

# ACHIEVING USABILITY USING INTERACTION DESIGN PATTERNS

Ahmed Seffah, Eng., DEA., Ph.D. HDR  
Customer-Centric Interactive Services Design

## Outline

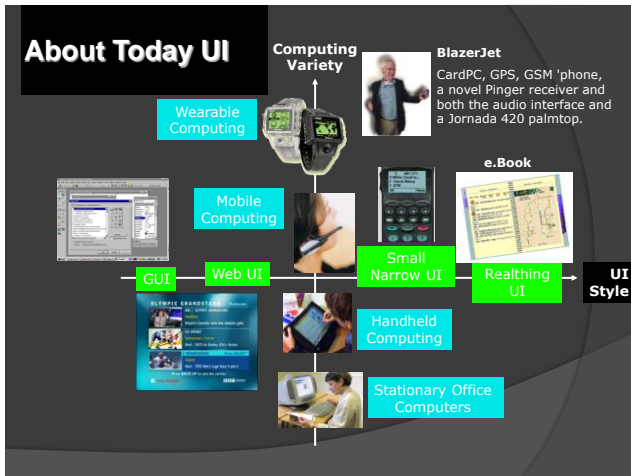
- ◉ Introduction to Usability Patterns
- ◉ History, Definitions and Background
- ◉ Pattern Languages for HCI Design
- ◉ Usability Patterns for Web, Mobile and Cross-Platform Applications
- ◉ Patterns-Oriented Design
- ◉ Patterns and the Software Development Lifecycle
- ◉ Tools Support for Patterns-Oriented Design
- ◉ MOUDIL: Montreal Online Usability Patterns Digital Library
- ◉ Patterns and design theories
- ◉ Conclusions and Open Questions
- ◉ References and Web Links

## Context

- ◉ Software as a service and Web services
  - Connect and use
- ◉ Cross-platform, multi-devices and multiple user interface design
- ◉ But?

## Motivation

- Stop developing applications from scratch;
  - use reusable components and designers experiences
- Design decisions are made at early stages in the development lifecycle.
  - These decisions have a great impact on software quality
- Patterns -- one approach to reusing design solutions
  - Need systematic design methodologies to glue together these design patterns
  - A methodology supported by processes, design models, and tools



## About usability

- Usability refers to how well users can learn and use a product to achieve their goals and how satisfied they are with that process.
- The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use." (ISO9241-11, 1998)
- It is more than this, QUIM model

## QUIM: 15 Usability constructs (Seffah et al., 2006)

Challenging cognitive factors  
7- Learnability 8- Comprehension 9- Acceptability

Business dimension  
12- Usefulness  
13- Productivity  
14- Adoption

Core usability factors  
1- Effectiveness  
2- Efficiency  
3- Satisfaction

System dimension  
10- Security  
11- Sustainability  
12- Robustness

Emerging related factors  
4- Universality 5- Accessibility 6- Trustfulness

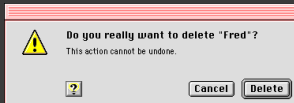
## All the aspects that affect usability should be considered in the design process

- User interface
- Help system
- Training plan and resources
- User documentation
- Technical support
- Installation and configuration procedures

They should evolve in parallel and be under one management process

## What is an interaction design pattern?

- Captures best design practice
  - Dialog boxes from the Macintosh Human Interface Guidelines
  - Use a modeless dialog box to preserve user ability to perform tasks in any order



## What is an interaction design pattern?

From the most generic to more HCI domain dependant, a design pattern is:

- Form, template, or model or, more abstractly, a set of rules which can be used to make or to generate things or parts of a thing.
- A general repeatable solution to a commonly occurring problem.
- A three-part rule that expresses a relation between a certain context, a problem, and a solution" (Alexander, 1979).
- An invariant solution to address a recurrent design problem within a specific context (Dix, 1998).
- A general repeatable solution to a commonly-occurring usability problem in interface design or interaction design.
- **A solution to a usability problem which occurs in different contexts of use.**
- **A successful HCI design solution among HCI professionals that provides best practices for HCI design to anyone involved in the design, development, evaluation, or use of interactive systems (Borchers, 2001).**

## Quick access pattern

- Assists the user to reach the most useful and frequently visited pages promptly
- Groups the frequently used pages together, labels this toolbar with meaningful icons or notations and locates them on the consistent place throughout the whole Web site



## Go back to a safe place Pattern

### Context

- They user try to reach a specific Web page

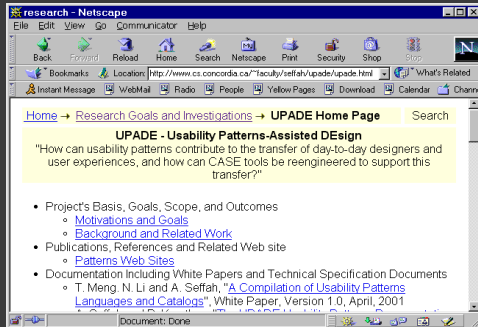
### Problem

- Users often get lost when exploring a large set of pages or windows
- Users often want to go back to previous state they were happy with
- Users are more likely to explore if they feel safe
- Backtracking out of a long navigation path can be tedious

### Solution

- Provide a way to go back to a checkpoint of the user's choice
- Place a button at the bottom of the page

## Go back to a safe place pattern



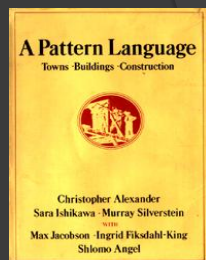
## Why pattern? Cross-platform UI design

- Different representations are possible to support variations in design look and feel, platform preference and usage context.
- The Quick Access pattern, used to logically group the most frequently used pages on a website, can be implemented on three different platforms. For a web browser on a desktop, the Quick Access pattern is implemented as an index browsing toolbar; for a PDA, as a combo box; and for a mobile phone, as a selection (Seffah and Javahery, 2003).



## The father of design patterns

- Christopher Alexander, an architect
- A network of 253 patterns
- A pattern connects **individual** and **social behavior** to the **physical features** of a place
- Alexander Christopher original work  
<http://www.patternlanguage.com>



## Pattern language

- A language captures the collective wisdom of designers in a way that can be reused, especially by novice designers who are not familiar with HCI design principles
- It is a collection of interrelated patterns, when you apply one, others may apply as well
- Two conditions for a patterns languages
  1. Standard format for documenting and representing patterns
  2. Relationship between patterns

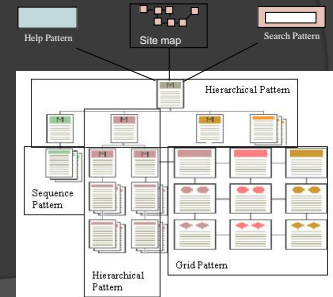
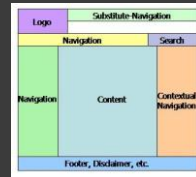
### Major efforts to collect and document patterns

- Welle [www.welle.com](http://www.welle.com)
- Jenifer Tidwell <http://designinginterfaces.com>
- James Landay <http://www.designofsites.com/about-the-book/descriptions>
- Also Yahoo patterns catalog <http://developer.yahoo.com/yepatterns>

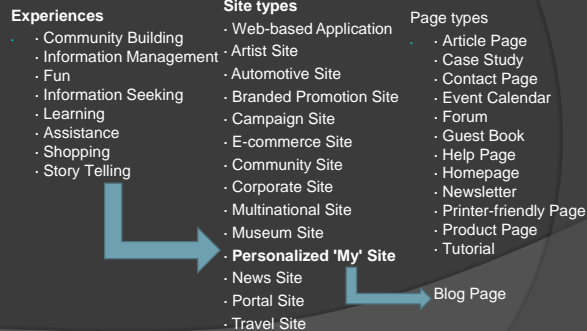
## Pattern language for Web and the Web design steps

Step	Pattern Groups	Description	Pattern Examples
A	Site Genres	Construct particular site type	Personal e-commerce Nonprofits as networks of help
B	Creating a Navigation Framework	Choose patterns to navigate, browse and search on the site	Multiple ways to navigate Task-based organization
C	Creating a Powerful Homepage	Design the homepage based on user needs	Homepage portal Up-front value proposition
D	Writing and Managing Content	Manage content and address user accessibility	Page templates Internationalized and local content
E	Building Trust and Credibility	Address issues dealing with trust and credibility	Site branding Fair information practices
F	Basic E-Commerce	Create a good customer experience for e-commerce	Quick-flow checkout Clean product details
G	Advanced E-Commerce	Incorporate advanced e-commerce features	Featured products Cross-selling and up-selling
H	Helping Customers Complete Tasks	Structure your site to improve task completion	Process funnel Persistent customer sessions
I	Designing Effective Page Layouts	Create clear, predictable and understandable layouts	Grid layout Expanding-width screen size
J	Making Site Search Fast and Relevant	Design interaction so that user searches are effective	Search action module Straightforward search forms
K	Making Navigation Easy	Display helpful navigation elements	Unified browsing hierarchy Action buttons
L	Speeding Up Your Site	Incorporate patterns to make your site look and feel fast	Low number of files Fast downloading images

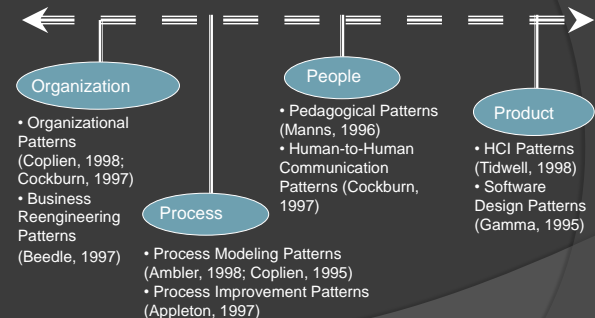
## Pattern-oriented design: Combining patterns to create a design



## Deriving a design (pattern-oriented design) from user experiences



## Pattern Supported Integration Framework



## Readings about interaction design patterns

- Tom Erickson, The Interaction Design Patterns Page  
<http://www.visi.com/~snowfall/InteractionPatterns.html>
- Brad Appleton's Software Patterns Links  
<http://www.cmcrossroads.com/bradapp/links/sw-pats.html>

### Also, books

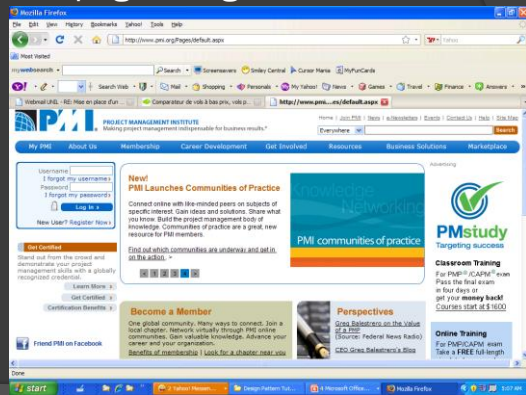
- A Pattern Approach to Interaction Design, by Jan Borchers (2001)
- A Pattern Language for Web Usability, by Ian Graham (2003)
- The Design of Sites: Patterns, Principles, and Processes for Crafting a Customer-Centered Web Experience, by Douglas K. van Duyme, James A. Landay, and Jason I. Hong (2002)
- Designing Interfaces: Patterns for Effective Interaction Design, by Jenifer Tidwell (2005)

## Try to discover and apply patterns

Web sites for professional communities, there should be some similarities

- PMI (<http://www.pmi.org>)
- ACM (<http://www.acm.org>)
- IEEE (<http://www.ieee.org>)
- Etc.

## Home page design



## Questions...

