Designing a Flexible GUI for R

UseR! The R User Conference 2010

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Introduction

- Sheri Gilley, Principal User Interface Designer
- BS in Psychology, Statistics
- MS in Statistics
- 25 years of software experience at SPSS
  - Statistician
  - Techline & Training
  - UI Designer
    - SPSS for Windows
    - What If?, What If? Web
    - Clementine
    - Text Analysis for Surveys, Text Analysis for Clementine
- Now Principal UI Designer at Revolution Analytics
GUI Design

- Design a user interface for R
- Easy to use
- Dialogs
- Menus
- Programming environment
UCD

- User Centered Design
- Focus on user TASKS, user GOALS, user NEEDS
- Process incorporates user feedback and testing at every step.

“Optimize the user interface around how people can, want, or need to work, rather than forcing the users to change how they work to accommodate the software developers' approach.”

http://en.wikipedia.org/wiki/User-centered_design
UCD Phases

User Requirements Analysis

Conceptual Design

Design & Implement

Usability Evaluation

Launch & Maintenance
UCD Phases

- User Requirements Analysis
- Conceptual Design
- Design & Implement
- Usability Evaluation
- Launch & Maintenance

Designing a Flexible GUI for R
User Requirements

Who are the USERS? What are their GOALS? What are their NEEDS?

- USERS: Develop personas
- GOALS: What do they want to do?
- NEEDS: What do they need to do?

- Internal review
- Competitive analysis
- User interviews and surveys

Launch & Maintenance

Usability Evaluation

User Requirements Analysis
Personas

Phyllis the Professor

Sam the Student

Bernie the Business Analyst

Saul the Statistician

Marianne the Marketing Manager

Charlie the Chemist

Patricia the Programmer

“Know thy user, for he is not yourself”
User GOALS

Phyllis: Teach Statistics with R

Sam: Complete my Assignment

Bernie: Detect Fraud

Saul: Analyze my client’s data

Marianne: Monitor my customer survey

Charlie: Collect data and understand results

Patricia: Extend the capabilities of Phoenix

Designing a Flexible GUI for R
User NEEDS

**Product Goal**: Provide a user experience that will broaden the use of R in the general data analytics market

**Needs**: Fundamental UI design principles to be followed to achieve the goal

- Support the entire *workflow* of data analysis
- Easy to *move seamlessly* between the GUI and R Language
- Make it *easy to use* for a person who does not want to program in R
- *Aid in learning* for a beginner in R programming
- *Easy to extend* for someone who is an experienced R programmer
- *Cross platform*
Conceptual Design

**SKETCH**
- High Level Design
- Mockup
- Prototypes

**EVALUATE**
- Internal Review
- Focus Groups
- Demos
- Usability Testing

**ITERATE**
- Each iteration improves upon the last
- Less code iteration later
Many iterations of a prototype based on feedback from:

- Internal demos
- 1-1 demos to members of User Advisory Board
- Focus Group I – experienced R users/teachers
- Focus Group II – students new to R
References

- [http://www.upassoc.org/usability_resources/about_usability/what_is_ucd.html](http://www.upassoc.org/usability_resources/about_usability/what_is_ucd.html)
- [http://www.w3.org/WAI/redesign/ucd](http://www.w3.org/WAI/redesign/ucd)

- Cooper, Alan. (1999): *The Inmates are Running the Asylum*. SAMS
User Advisory Board

- Revolution’s User Advisory Board
  - 1-1 demos
  - specific questions about a design
  - survey of feature desirability
  - early information about beta program

- How to join?
  - see me after this talk
  - email me: sheri@revolutionanalytics.com
DEMO

- Prototype Demo
- Images from Fireworks
  - Webpage from Dreamweaver, simple click events
  - Easy to iterate quickly, just draw a different picture
- Actual client development and UI designs are underway in parallel
Appendix

- The following slides show UCD activities involved in other phases of development. They will not be covered in the conference talk.
Appendix

- Design & Implement

  - Conceptual Design
  - Design & Implement

  **Write** UI Designs with full details
  Include Accessibility Issues
  Decide on Look and Feel, Style

  **Review** Designs

  Design changes occur…

  **Update** UI Designs

  Evaluation
Appendix

Design & Implement

- Focus on user **task**, not on R code
- Reveal underlying code rather than design for it

- More complex designs may be simpler for user

- What does the user **want?**
- **Why** does the user want it?
- What is the user going to **do with it?**
Appendix

Design & Implement

- High level view of product
- How rich is the UI?
  - Drag & Drop?
  - Accessibility?
- How extensible?
  - What can the user extend?
  - What can a developer extend?
- What platforms?
- Thin client or desktop?
- Cloud or corporate intranet?
- What common components are there?
Appendix

Usability Evaluation

- Conduct Usability Studies
  - Focus Groups
  - Now: Make changes that fit in release schedule
  - Later: Start enhancement list for next release

Launch & Maintenance

Usability Evaluation

Implement
Appendix

Usability Evaluation

- Usability lab
- Online meeting software
  - cheaper
  - easy access for subjects
  - but not as hands-off as a lab
Designing a Flexible GUI for R

Collect feedback from users/customers
- Surveys
- Focus Groups
- Training
- Techline Requests
- User Groups

Launch & Maintenance

Usability Evaluation

User