Patterns: Problem and Solutions?

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Clearly, one pattern format does not fit all. What does fit all is the general concept of pattern as a ***vehicle for capturing and conveying expertise***, *whatever the field.* (John Vlissides 1997)

ABSTRACT
We consider the use of patterns as a means of structuring and presenting ethnographic material within a broader system design and research process. In contrast to many existing approaches that orient pattern languages to encode problems and their solutions, we focus on the communicative properties of pattern languages. Addressing the ethnography-design relationship in particular, we suggest that pattern languages may be devised to support practitioners address the perennial problem of interdisciplinary communication. The emphasis here is shifted *from* a retrospective concern with mining previous experiences *to* the development of support for interdisciplinary analysis of the design space in the ongoing flow of design work. The rationale for a format for structuring and presenting ethnographic findings is outlined.

Keywords
Pattern language, interdisciplinary communication, ethnography.

INTRODUCTION
Our turn to patterns as a technique to communicate ethnographic studies arose as a result of their broad acceptance in the Software Engineering [8] community and our need to convey studies of human activities to those involved in the development of CSCW systems. Pattern languages have also been championed by members of the HCI community as a vehicle for sharing design solutions [2, 5, 7]. In the case of the latter pattern languages are said to consist of a family of interrelated design patterns, which describe recurring problems that occur in particular contexts and articulate technical solutions. HCI patterns are

retrospective and prescriptive in character. They aim to mine previous experiences in order to build a set of patterns that convey design problems and solutions to the wider community. Descriptive patterns frameworks in CSCW have complemented these solution-based approaches, however. These frameworks are concerned to illuminate, again retrospectively, arrangements of cooperative work that commonly occur across a variety of settings, rather than design problems and solutions [6, 11, 12]. Both types of framework may form part of a broader pattern based-approach to design where patterns are made available as a resource for design teams [9].

It is worth reflecting not only on the obvious diversity of ways in which patterns are being constructed and used within the HCI and CSCW communities, but also on the fact that patterns are not inherently wed to the articulation of problems and solutions. Indeed, Alexander does not make this claim his original work [1], a point reinforced by Vlissides [14]. Problems and solutions is but one definition of what pattern languages are 'all about'. A definition fostered by the Software Development community and subsequently inherited by the HCI community.

When we look beyond the Software Engineering community's interpretation of patterns to the original inspiration for the construction of pattern languages, other alternatives become possible. We would suggest that these alternatives are more sensitive to the problems CSCW practitioners are trying to address *in their work*. The descriptive frameworks emerging from the work of a number of CSCW practitioners are constructed to capture and convey essential features of cooperative work in a wide variety of settings; features which CSCW practitioners think it important to consider when undertaking systems design [6, 11, 12]. Pattern languages must be responsive to the problems design practitioners address in their work, then, rather than slavishly implement the definitions constructed by others for alternate purposes, whether of HCI, Software Engineering, or architecture.

Our overall aim is to extend the use of pattern languages. In addition to focusing on the descriptive properties of patterns we also seek to exploit their communicative properties in the unfolding course of the design process. We therefore seek to move away from existing uses of pattern languages, which are essentially *retrospective* in character and focus on mining previous experience. Tom Erickson, a major proponent of pattern languages in design, suggests that patterns may also play a different role:

> The challenges posed by the increasing size of the interactive systems design space are exacerbated by … the increasing diversity of the design process … this diversity poses a problem: how are the various stakeholders in the design process to communicate with one another, when they share little or nothing in the way of a core discipline, practice, or theoretical basis? This brings us to the concept of a ***lingua franca*, a common language which is accessible to all the participants in a design process** … … … I should make it clear that I am advocating multiple *lingua francas* (rather than "a" *lingua franca*). A frequent confusion is to think of Alexander's pattern language … as "the" language. [It] is just a proto-or meta-language … **used to generate languages appropriate to the particularities of the project, site and community involved … rooting design in concrete exemplars of the design domain**, rather than abstract disciplinary based concepts. [5]

While there may undoubtedly be many interpretations of what this means, we take it that it the emphasis on lingua francas supporting the design process opens up the possibility of developing pattern languages that support interdisciplinary communication. It might otherwise be said that whether intentionally or not, Erickson's comments warrant the construction of prospective pattern languages that are designed to support interdisciplinary analysis of the design space *in the actual flow of design work*. These prospective languages will serve to capture and convey, and thereby root design in, concrete exemplars of the design domain *over the unfolding course of the design process*.

We are particular concerned with the development of *prospective* pattern languages that support communication between ethnographers, designers and others. Ethnography has been of considerable utility to CSCW, though the approach is not without its attendant problems. Of particular concern is the perennial problem of linking ethnographic studies to design. This problem is understood to be a problem of communication, which may be addressed through the development of appropriate presentation frameworks that support the communication of ethnographic findings to the other members of a design team [10].

OUTLINE OF A PROSPECTIVE PATTERN FORMAT
Our pattern format adapts Alexander's original, which was primarily concerned to explicate the *patterns of relationships* produced by persons interacting with the architectural arrangements of place [1]. Alexander reasoned that poor architectural design results in the production of problematic patterns of relationships and a poor quality of life. His format was designed to articulate quality problems produced by poor architectural design in specific 'contexts' – i.e. in specific *places* such as urban roads comprising cycle paths and pedestrian crossings - and to outline architectural alternatives or 'solutions'.

PLACE is central to Alexander's framework – "I cannot imagine any pattern without imagining a place where it is happening" [1] - and invariably ignored by pattern frameworks in HCI and CSCW alike. We wish to retain a concern with place when adapting Alexander's pattern format for ethnographic purposes. We do so because 1) as ethnographers studying cooperative work we are essentially interested in situated action and 2) as action is always situated in some place, then place becomes a way of organizing the pattern language itself. For example, we are currently engaged in the study and development of technologies for domestic settings. Employing the notion of place as an orientation to study and organizing principle of the pattern language provides us with a means of structuring ethnographic fieldwork. The structure reflects the sub-environments that the home is made up of and in which action is situated. Thus, the domestic settings pattern language is structured at a high level in terms of 'kitchens', 'living rooms', 'hallways', 'bedrooms' and the other discrete places that make up the home.

Employing place as an organizing principle provides ready access to the *component parts* of the pattern language – to the studies of situated action that occur in the particular places making up the home (or any other environment). Component patterns are organized through a web-based format for structuring and presenting empirical instances of situated action gathered over the course of fieldwork. These instances are equivalent to Erickson's 'concrete exemplars', they describe the pattern in real world, real time details of social interaction and root design in the cooperative work of a setting. The pattern format may provide access to video footage that makes the pattern in question observable or, for patterns that are spatially and temporally distributed, observability is provided for through still photography built into the unfolding sequences of action that provide for the real world visibility of the pattern. [1]

In addition to being linked at a high level, component patterns are also linked at a low level to connect patterns that use the same technologies in a place together. Why? Alexander's pattern language is essentially hierarchical – large patterns connect to the smaller patterns out of which they are composed and small patterns to even smaller patterns which "embellish" the language and "fill it out". We are not concerned with the architectural arrangements

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[1] See the accompanying Pattern No. 25 for concrete example of the format.

of place, however, but with the technological arrangements of place, broadly construed. This means that we are interested in the patterns of relationships that are produced in persons interactions with calendars, tables, and noticeboards, etc., as well as sophisticated electronic and computing technologies in the home. Thus, we are interested in the patterns of relationships produced by persons' interactions with the technological arrangements of place (socio-technical patterns). Connecting together patterns that use the same technologies in a place serves to articulate potential application areas for design in the domestic environment.

Articulation of potential application areas is provided for by the language through the emergence of a *bricolage of patterns* coalescing around particular technologies in the home. The coalescence of patterns around particular technologies draws attention to important sites of technologically-mediated activity or 'activity centres' in the home. Activity centres may be treated both as objects for design - where the emphasis is on considering how to design devices to be placed in important sites of technologically-mediated activity – and as resources for design - where the actions that occur at activity centres are represented within a system and made available to support the cooperative work of a setting [4].

CONCLUSION

We have suggested that pattern languages must be responsive to the problems design practitioners address in their work, rather than slavishly implement the definitions constructed by others for alternate purposes. Accordingly, we have sought to move away from a retrospective concern with problems and solutions to support interdisciplinary communication between ethnographers and designers in the actual flow of design work.

The outline of a prospective pattern language provided here is the outline of a language to be used by participants *in the* design process. It is not designed for the use of the wider community, but (in accord with Erickson) to address the "particularities of the project, site and community involved" as the process of design unfolds. The patterns comprising the prospective language gain their sense and relevance *from within* an ongoing process of inter-disciplinary analysis. If abstracted from that context, the patterns may well be seen as wanting, but to read them so would be to misconstrue their utility. These socio-technical patterns are designed to support ongoing communication and between the various parties to design, not the documentation of prior experiences in terms of perceived problems and solutions.

Ultimately, the documentation of problems and solutions relies on prior knowledge. The aim here is to support *the development of knowledge* of cooperative work in various settings in the first place – to capture and convey expertise - and distribute it amongst the various members of design team in the ongoing flow of design work.

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