Chapter 1
Perspectives on Patterns

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ABSTRACT
Patterns are systematic approaches to documenting and classifying recurrent problems and their solutions. Patterns are usually based on empirical observations of good practices. This chapter provides a brief introduction to the core concepts of patterns, and distinguishes between patterns in the real world, patterns in the heads of designers, and pattern descriptions. It starts with basic definitions and explains the relationship between context, problems, forces, and solutions. Key concepts such as connecting patterns into pattern languages, finding whole forms, and sharing best practices among peers are elaborated. To distinguish between patterns in the world, in the heads of designers and in documentations it introduces a vocabulary that may clarify the different meanings of the term “pattern” in the context of design. A discussion of how patterns are recognized and induced by practitioners resolves why there are patterns at different levels of granularity and abstraction. Schema theory provides a theoretical framework to understand how successful strategies of problem solving are stored in the mind of an expert. To share this knowledge, patterns can be described in various ways using different pattern formats or templates. While there are many benefits of the pattern approach, both the pattern author and the pattern user face some challenges. Therefore some of the major benefits and challenges are discussed at the end of the chapter.
E-Learning patterns capture good and successful practices and forms in educational contexts that make use of digital media. In describing such structures, we refer to “design patterns” if the structures are constitutive, describing a design space, and analyze the forms in the general dimensions context, problem field and solution (Alexander, 1979). An e-learning pattern captures the regularities of good practices in order to reuse the proven methods, scenarios and content forms in new contexts addressing new design tasks. The core idea is to not reinvent the wheel but to preserve what has been successful in the past.

Beside the explicit description of good (successful) pedagogical methods, tools, media formats, resources, and scenarios design patterns reason about the adequate use of such solutions (Kohls & Wedekind, 2008). As such they are a very good analysis framework. The pattern approach ensures that it is not the form alone that is captured but the application context, the problem field with its forces and constraints, the implementation steps, the usage and the gained values are documented as well.

Alexander (1979) defines patterns as a three-part rule which shows the relation between a certain context, a problem and a solution. „Each pattern describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice.“ (Alexander, 1977, S. X) This definition refers to the recurrent forms in the world. As part of a pattern language, a pattern is not only the form but a constitutive design rule as well. A pattern document does not only describe the form but also explains how to create the form, i.e. how to implement and use the form. Hence, patterns are about craftsmanship as well. Being constitutive requires that the recurrent solution must be general enough to be reused and specific enough that it shows how the implementation can be achieved in practical terms. The design space has to be open enough in a way that the form can be adapted to the particular context in which the pattern is used. The original idea of collecting software patterns was to create an architecture handbook. (Buschmann, Henney & Schmidt, 2007). Likewise, educational patterns one day can be the base for a handbook for educators. In addition to the practical benefit of documenting such good practices, a design rule captured as a pattern also delivers the rationale for a specific design in terms of forces. Patterns are generative rules rather than templates.

**BACKGROUND**

The pattern approach has its roots in the theory of architecture. Patterns should help individuals to identify and express their needs and requirements for the environments they live in (Alexander, 1979). In “A Pattern Language” there are 253 patterns for towns, buildings and constructions (Alexander, 1979). Alexander first mentioned patterns in “Notes on the synthesis of forms” (Alexander, 1964) where he already introduced the concepts of fitness between context and solution, decomposition into sub-patterns and the reasoning for a form in terms of forces which is linked to the natural development of forms similar to the ideas described by D’Arcy (1942). Beck and Cunningham (1987) introduced the pattern concept to the field of user interface design and object-oriented programming. Patterns started to spread wide in the software community in 1994/95 when Gamma et al. (1995) published their standard work “Design Patterns: Elements of Reusable Object-Oriented Software” and Cunningham programmed the first Wiki ever to collaboratively write design patterns and share best practices. Other disciplines started using the pattern approach, particularly human-computer-interaction (Borchers, 2001; Tidwell, 2005; Schümer & Lukosch, 2007), web design.
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