what has already been asserted
how does a sighted person convey the contents of a sketch to a blind person?

C. Communication via metaphor and artefact requires a physical model to mediate (an instrument)

orthodoxy would claim that communication of this kind is inferior, less trustworthy
In two respects, converse has some truth? E.g. in a formal system:

how do we know what something refers to?

how do we know that a system of constraints is consistent?

cf power of spreadsheet principle to establish reference

detectability and acceptability of local singularity in definitive script

important to know when things fail (which they always can without extra-logical presumptions)

not just precisely what they are like when they function correctly (cf serendipity airbus)
cf some mathematical concepts

are formalised wrt implicit reference to agency

invoke interaction in faithful implementation

D. Classification of design wrt the empirical-theoretical pyramid
object-oriented design

formal specification approach (is it a method of design?)

(semi-)automated design (neural nets, genetic algorithms, expert systems, Bayesian models)

E. What requirements for a good approach to representing design? Need to deal with concurrency in the design process, commitment, negotiation

Sources

Worlds before and beyond Words, Conceptual design paper
Gooding