CHAPTER 6:
Design Case Studies

Designing the User Interface:
Strategies for Effective Human-Computer Interaction

Sixth Edition

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Introduction to Design Case Studies

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Introduction

- This chapter's case studies present design contexts and applications to let readers see how tradeoffs and choices are made.
- The case studies were chosen to cover this book's design methods (see Chapter 4).
- The case studies are valuable for encapsulating design learning and showing the challenges of a design context.

Case Study 1: Iterative Design Evaluation of Automated Teller Machines (ATMs)

- The scope of this Case Study is physical ATMs an example of which appears below:

- What human-computer interface issues need to be addressed to begin the case study, e.g. specific input-output expectations, task knowledge, domain knowledge, user characterization, etc.?

Case Study 1: Iterative Design Evaluation of ATMs (continued)

Visualize the statistical data that can be captured from this usability "experiment":

- Time to complete entire tasks over a statistically significant set of ATMs
- Time expended for these ATM steps or "subtasks":
  1. Entrance into ATM (approach ATM, read instructions to get started, insert card, enter PIN, continue following prompted instructions)
  2. Enter commands to make withdrawal, and
  3. Receive cash, optional receipt, and card returned (with the preferred goal of leaving a positive balance in the account).
- Objective and subjective user feedback and contextual observation regarding user performance of the above ATM steps.

Case Study 1: Iterative Design Evaluation of ATMs (concluded)

Add additional requirements and technology to further complicate your analysis:

- Use eye-tracker data to further analyze the product
- Consider accessibility (universal usability) issues
- Consider user profile issues, e.g. is this the first time this user is using an ATM by herself?
- Perform some beta and/or market tests?
- Are there other stresses such as a looming time deadline or a safety issue?
- *Discussion item: anything else that would add more complexity to this case study?*

Case Study 2: Design Consistency at Apple Computer

See the iOS Human Interface Guidelines in the iOS Developer Library

Here are some sample guidelines:

- Take advantage of the whole screen
- Reconsider visual indicators of physicality and realism
- Let translucent user interface elements hint at the content behind them
- Let color simplify the user interface
- Ensure legibility by using the system fonts
- Use depth to communicate

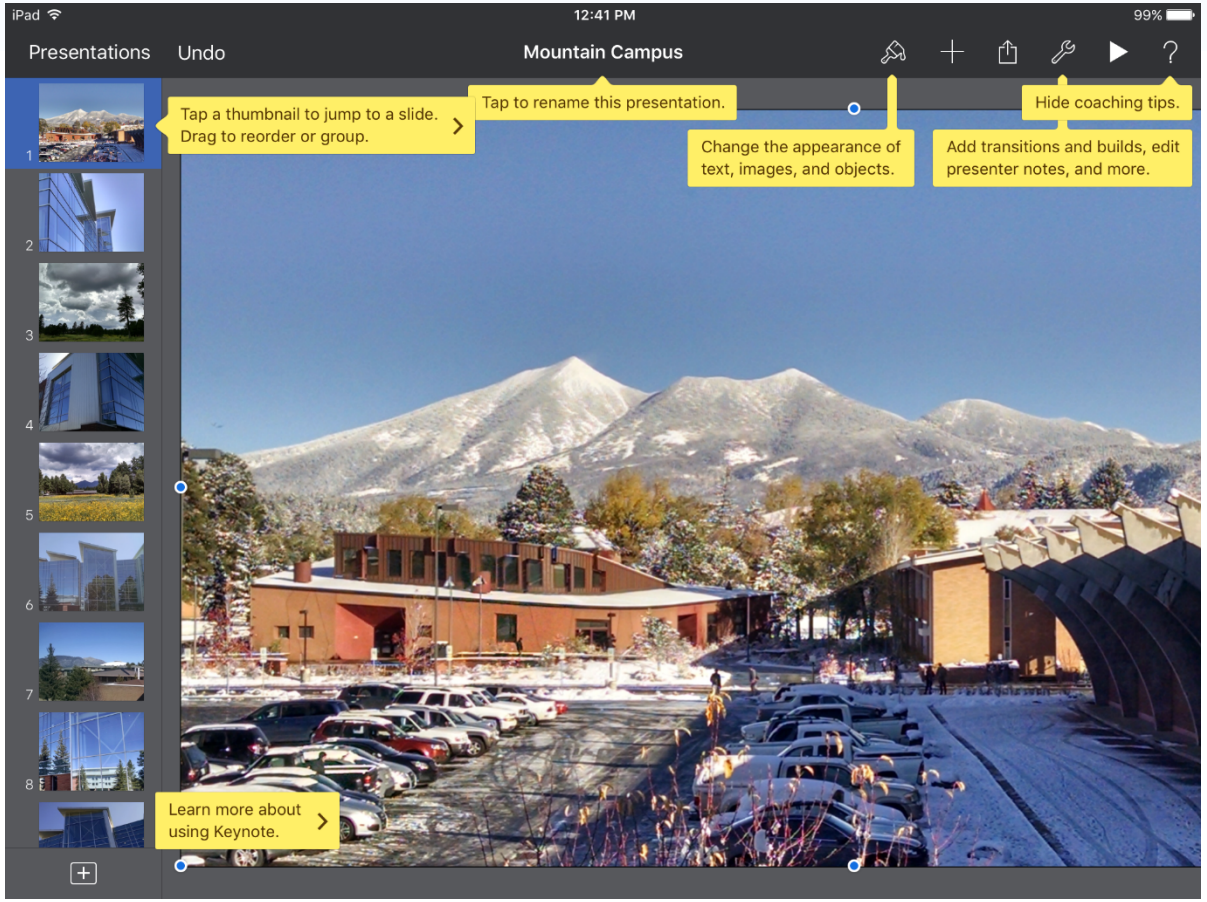
There are guidelines for icons and image design, iOS technologies, user interface elements, and more.

Case Study 2: Design Consistency at Apple Computer (continued)

- Note the application of these UI guidelines to Apple's Keynote™ product
- Keynote has presentation development tools, graphics and toolbars for rapid generation of presentations
- See what Keynote can do at: http://www.apple.com/ios/keynote/

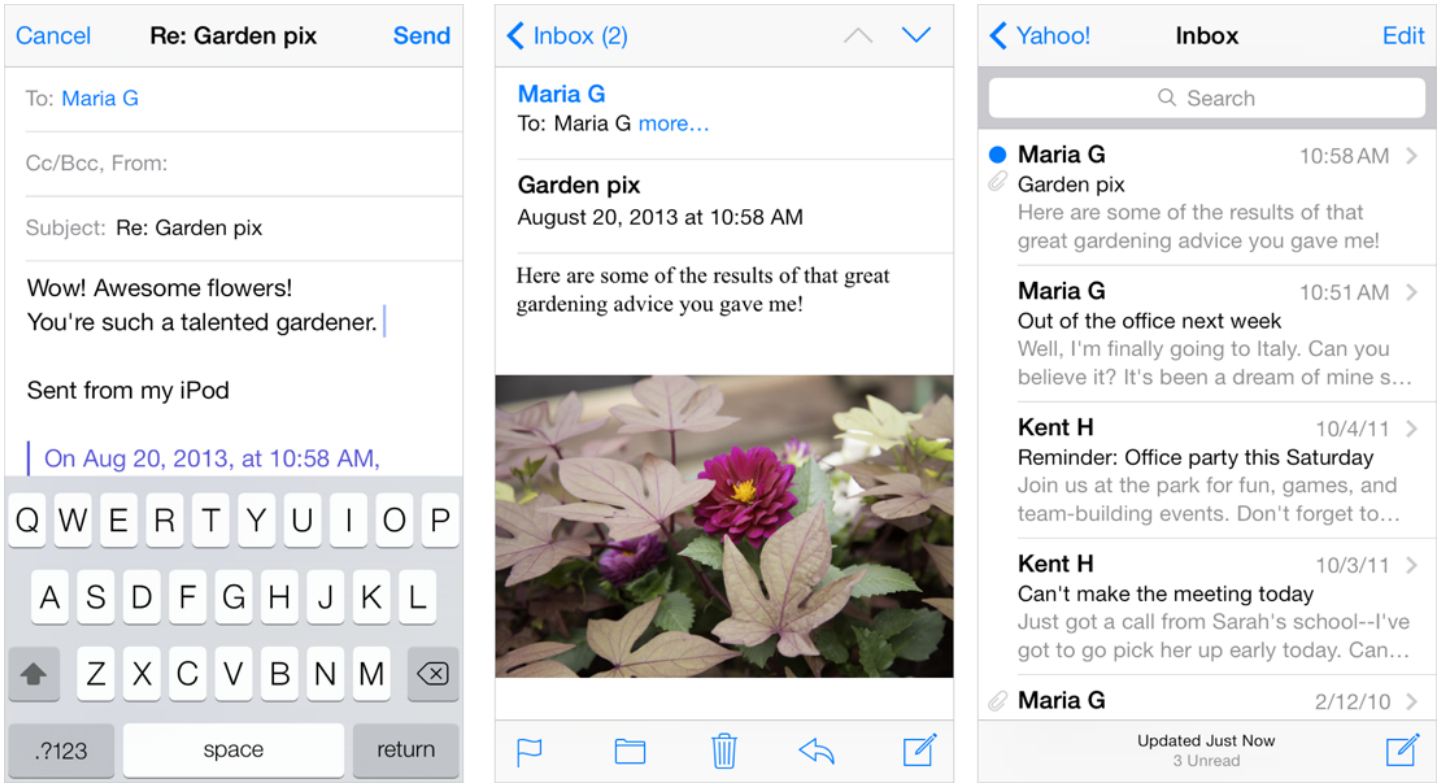
Case Study 2: Design Consistency at Apple Computer (continued)

Sample Keynote display with help text:



Case Study 2: Design Consistency at Apple Computer (continued)

Next see how the UI guidelines apply to the these iPhone mail screens:



Case Study 2: Design Consistency at Apple Computer (concluded)

- Rapid device technology improvements (lighter weight, faster, more colors, more pixels, improved throughput, etc.) result in a constant re-evaluation of the user interface and improvements of the guidelines applied
- The principles discussed in this text also hold true in this case study:
  - universal usability
  - guidelines based on principles and theory
  - Iterative, user-centered design processes
  - a keen appreciation of the user experience and of style

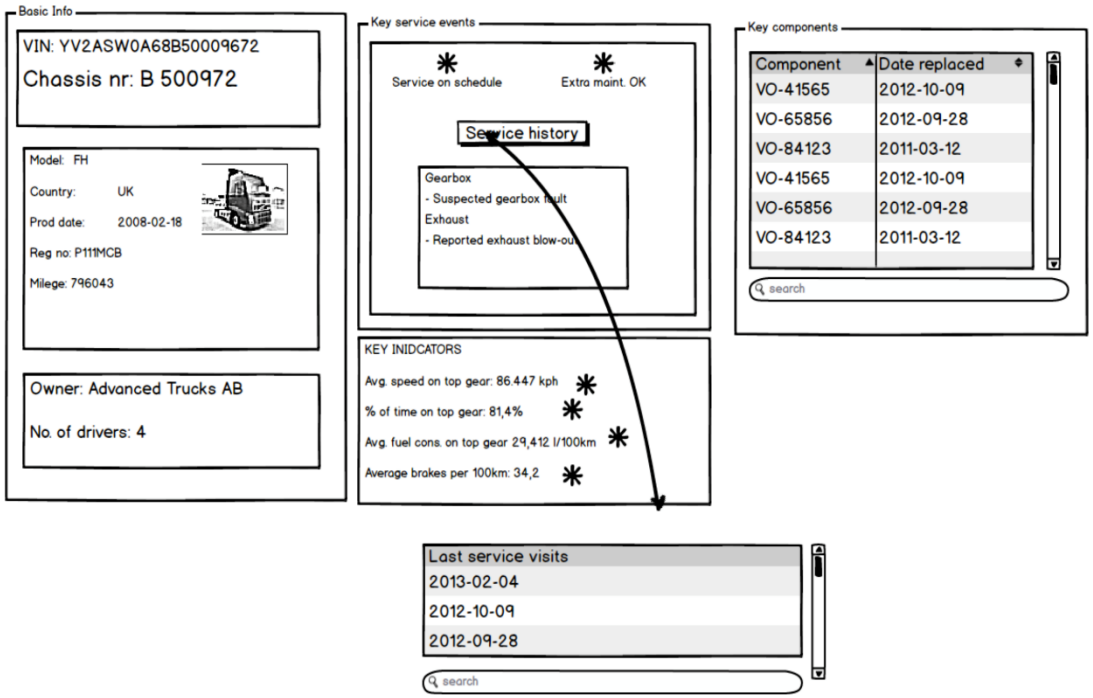
Case Study 3: Data-Driven Design at Volvo

- Volvo's Big Data service provides a terrific example of a case study with Big Data analytics used in the corporate world that contains a strong user-interface design component.*
- Taking huge data sets of Volvo truck service data and essentially prototyping the analysis output that could be performed worked successfully to identify the needed data in useful formats.

*Wozniak, P., Valton, R., and Fjeld, M., "Volvo Single View of Vehicle: Building a Big Data Service from Scratch in the Automotive Industry", *CHI EA '15: Proceedings of the 33rd Annual ACM Conference Extended Abstracts on Human Factors in Computing Systems*, ACM, 2015, pp. 671-678.

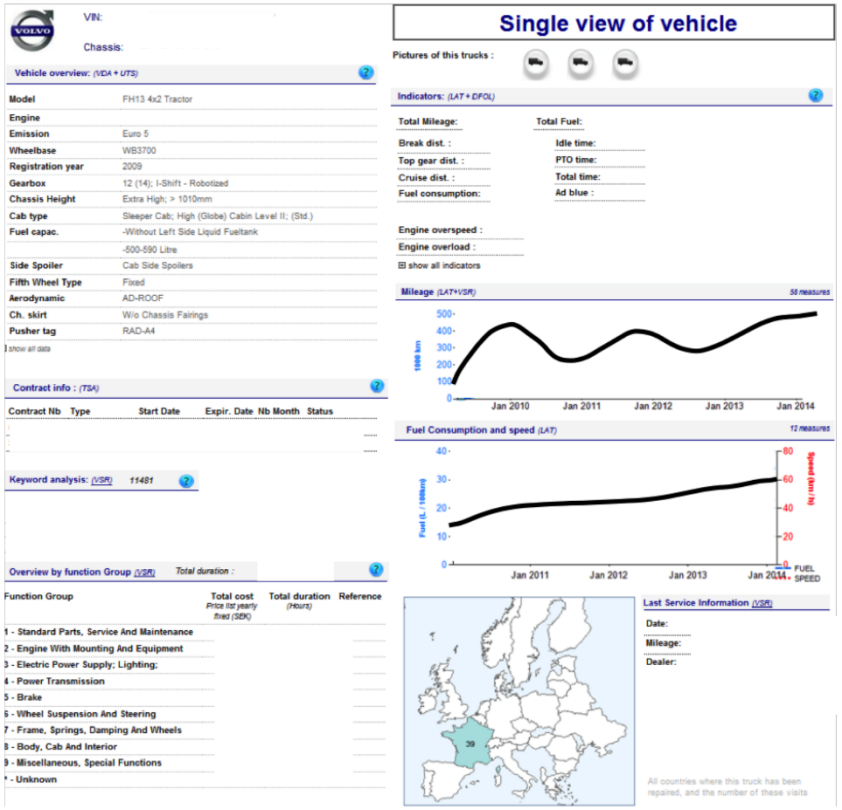
Case Study 3: Data-Driven Design at Volvo (continued)

- A multi-disciplinary, cross-organizational stakeholder team developed this low-fidelity prototype:



Case Study 3: Data-Driven Design at Volvo (continued)

- Through a series of refinements, this prototype evolved into something useful for all concerned:



Case Study 3: Data-Driven Design at Volvo (concluded)

- The performers of the study learned to first identify sources of data, while empowering the stakeholders of the data to choose what data they could use (and how) in order to get their jobs done.
  - The final result was corporate Big Data policies that led to stakeholder-customizable report formats to better improve internal corporate communication and decision-making.
- What was essentially a process for developing a Big Data analysis strategy, service design and supporting tools for a company to use to increase internal communication and profitability, ***turned out to apply methods and processes taken from the world of user experience design and designing user interfaces!***

Case Study General Observations

- These case studies are “a tip of the iceberg” in what can be accomplished by designers of user interface systems
- The case studies were chosen strategically to highlight design contexts, various applications, and incremental continuous improvement
  - The ATM design example illustrated where what may have started out as a relative straightforward task turned into a methodical study of how to improve a user interface to the machines were not only accepted but embraced by banking customers
  - The Apple Guidelines case study shows one company’s approach to a consistent, easy-to-to use style for all the company’s products and iOS-enabled devices
  - The Volvo study shows how following a good user interface design process can result in a successful conclusion with a large, data-intensive problem