

Boundary objects, please rise! On the role of boundary objects in distributed collaboration and how to design for them

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ABSTRACT

'Boundary object' is probably the number one 'feel good-term' in user centered approaches to interaction design, at least in CSCW contexts. In fact many visions about good CSCW can be summed up in the hope that the systems may serve as boundary objects within and in between communities of users. But can a boundary object be designed? The paper call attention to the context where the concept originated and points out that standardization seems to be a precondition for a boundary object to rise. Hence, the design challenge seems to lie in standardization, while it is the use situations that give rise to development of boundary objects. Why it has to be so is explained with reference to Bateson's concept of 'patterns which connect the items of learning'.

Key words: boundary object, standardization, interaction design, patterns

INTRODUCTION

There is a turn in HCI away from formalization towards experience design and towards design of experience. The argument is that ubiquitous computing has changed the design agenda away from development of dedicated systems towards design of appliances, open to use, which is why design must be a '*revolving cycle of seeing, moving and seeing*' [5]. Or the argument is that '*if we only look through the interface, we cannot appreciate the ways in which the interface itself shapes our experience*' [4, p.9]. In other words: the argument for experiential design lies in a need for reflexivity.

There is a risk, however, that focusing on user experience and designer experience draws the attention away from the core business of HCI: expansion of the competence and capacity the user. In this short paper I try to recapitulate why this is the main HCI task, starting from the - in the HCI context famous - formulation of the notion 'boundary object'.

THE CONTEXT OF A BOUNDARY OBJECT

Star coined the concept *boundary object* as one of two keys to analyze scientific work in a paper about 'institutional ecology', written together with Griesemer [9]. A *boundary object* is defined as '*an analytical concept of those scientific objects which both in habit several interacting social worlds ... and satisfy the informational requirements of each of them. Boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly constructed in common use, and become strongly structured in individual-site use. These objects may be abstract or concrete.*' [9, 393]. Already here lies an answer to the title of this paper: boundary objects can not rise, because they are not real, they are analytical categories that can be attributed to a design when analyzing use. 'Boundary object' is an attribute of the functionality of a design in use. So the question for designers is how to design forms so that they when used allow to generate boundary objects around them in the translation of meanings from one context to the other.

As mentioned, Star and Griesemer, in their study of Berkeley's museum of Vertebrate zoology, discovered two factors that explain why scientific findings, which incorporate radically different meanings can become coherent. The one was boundary objects, the other was methods of standardization [9, p.392]. Star and Griesemer explains how standardization happens: '*first, developing, teaching and enforcing a clear set of methods to 'discipline' the information obtained by collectors, trappers and other non-scientists; and generating a series of boundary objects which would maximize both the autonomy and communication between the worlds. Different social words maintained a good deal of autonomy in parallel work situations. Only those parts of the work essential to maintaining coherent information were pooled in the intersection of information; the others were let alone. Participants developed extremely flexible, heterogeneous economies of information and materials, in which need*

objects could be bartered, traded and bought or sold. Such economies maximized the autonomy of work considerations in intersecting worlds while ensuring 'trade' across world boundaries [9, 404].

As we can see standardization is imposed, and boundary objects emerge – in a sequence: first an attempt is made to impose standardization, and then, along with the adaptation to the standardization, develops boundary objects as ‘means of translations’ in those instances where information travels through a ‘passage point’ from one community of practice to the next in the process of collecting, cataloguing, storing and retrieving information.

Hence, designers are barking up the wrong tree if seeing the design rationale to be to design for open use. Taking Star and Griesemer’s analysis seriously I am going to argue that the challenge to designers are to suggest forms of standardization while keeping in mind the process in which this standardization will unfold. Spinuzzi gives numerous examples of solutions according to local criteria, and he quotes Star for the point that ‘when formalizations become recipes for action, then further ad hoc work-arounds are necessary to make the prescriptions fit the local circumstances’ [8, p.20] – in other words: when the professional, designated designers end their work, the local, intuitive design begins. Users start working on the open end, in case there is some.

THE CHALLENGE FOR DESIGN: IMPOSING STANDARDIZATION

This is in fact, what designers who use patterns in design recommend. The earliest HCI-reference to Alexander’s pattern idea is Norman and Draper’s seminal book on user-centred system design [7] . While there have been many different suggestions about the use of patterns within HCI, there seems to be a general agreement as to their definition: patterns describe key characteristics of a situation or events in a context-sensitive way. Alexander [1] developed a uniform pattern structure consisting of 1) the name of the pattern; 2) a ranking of its validity; 3) a picture as an example of its application; 4) the context in which it is to be used as short problem statement; 5) a more detailed problem description with empirical background; 6) the central solution of the pattern; 6) a diagram illustrating the solution; 7) references to smaller patterns – in itself an excellent example of an open standard.

The idea of creating standards through design is of course older within computing at large. Winograd & Flores [10] and also Nardi [6] were quite optimistic with respect to the design of formal languages as task specific programming languages, an idea also to be found the early work of Christen Nygaard, who together with Ole-Johan Dahl and colleagues created the object oriented programming lan-

guage ‘simula’. His view on ‘perspective’ captures the HCI design challenges with respect to standardization: *'In any given situation, a person's cognitive process is structured by a perspective that: - is common to the given one; - selects those properties of the situation that are being considered (and, by implication, those that are ignored), and provides concepts and other cognitions that are being used in the interpretation of the selected properties.'*

[http://heim.ifi.uio.no/~kristen/PRIVATDOK_MAPPE/P_R_CV_KN.html#Side_toppp]

WHY OPEN STANDARDIZATION MAY BE ‘THE WAY’?

Bateson, in his concluding book ‘Mind and Nature’ [3] refers a story of a man who wanted to know about the mind of his computer. He asked ‘Do you compute that you will ever think like a human being?’ The computer analyzed its computational habits and printed the following answer ‘That reminds me of a story’. Bateson uses this anecdote to state that humans think in terms of stories, and that ‘context’ and ‘relevance’ are characteristics of all stories. Stories is about connectedness at two levels: a. we realize that A and B are components of the same story, and b. we realize that we think in stories – in connectedness and relevance, that is. But first we must deal with A and B and their membership. That means: first there must be structure! Which is not the same as saying that structure should control thinking. Bateson warned decision-makers that goal- and blue print-directed planning would destroy what he saw as a delicate balance between form and processes of communication in society at large: *'Break the pattern which connects the items of learning, and you necessarily destroy all quality'*¹. And the patterns which connects the items of learning is, according to Bateson, an open structure. What to Bateson defines a phenomenon is in line with phenomenology: human experience, not as function, but as a way of relating to other phenomena – and that relation is its form. Bateson suggested that 'Nature's way' can be learned through conscious reflection upon the patterns that connect levels of process and form, and, based on this reflection, a reorientation of action-patterns. This kind of reflection-in-action he labeled ‘deutero-learning’, a concept which relates to the term “double-loop-learning” or “learning to learn”, developed by Schön and Argyris within organizational science. Bateson himself stated that *'We lack any systematic knowledge of the dynamics of these processes'* [2, p. 174], referring to the processes of interaction that result in either adaptation or addiction. But he searched for answers, because he found that *'the question is pressing and relevant to the contemporary dilemmas of our own civilization. In Darwin's day, every invention appeared benign, but that is not so today. Sophisticated eyes in the twentieth century will view every*

¹ G. Bateson in the introduction to 'Mind and Nature'

invention askance and will doubt that blind stochastic processes always work together for good. We badly need a science that will analyze this whole matter of adaptation-addiction at all levels “ [2, pp. 173-74].

Bateson saw 'the pattern which connects the items of learning' as a pattern that assembles the conditions for communication so that the communicating parties are able to make their interaction subject to reflection in a way that opens for a shift from symmetrical to complementary response or vice versa. Patterns which connects the items of learning are patterns that create recognition and empathy. So that is what the structure of information systems should allow its users – to create empathy!

CONCLUSION

You can never predict use, hence designed structures must have an open end. How can designers create a structure open enough and inviting enough for different – collaborating – practices to which to relate productively. I have shown that the original context of the concept of boundary object does not tell designers to create boundary objects, but to create a form of standardization that support users to develop boundary objects during their translations. I have further argued that it has to be so, because as an anthropological primitive, standardization precedes the formation of boundary objects in cases where the standards form a pattern which connects the items of learning – which means allow the users to see what is connected with what and what is the connection. Design should be 'where the action is' but not to design it, but to design for it.

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