Increasing Student Participation Using Open Source

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Who Are We?

- Professor, Drexel University
- Foss2serve team lead
- Software industry veteran

- Professor, Western New England University
- Co-maintainer GNOME MouseTrap
- Founding Member HFOSS
This Presentation

- Current situation for open source in higher education
- Challenges to teaching open source
- Helping instructors prepare to teach FOSS
- Student results
- Next Steps
Current State of FOSS in Education
What Students Know

- Open Source Software exists
  - They can use stuff without paying for it
    - It’s legal to do so
What Most Students Don’t Know

• Organization and Scale
  – The extent of FOSS – number and scale of projects
  – FOSS career opportunities
  – Licensing
  – FOSS culture

• Development
  – FOSS development tools
  – Processes and techniques
Example: Student Survey

- Junior and Senior computing majors at Drexel
  - Multiple choice and fill-in-the-blank
  - Goal: Get a baseline familiarity with FOSS concepts
Survey Results

- Fewer than 10% of students:
  - Know that people get paid to contribute to FOSS
  - Have any concept of FOSS as a career area
  - Have any understanding of the history of FOSS

- Most students think that the average number of contributors to a FOSS project is > 50
Challenges
Faculty Learning Curve

• Relatively few CS faculty have significant software engineering experience
  – Large code bases
  – Active client communities
  – Product management, evolution, packaging, distribution, and support

• Very few CS faculty have FOSS experience
  – Tools and processes
  – Open source culture
  – Licensing, business models, etc.
Faculty Reward Structure – Research Institutions

● Research emphasis
  − Publish or perish
  − External funding
  − Education research not always valued
  − Peer review is key

● Education innovation
  − Not always rewarded!
Faculty Reward Structure – Teaching Institutions

• Teaching emphasis
  – Higher teaching load
  – More courses covered by each instructor

• Scholarship still expected
  – Especially peer reviewed publications

• Education innovation
  – Perhaps more welcome
Curricular Innovation is Slow

- Up to 1 year for new course
- Up to 4 years for new curriculum
- Not all faculty are able to innovate
  - Seniority helps
Mismatch in Timelines

Fedora Project:
- Release Cycle: 6 mo
- Planning Cycle: ~1 yr
- Execution Time: 6-12 mo

Higher Education:
- Release Cycle: 1-4 yrs
- Planning Cycle: 2-5 yrs
- Execution Time: 4 yrs
Instructional Expectations

• Instructor as the expert
  – Difficulty in being “productively lost”
• Meeting course learning outcomes
  – Difficulty with unpredictable events in FOSS
  – Difficulty achieving the same outcomes for all students
• Short, fixed time frame of academic term
Helping Faculty Prepare
POSSE v1.0

- Professors Open Source Summer Experience
- Red Hat outreach initiative for college faculty
  - 3-5 days immersive introduction to FOSS
  - Focus on open source culture, tools, processes etc.

- Challenges
  - Funding for travel
  - Covering instructional issues
POSSE v2.0

- Professors Open Source Software Experience
- Collaboration of instructors and Red Hat
  - Plus NSF funding and recent Google support
- Coverage of instructional issues along with HFOSS introduction
- Three stage model
  - Online; f2f; small group
Student Contributions
50 Ways to be a FOSSer

- Use & Evaluate
- FOSS Participants
- HFOSS Project Overview
- Communication
- Tools
- Business Model
- Philosophy and Politics
- Privacy and Security
- Documentation
- Visual Design
- Quality and Testing
- Usability
- Design
- Style
- Coding
- Localization
Gnome Caribou Keyboard

- Student enhancements:
  - Shift Key
  - Esc Key
  - Delete Key (vs backspace)
  - Page Up, Page Down
MouseTrap

- GNOME Accessibility
- Institutional project
- Goal: Use project to support mentoring and learning across institutions and classes
Step By Step Developer Setup Guide (Linux)

10 Added by Todd Binger, last edited by Wyclif Luvungi on Jul 19, 2012  View change, show comment

Step by step setup walk through for Linux Developer Installation

(This guide was designed for Linux Ubuntu 10.10, x86- results may vary based on distribution and architecture)

Notice that the step named Build Maven Project below also works on Windows 7 / 64.

Prerequisites:

1. Install: Eclipse IDE for Java EE Developers
   - Download: eclipse-jee-juno-linux-gtk.tar.gz (May need to select alter for latest file or architecture at http://www.eclipse.org/downloads/)
   - Open terminal and navigate to your download folder
   - su – or prefix all commands with sudo
   - Extract files
   - tar-xzvf eclipse-jee-juno-linux-gtk.tar.gz -C /opt (varies by downloaded file name)
   - Add read permissions to all files
   - chmod +r /opt/eclipse
   - Create Eclipse executable on /usr/bin path
   - touch /usr/bin/eclipse
   - ln -s /opt/eclipse /usr/bin/eclipse

OpenMRS – Other Contributions

• Dev Environment
  – Explore VM's and containers to package demo or development environment
  – Writing more installation instruction

• Translating system messages to multiple languages
  – Updates and additions to French
  – Additions in Polish
  – Attempt in Arabic
Next Steps
Goal: Graduates able to contribute to HFOSS project

- Define HFOSS instruction
  - What does a student need to know?
  - What are good sequences for learning?
- Map instruction to computing curricula
- Provide learning activities
  - More scaffolding for early activities
  - More independence for later activities
Learning Pathways

- Contribute code
- Work on defects
- Documentation
- Installation instructions
- Web sites
- Release packaging
- Demo server: build, maintain
- Maintain a demo server
Open Source Communities

- Having a contact for educators
  - Or having a community manager help with this
- Having instructions for potential contributors
  - “Easy” bugs
  - Product documentation
  - Non-code ways to contribute
  - And try to keep these things current!
- Reach out to colleges or universities in your area
Resources

- teachingopensource.org
  - Resources on the Web
  - Listserv

- foss2serve.org
  - HFOSS focus
  - POSSE
  - Learning activities collection
Questions?

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