Center for
Human-Computer Interaction
Department of Computer Sciences

UNIVERSITÄT
SALZBURG

Theory and Practice

A Discipline-independent Pattern Approach for Capturing and Communicating Problem Solutions

Background

Center for Human-Computer-Interaction,
University of Salzburg, Austria

Background:

General Philosophy of Science and Science of Consciousness

Interdisciplinary Workgroup *Neurosignaling*, Department of Zoology, University of Salzburg

Since 2012: Center for HCI

Main topics:

(Semi-)autonomous vehicles and persuasive interfaces, interface evaluation (Usability and User Experience), definitions and formal approaches in HCI, in-vehicle UIs, theories of consciousness

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Tutorial Goals

- At the End of this tutorial you will
  - Know the basic **requirements** and **elements** of a pattern

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  - Be able to **write** a pattern from scratch for solutions from your respective area, domain, or discipline
  - Have access to a **rating scale** for pattern elements to help with the iteration process

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Tutorial Structure

- Introduction
- Pattern Theory
  - What is a pattern, basic elements of a pattern and their requirements
- Hands-on: Problem statements
  - Write and iterate on an appropriate problem statement from your area
  - Briefly present the statement and iterate based on feedback
- Break
- Hands-on: Pattern Writing – Context & Solution
  - Write a complete pattern based on the problem statement from before
- Hands-on: Pattern Iteration
  - Read everyone else's pattern and rate them with the standardized rating sheet
  - Iterate your own pattern based on the ratings you received
- Presentation
  - Present your pattern in plenum, explain the contents of each subcategory (what&why) and where&why parts were iterated
- Closing and Open Discussion

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Introduction and Pattern Theory

- Patterns – What are they?
  - **What they are**: Structured and documented solutions to reoccurring problems.

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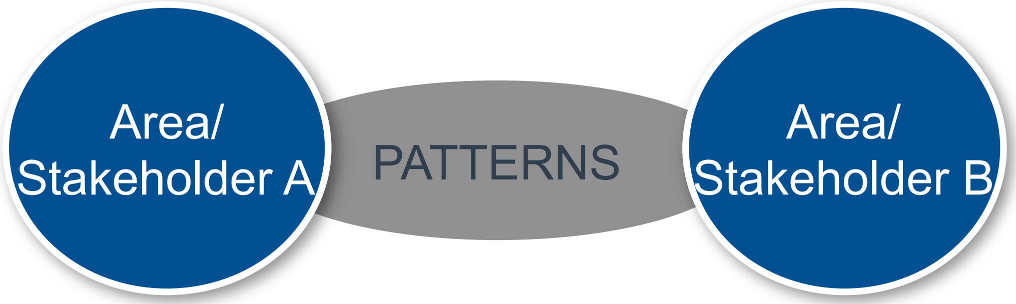
Introduction and Pattern Theory

- ## Patterns – What are they?
  - **What they are**: Structured and documented solutions to reoccurring problems.
  - **What they can be**: Knowledge transfer method within and between disciplines and areas.



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Types of Patterns

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Introduction and Pattern Theory

- Example – a Programming Pattern

http://gameprogrammingpatterns.com/observer.html

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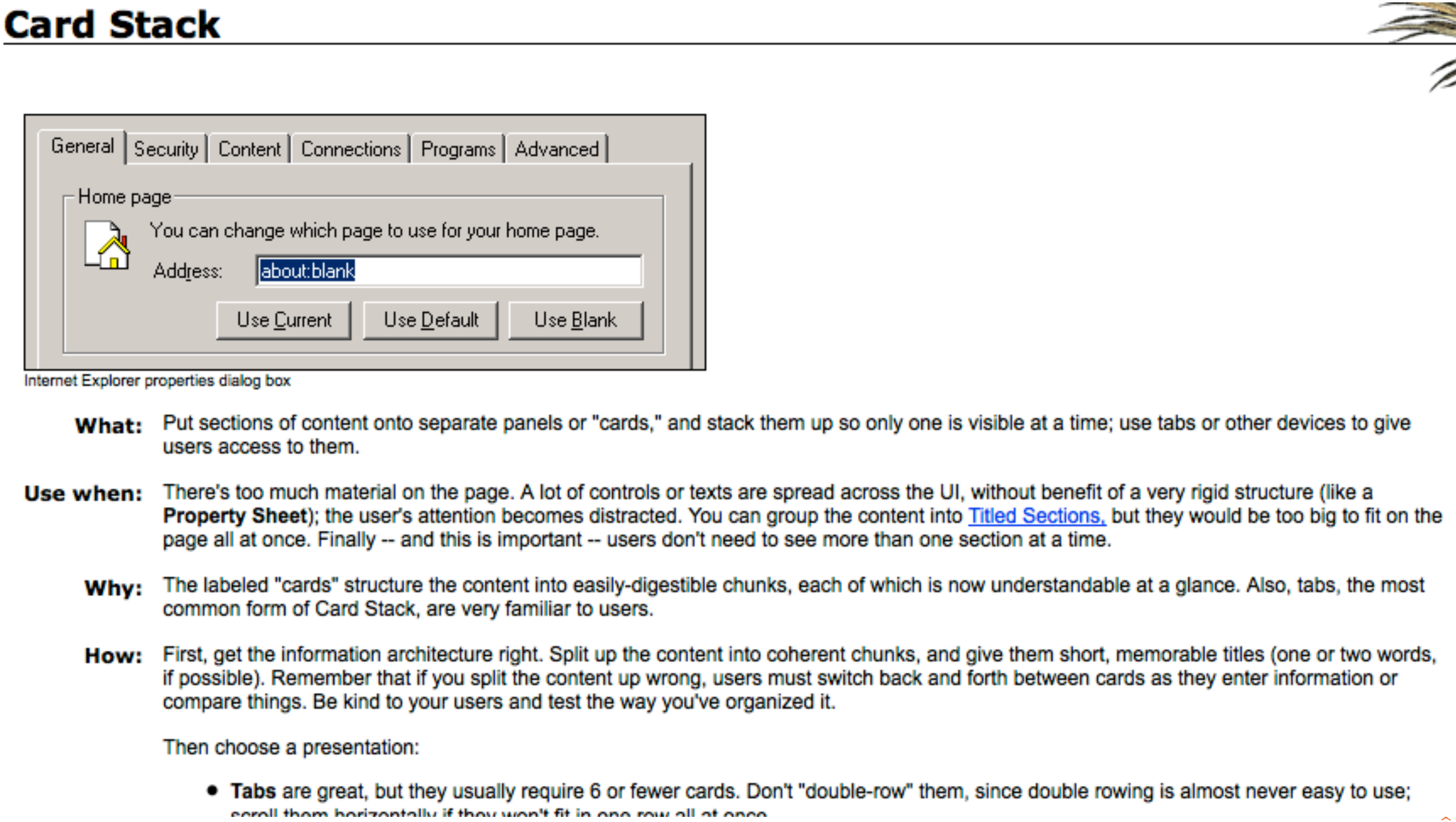
Example – and HCI Design Pattern



Card Stack

Home page

You can change which page to use for your home page.

Address: about:blank

Internet Explorer properties dialog box

What: Put sections of content onto separate panels or "cards," and stack them up so only one is visible at a time; use tabs or other devices to give users access to them.

Use when: There's too much material on the page. A lot of controls or texts are spread across the UI, without benefit of a very rigid structure (like a **Property Sheet**); the user's attention becomes distracted. You can group the content into Titled Sections, but they would be too big to fit on the page all at once. Finally -- and this is important -- users don't need to see more than one section at a time.

Why: The labeled "cards" structure the content into easily-digestible chunks, each of which is now understandable at a glance. Also, tabs, the most common form of Card Stack, are very familiar to users.

How: First, get the information architecture right. Split up the content into coherent chunks, and give them short, memorable titles (one or two words, if possible). Remember that if you split the content up wrong, users must switch back and forth between cards as they enter information or compare things. Be kind to your users and test the way you've organized it.

Then choose a presentation:

- **Tabs** are great, but they usually require 6 or fewer cards. Don't "double-row" them, since double rowing is almost never easy to use; scroll them horizontally if they won't fit in one row all at once

* © Jennifer Tidwell; http://designinginterfaces.com/firstedition; retrieved 2014

Pattern Requirements

- a) Findability: A pattern needs to be easily findable within a pattern collection or language. If it already requires considerable effort to find a pattern in the first place, then that defeats the aim of patterns to provide easier access to specific information.

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- e) Overall acceptability: This is an additional criterion to capture the subjective component of whether or not a reader agrees with a pattern solution or not, regardless of the presence or absence of deficiencies in any of the other quality requirement categories.

Minimal Pattern Elements

- a) Means of reference: Name, Type, Keywords, and similar elements serve to distinguish a solution description from others, help build references between solutions, which are dependent on other solutions or problems, and aid in finding or re-finding the particular solution in a collection or database containing several patterns. Corresponds to the criterion of findability. At least one such means of finding and reference should be contained in every pattern.

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- c) Context description: Since patterns provide solutions for very concrete problems, these problems need to be described in the context the solution occurred in. Depending on the context, some solutions are not feasible or have different effects than they would have in other contexts. Ideally, this context description includes a detailed listing of the forces influencing the solution, but not necessarily. The basic requirement is a description detailed enough to let the reader decide whether the solution can be applied in the particular context or not.

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  - Example from Philosophy: "What is truth?"
    - Are we looking for a physical object? A language construct? A semantic function? An (abstract or physical) attribute or property?

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Evolution of a (bad) problem statement

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Evolution of a (bad) problem statement

1) Where should what be displayed?
2) Where should displays be positioned in the cockpit?
3) Where does a driver look first? Which areas are quicker to access for the eyes than others?

Finding the right Problem

Final Problem Statement:

- Information sources are spread throughout the cockpits of cars (instrument cluster, center console, in and around the steering wheel). Differently sized displays in different positions make it difficult for the driver to locate the right information at the right time, thus being a potential source of distraction for the driver.

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- A successful solution needs to provide information on areas (to account for the size), where displays can be positioned in the car and how long it takes to gather information from each area. The distraction potential and recommendations on information to be displayed for each respective are need to be acknowledged as well.

Hands-On: Write a Problem Statement

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Examples/Primers:

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- You need to take notes but have neither pen nor paper

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- Analogy to Linguistics:
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- The context description enriches the information contained in the Problem statement and provides guidance as well as constraints for the Solution description

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Hands-On: Write down the Problem Context

Keep in mind:

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  - See above

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- Needs to address beneficial factors and limitations from the context description
- This is why the Problem Statement and Context are so Important: They Problem statement guides the Solution writing Process!

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- Think of it as *Solution Writing for Dummies*

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Example:

- Images say more than words
- The more examples, the better

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- Ideally, this is done via writers' workshops, in which patterns of various stages of maturity are read and discussed together with others
- Rating systems can facilitate this process
    - Rate the pattern in each of its subcategories and general pattern requirements.
    - Low individual scores imply weaknesses in the respective Pattern-subsection. This allows for focused iterations.
    - The pattern is finished (barring minor polishing), if it receives high ratings (4+ on a 5-point scale) for each item.

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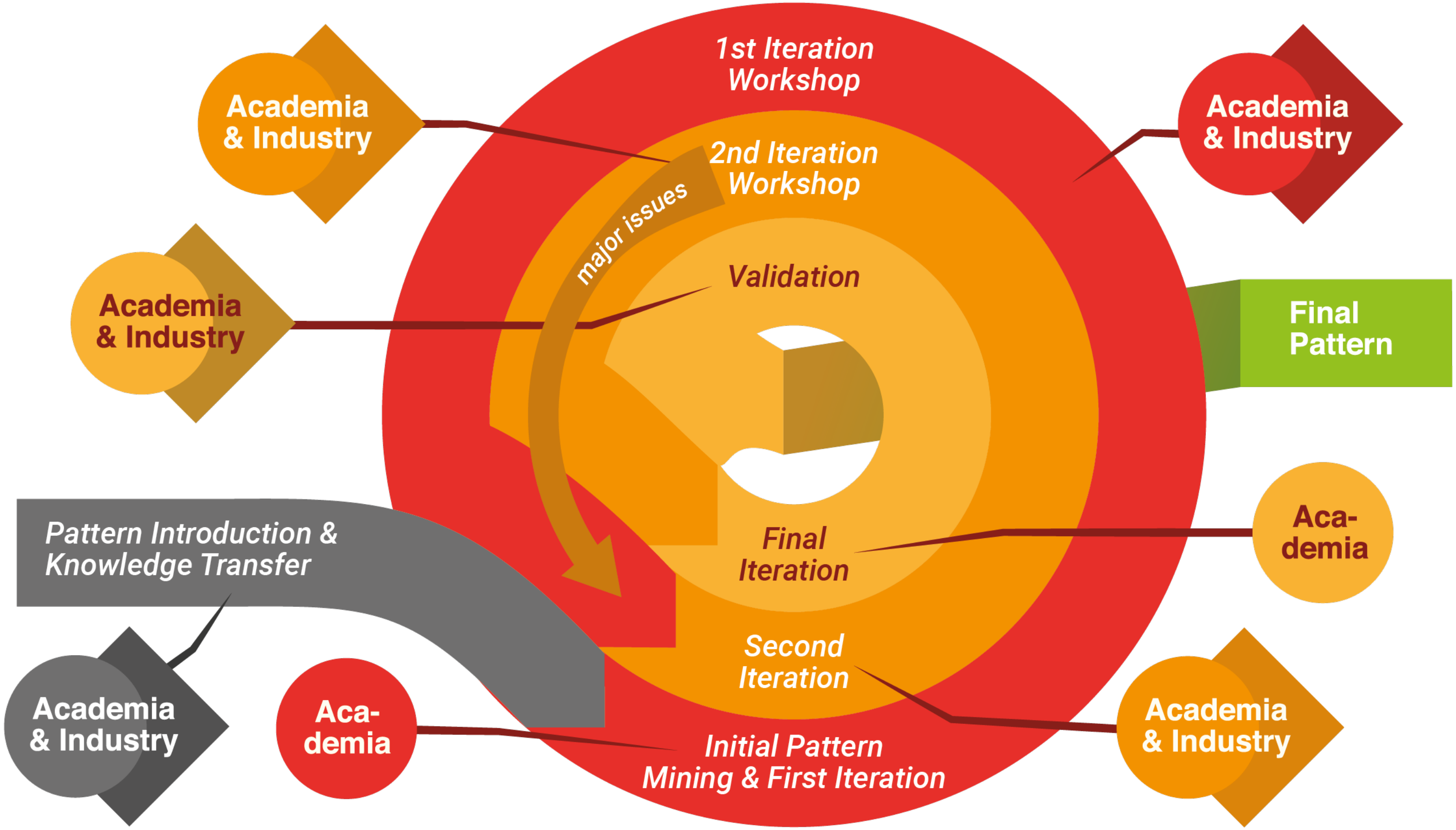
Iteration Process Example



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Hands-On: Read and Rate everyone else‘s Patterns

- Use the provided rating sheets.
- Read the pattern carefully from beginning to end.
- The more individuals read and rate a pattern, the better.
- Each pattern subsection is rated regarding its quality on a 5-point scale.
- If a subsection receives an (avg.) rating <4, then the pattern needs to be iterated **for that subsection only**.
- Iterations continue until scores >4 for each subsection as well as for the overall rating are reached.
- *(We are only doing one iteration cycle in this exercise, however)*

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Discussion, Q&A

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Contact

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