



KUNGL  
TEKNISKA  
HÖGSKOLAN



CID-120 • ISSN 1403-0721 • Department of Numerical Analysis and Computer Science • KTH

## **Design patterns versus style guides – re-inventing the wheel?**

**Jan Gulliksen, Inger Boivie and Bengt Göransson**



**CID, CENTRE FOR USER ORIENTED IT DESIGN**

**Författare: Jan Gulliksen, Inger Boivie and Bengt Göransson**

Design Patterns versus Style Guides - Re-inventing the Wheel?.

**Report number:** CID-120

**ISSN number:** ISSN 1403-0721 (print) 1403-073X (Web/PDF)

**Publication date:** November 2000

**E-mail of author:** jan.gulliksen@hci.uu.se, inger.boivie@hci.uu.se,  
bengt.goransson@hci.uu.se

**URL of author:** <http://cid.nada.kth.se>

**Reports can be ordered from:**

CID, Centre for User Oriented IT Design

NADA, Department of Numerical Analysis and Computer Science

KTH (Royal Institute of Technology)

SE-100 44 Stockholm, Sweden

Telephone: + 46 (0) 8 790 91 00

Fax: + 46 (0) 8 790 90 99

E-mail: [cid@nada.kth.se](mailto:cid@nada.kth.se)

URL: <http://cid.nada.kth.se>

# Design patterns versus style guides – re-inventing the wheel?

Jan Gulliksen<sup>1</sup> ([Jan.Gulliksen@hci.uu.se](mailto:Jan.Gulliksen@hci.uu.se)), Inger Boivie<sup>1</sup> ([Inger.Boivie@hci.uu.se](mailto:Inger.Boivie@hci.uu.se)) and Bengt Göransson<sup>1,2</sup> ([Bengt.Goransson@hci.uu.se](mailto:Bengt.Goransson@hci.uu.se))

<sup>1</sup>Department of HCI, Information Technology, Uppsala University

<sup>2</sup>Enea Redina AB, Uppsala, Sweden

## ***Introduction***

Patterns describe generic solutions to common problems in context [Erickson & Thomas, 1997]. Patterns can be used to document design knowledge and facilitate communication between the people involved in the user interface design process [Granlund & Lafrenière, 1999]. But what are the rationales behind the patterns, are they based on subsequent successful repetition of a design which then is generalised to a design pattern or is there a theoretical reasoning behind each pattern?

## ***Design patterns; Reusing components or a source for inspiration?***

Software developers have always reused design solutions. We know that the user interface composes the majority of the code of an information system, but the time and the effort put into the user interface design process does not reflect that [e.g. Nielsen, 1992]. Reusing user interface components is difficult, thus the reuse of application code or a design style would be preferable.

### **Reuse**

Due to the often very tight development schedules nobody has the time to create software components of a generic nature that can be the basis for actual reuse. Projects tend to borrow already implemented design solutions and modify the code based on the context of the new project. However, modifying program code to fit the purpose of a new context almost always proves to require more time and effort than beginning from scratch.

### **Source of inspiration**

The main advantage with design patterns is their use as a source of inspiration for interface designers. Just as we use a magazine for interior design when we are about to re-decorate our house, interface designers can use design patterns as a source of inspiration in the user interface design process. Designers seldom reuse exactly the same design but you can often see who has designed something by the look and feel of a system.

## ***How are patterns used, documented and reused in the development process***

When can patterns be applied in the development process and in that case in what activities? In answering these questions the following issues comes to our mind:

- How do we communicate the patterns?
- How do we treat different versions of the patterns?
- Can patterns inherit from other patterns?
- Can there be interdependency between patterns?

A very interesting question is the corporate image or the looks of the interfaces. Can patterns help communicate such a corporate “look”? These are our concerns:

- What are the requirements on an organisations systems development process for it to be able to use design patterns in the development process? Will design patterns be like many other great ideas from the HCI community, such as design rationales or domain specific style guides? They have been important means to develop the area as such, but will they ever be used in practical systems developments.

- Under what premises will people start to use design patterns?
- Can the design patterns only encapsulate the successful design solutions only, or do they also document rejected design decisions?
- Can there be such a thing as a generic design patterns? Is the notion that a general organisation should test the latest design patterns and grade them based on their usefulness as a substantial support for the user interface designers in their work? If doing so, patterns can be used to fool oneself that you do not need to do anything yourself.

### ***Workspace metaphor – a design pattern that works***

Limited screen space is one of the major obstacles when designing information systems for administrative work. The workspace metaphor [Lif, Olsson, Gulliksen & Sandblad, 2000] is our approach to solve some of the basic design problems, such as task switching and visualisation of large and complex information structures onto the limited screen space. It is based on the basic principles of the room metaphor as presented in (Card & Henderson, 1987; Henderson & Card, 1986).

For a specific domain of work a specific design pattern can serve as a good source of inspiration to the design. In retrospective the workspace metaphor [Lif, Olsson, Gulliksen & Sandblad, 2000] has served as one of the few high level design patterns that we have reused over several different domains of applications.

### **Pattern aspects of workspaces**

Is a workspace a design pattern? Yes! Why?

- The design of the workspace metaphor is based on knowledge of the cognitive processes of skilled users in a frequent use situation.
- It is applicable when the use situation is case handling [Gulliksen, 1996]

The workspace metaphor has since been used as a design pattern for administrative case handling work at the Swedish National Tax Board. Due to the case handling nature of most of our research applications (e.g. the medical record work and administrative work in public service organisations and industries) the pattern of the workspace metaphor is constantly and quite successfully reused. The appearance of each workspace varies enormously, but the cognitive knowledge that it is based upon and the effect it has for the users is easy to observe.

### ***Experiences from corporate style guides – communicating design patterns***

Before design patterns were common knowledge we tried to communicate design ideas through domain specific style guides in cooperation projects with several different organisations. These experiences are important for the development, communication and maintenance of design patterns within an organisation.

We introduced the concept of corporate style guides [Olsson & Gulliksen, 1999] and domain specific design [Gulliksen & Sandblad, 1995] in previous publications. With a domain specific (or corporate) style guide we mean a specification of classes of appropriate interface elements together with guidelines for interface design using these elements for a given domain of applications. Based on our previous experiences from developing corporate style guides we concluded a number of conditions for the successful application of corporate style guides within an organisation [Olsson & Gulliksen, 1999]. These conditions would be the same for the successful and efficient use of design patterns use in practice:

- **Accessible.** They must be easy to access online. Developers and users that need design patterns must be able to easily find and efficiently use the design patterns on-line in their daily work.

- **Structure.** They must be well-structured, providing an overview and a few levels below that to support the user with detailed information at the same time as it presents the overview.
- **Navigation.** They should be hypertext-based, i.e. with search and navigation facilities, a possibility to link to different indexes (like contents, dictionary, figure and component libraries) and to newsgroups within the area.
- **Communication.** It should be easy to communicate opinions on the contents of the patterns, and the users should be able to ask questions on-line and obtain quick responses. These questions and answers should be available to all users, though perhaps in an edited form.
- **Maintainability.** It should be easy to maintain and perform revisions; the user should be able to distinguish version number and recent changes.

Our experience is that it is difficult to create a cultural context within an organisation that allows for all these conditions to apply simultaneously. For example, organisations could easily agree upon the use of a specific font or style for text, and other low-level details. But, when it comes to high level elements, such as client identification cards or workspaces (i.e. design patterns), the general notion was that these elements had to receive consensus within the organisation, something that proved to be difficult to find in practice.

### ***Summary and discussion***

For an organisation to be able to use design patterns in their software development process the following conditions must be fulfilled:

- **The patterns specification process.** Procedures for the establishment and use of design patterns must be included in the system development process.
- **Patterns project examples.** We need example projects that have applied design patterns in the marketing of the approach.

Generally we believe that: design patterns are appropriate for reuse of design styles but when it comes to reuse of components we have our doubts.

### ***Acknowledgements***

We acknowledge the Swedish National Tax Board and the Swedish Work Environment Fund for supporting us financially in this work

### ***References***

CARD, S.K., & HENDERSON, A. (1987). A Multiple Virtual-Workspace Interface to Support User Task Switching. In *Proceedings of CHI '87 Conference on Human Factors in Computing Systems* (pp. 53-59). New York: ACM/SIGCHI.

ERICKSON, T. & THOMAS, J. (1997) Putting it All Together: Pattern Languages for Interaction Design. A CHI '97 workshop. In *Proceedings of CHI '97 Conference on Human Factors in Computing Systems*. New York: ACM/SIGCHI.

GRANLUND, Å. & LAFRENIÉRE, D. (1999) PSA; A Pattern-Supported Approach to the User Interface Design Porcess.

GULLIKSEN, J. (1996) Case Handling Models as a Basis for Information System Design. In C.A. Ntuen & E.H. Park (eds.) *Human Interaction with Complex Systems-II*, Kluwer Academic Publishers, Norwell, MA.

GULLIKSEN, J.& SANDBLAD, B. (1995). Domain-Specific Design of User Interfaces, *International Journal of Human-Computer Interaction*, vol. 7, no. 2, pp. 135-151. Ablex Publishing Corporation, Norwood, New Jersey.

HENDERSON, A., & CARD, S.K. (1986). Rooms: The Use of Multiple Virtual Workspaces to Reduce Space Contention in a Window-Based Graphical User Interface. *ACM Transactions on Graphics*, 5 (3), 211-243.

LIF, M., OLSSON, E., GULLIKSEN, J., & SANDBLAD, B. (2000) Workspaces enhance efficiency - theories concepts and a case study. *Information Technology and People*, Vol. 30, No. 4. MCB University Press.

NIELSEN, J. (1993). *Usability Engineering*. Academic Press, Inc., San Diego.

OLSSON, E. & GULLIKSEN, J. (1999) A corporate style guide that includes domain knowledge. In G. Salvendy, M.J. Smith, & M. Oshima (eds.) *International Journal of Human-Computer Interaction*. Vol. 11, No. 4, pp. 317-338. Ablex Publishing Corporation, Norwood, New Jersey.