

The Need for Design Cases: Disseminating Design Knowledge

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This article covers the definition of a design case as a specialized and critical form of design knowledge, including discussion of similar types of scholarship that are not design cases and the characteristic ways in which design cases are used. Arguments for developing rigorous design cases are presented.

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Citation: Boling, E. (2010). The Need for Design Cases: Disseminating Design Knowledge. *International Journal of Designs for Learning*, (1) 1. 1-8. Retrieved from <http://scholarworks.iu.edu/journals/index.php/ijdl/index>

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The Need for Design Cases: Disseminating Design Knowledge

What is a design case?

The design case is a vehicle for dissemination of precedent, direct or vicarious experience of existing designs stored as episodic memory (Lawson, 2004). Precedent is also described as “the unique knowledge embedded in a known design” (Oxman, 1994, p. 146), meaning, in everyday terms, that the memory of having experienced an existing design is a memory that contains special forms of knowledge. That knowledge includes the moves that one designer interprets another as having made in order for the design in question to have come into being, and the affordances this design offers for making such moves in the future (Norman, 2003).

Expert designers accumulate “a huge range of precedent which is stored as having affordances that might come in useful at some point in design projects” (Lawson, 2004, p. 456); they “browse freely and associatively between multiple precedents in order to make relevant connections ... [this] browsing enables the discovery of new, often unanticipated, concepts” (Oxman, 1994, p. 146). Design students are expected to develop this capability via their growing appreciation of the designed world and the specific designs they experience directly or via representation. While this may sound ad hoc in situations where design is viewed as primarily scientific and systematic (Smith and Boling, 2009), it is seen as central to design expertise and learning across traditional disciplines (Brown, 2008; Eckert & Stacey, 2005).

At heart, the design case is a description of a real artifact or experience that has been intentionally designed. A case may be as minimal as an individual image of a commercial product, a building, an advertisement, a classroom or anything else designed; these forms of design cases appear in hundreds of magazines, design annuals, competition catalogs, display books, web portfolios and similar venues. A case may also be as comprehensive as a full-length book tracing the inception of an idea through the process of design to the use and the ultimate destruction of the artifacts (Glanz & Lipton, 2003).

What is not a design case?

It may be worthwhile to discuss what design cases are not. Many forms of knowledge building share characteristics with design cases, although their aims are different and therefore expectations for what they will include are different as well.

Design cases are not research on design (Cross, 2007). This is a form of research that follows a social science model in which a naturally occurring phenomenon (like the act of designing, or the product of design) is studied to answer questions like, “What activities make up designing?” and “What kind of thinking do designers engage in when they are sketching?” Methods for carrying out such studies conform to the expectations and standards of science. Reports

of this kind of research include descriptions of those methods, of data sources, study participants, findings and generalizations or implications.

Design cases are not research in design, which might be called analysis and formative evaluation in some forms of systematic design (cultural probes, usability tests, audience analysis); these studies tend to be carried out, appropriately, using scientific or social science methods (Cross, 2007). While a design case might include descriptions of research that was carried out to direct or inform design, these activities are not the central point of the design case. A rigorous design case might contain most of the same material as a project report detailing these activities, but it must also contain *a detailed description of the product of design*.

Design cases are not what instructional designers call “design and development research.” This is a form of research on design carried out with the “aim of establishing an empirical basis for the creation of instructional and non-instructional products and tools or new and enhanced models that govern their development” (Richey and Klein, 2007), in effect, research on design. While these studies focus on design processes and tools, they aim to arrive at conclusions applicable to all design processes, or classes of designing.

Design cases are not validation studies focused on particular designs that have been created using a particular process or principle, or embodying a certain theory of learning. These are carried out sometimes as summative evaluation (actually another form of research in design), but sometimes as efforts to prove that the process, principle or theory upon which the design was based is a valid prescription for designs and designing (Reigeluth & Carr-Chellman, 2009).

Design cases are not design-based research (Rowland, 2007) in which the design component of research is a vehicle or stimulus for investigating another phenomenon, learning in particular. While many reports of such research do contain descriptions of a design, this is done as a means of illustrating the method of the study or as an inevitable component of the observations made during the study. Some reports actually contain very little description of the design that was used as the instrument of study, most do not contain discussions of the design decisions that were made either before or during the study, and in all cases the focus of intellectual attention is on the theory being developed and not on the design.

Design cases are not teaching cases, which are invented or adapted from real experiences purposely to highlight particular issues in designing or to present complexities to students for their analysis and reflection (Ertmer & Quinn, 2003). In these cases, the emphasis is on narrative accessible to students, crafted so as to offer them the opportunity for reflection on a wider range of design action than they may have engaged in themselves. These may, in fact, be adapted as a kind of substitute for precedent, particularly in situations where little else is available – but *as precedent* they are not authentic.

How are design cases used?

The use of precedent as a design activity is characterized by a particular combination of qualities. Some of these are shared with the use of other forms of knowledge and some are not. Together these qualities determine much of what must be considered in the production of design cases as a distinct form of knowledge dissemination.

Precedent use is proactive versus reactive. Designers develop the habit of observing and mentally storing episodic memories, or physically storing materials, in advance of any consciously perceived need. While a designer might encounter a situation in which it is appropriate to seek specific examples of existing designs and mine them for their potential contributions to the project at hand, the expert designer continually observes the designed world—not always within his own discipline of design—from the perspective of its ability to offer solutions that may come in useful someday, even when the particular future use is not yet known. This is a form of disciplined “preparation for action” (Stolterman, 2008).

Designers use precedent in a synthetic versus a linear manner. In addition to noting and storing precedent opportunistically, or proactively, in advance of possible need, designers draw upon that store of knowledge synthetically when they bring it into play. Specific details from an observed and remembered design may be retrieved and applied, but most precedent use is application of affordance for solutions from the episodic memories of designs to the problem space at hand in the form of a gambit, or design move (Lawson, 2004).

Use of precedent is concrete and situated versus theoretical and generalized (Goldschmidt, 1998). The primary use of precedent is not to extract disembodied “lessons learned” from previous situations and store these as rules for future designing. In practice, designers reason from cases, not from principles. This is not to imply that principles have no place in designing, or in the activity of designing, but that generalized knowledge “warn[s] designers about what cannot be altered or assure[s] them of the stabilities not worth questioning” (Krippendorf, 2006) and does not tell them what actions to take in a specific situation. Designers develop the ability to size up situations rapidly and determine the fit, if any, between the potentials embodied in precedent and the current situation (Cross, 2004; Lawson, 2004; Thomas & Carroll, 1979), but there is little, if any, evidence that they generate potential solutions based on principles or evaluate these solutions systematically against criteria or principles (Norman, 2006). There is, in contrast, reason to believe that when they do, such processes “encourage ... terminologies that become straightjackets and divert ... designers’ attention from what really matter[s]” (Archer, 2004).

The use of precedent in design is also fluid versus fixed; a precedent used in one way at a given time may be used in another way later, either by different designers or by the same designer. The appreciation of a design team for the knowledge embedded in a shared precedent may change over time, or

the utility of that precedent may be applicable differently from one situation to another.

What is a rigorous design case?

Smith (this issue) elaborates on the concept of trustworthiness and on issues of sampling drawn from particular social science perspectives that may be adapted to consider rigor in design cases, even though the aims of these disparate forms of knowledge building are distinct from each other. As knowledge-building endeavors they do share some functional characteristics that make such a starting place viable. In particular, naturalistic inquiry typically does not seek to reduce what is observed to a single perspective and does not assume that the utility of what has been presented will remain fixed for all readers or for all time (Lincoln & Guba, 1985). Action research is carried out from within a situation rather than from a claimed position of objectivity. Its aims include not only the creation of knowledge that may be generalized, but also the achievement of goals on the part of those who participate in the building of knowledge (Argyris, Putnam & Smith, 1985). In both kinds of research, emphasis within rigor focuses on support of the reader—building trust in what has been reported, providing context that allows independent assessment of what has been reported by the reader, and committing to transparency in conveying the particular situation rather than to process in deriving the general rule.

Why do we need to publish rigorous design cases?

The practice of developing design cases in traditional design fields is very common, but the development of fully developed, rigorous cases tends to be carried out either in a historical context or in the pursuit of total failure analysis, or both (Glanz & Lipton, 2003; Scott, 2001; Tufte, 2006). The manifest utility of cases in which minimal information is given works against any urgent call for more rigorous ones to be produced. This is particularly true in fields of design for which a few images and a brief statement of intent from a designer or design team offers a rich set of implications for other designers who are already steeped in the practice being represented.

The value of a scientific research report is determined before it is published by an assessment, not only of its rigor, but of its contribution to the larger body of knowledge – an advance in knowledge or replication of results. Such research must be based on previously established results and the author of the report must establish where this knowledge fits into the larger picture. By contrast, a design case is judged by its utility to readers; this utility will vary from one reader to another and for an individual reader at different times. This property of design cases is what accounts for the fact that they need not be rigorous in every dimension, or indeed any dimension, to have high value as design knowledge (Boling & Smith, 2008). This does not mean there is no need for rigor in design cases, only that rigor is not the defining factor in judging the

quality of *every* case produced or disseminated. So, why do we need to publish rigorous design cases?

Experts and novices need and profit from widely available precedent in specific areas of design. In most fields this precedent is available (a notable exception is instructional design), but it is highly variable in the degree of rigor present. However, a body of design cases that offer in-depth explanations of design rationales, rich and multi-dimensional descriptions of designed artifacts and experiences, and full reflection on design processes have the potential to offer teaching and learning opportunities that are difficult to find and that may especially benefit students of design across multiple fields.

Sharing these cases across fields of practice exposes the languages and assumptions in use by designers, encouraging cross-fertilization of ideas and perspectives. Much precedent exists for which a general appreciation is possible but for which an in-depth understanding may be difficult from one field to another. While explicit discussion of design decisions and contexts across fields of design will not automatically be fully understandable from one to another, public explanations and reflections will improve the knowledgeable appreciation of design across specialties and illuminate points at which efforts to create shared understandings in the wider design community may be fruitful.

In academic environments, emphasizing rigor in design cases assists in disseminating design knowledge, distinguishing it from other forms of knowledge, and promoting its value on a par with forms that have long enjoyed more respect from scholars. Cross (2001) states plainly: “We have to be able to demonstrate that standards of rigour in our intellectual culture at least match those of the [sciences and the arts].” While standards of rigor will evolve over time, an attempt to articulate them forms the basis for peer review and an ongoing process of peer review will, in turn, inform the discussion of standards.

Summary

Precedent, in the form of design cases, is a critical component of learning and practicing design. Other types of scholarship related to design share some characteristics with design cases, but vary in intellectual focus and goals from design cases and from each other. Precedent is used in specific ways by designers, and this use drives the characteristics of design cases. This form of design knowledge varies, appropriately, in the degree of rigor with which it is presented. Growth in the number and quality of rigorous design cases offers the potential for multiple fields of design to improve development of expertise and cross-disciplinary communication, increase the perceived value of design knowledge, and build appreciation in the design community for the explanations behind moves made by their peers.

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