Bringing the User into Sustainable Software Development for Science

Dan Gunter
LBNL
What is needed to develop sustainable software?

- $$
- Great developers
- Good design
- Software engineering practices
- ....
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USERS
How do we build software for science?

- Gather Requirements
  - Talk and assume you know what is needed

- Design
  - Design what it is interesting

- Develop & Test
  - See, it works well for ME!

- Release
  - Send the software to the user
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- **Design**: Design what it is interesting.
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Develop & Test
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Release
Send the software to the user
"Build it and they will come?"
User Research

Scientists

User Research

R&D

Software

UX Designer

Product

**Images copyright the Walt Disney Company**

Image by Chris Gash
User Research Methods

Ethnography

User Analytics
How **should** we build software for science?

- **Gather Requirements**
  - Construct a hypothesis: what should the product look like?
- **Design**
  - Design a prototype to verify the hypothesis
- **Develop & Test**
  - Test by putting the prototype in front of users
- **Release**
  - Analyze results, prove/disprove hypothesis, refine vision
- **Learn**
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Example: User research to improve Workflow APIs (Tigres project)

Gather Requirements

What should Workflow API look like?

Design

Design sample "problem" to solve with a workflow API

Develop & Test

Test with Google Docs "paper prototype" and real users

Release

Analyze results, modify API, prepare new tests

Learn

http://tigres.lbl.gov
Conclusions

• Sustainable software needs users and giving users what they want needs better processes and empirical studies (ethnography)

Tigres


"a holistic approach to the development of tools and interfaces [for HPC] .. by employing a user-centered design process .. [and] empirical usability and ethnographic studies"

http://tigres.lbl.gov

http://uda.lbl.gov
Extra
Usability

Usability is the ease of use and learnability of a human-made object.

Merriam-Webster
http://www.merriam-webster.com/dictionary/usability

A user interface is well-designed when the program behaves exactly how the user thought it would.

Joel Spolsky.
http://www.joelonsoftware.com/uibook/fog000000249.html