

# Research Methodologies and Projects

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# Paper Structure

- Abstract
- Introduction
- Background and Literature
- Methodology and Data
- Results
- Discussion
- Conclusion

# Methodologies

- “Research design : qualitative, quantitative, and mixed methods approaches”
- by John W. Creswell

# Quantitative

- Problem
- Data and Methodology
- Extract and clean
- Model: Weka or R
- Write paper (usually around a single model)

# Qualitative

- Interview developers
- Survey developers
- Read email discussions
- See Rigby2011ICSE

# Code Ownership and Code Quality

- “Don’t Touch My Code! Examining the Effects of Ownership on Software Quality”
  - Bird2011FSE

# Simple Measure

- How many people edit a file?
- Proportion of changes
  - Major committer vs
  - Minor committer

Model	Windows Vista		Windows 7	
	Pre-release Failures	Post-release Failures	Pre-release Failures	Post-release Failures
Base (code metrics)	26%	29%	24%	18%
Base + TOTAL	40%* (+14%)	35%* (+6%)	68%* (+35%)	21%* (+3%)
Base + MINOR	46%* (+20%)	41%* (+12%)	70%* (+46%)	21%* (+3%)
Base + MINOR + MAJOR	48%* (+2%)	43%* (+2%)	71%* (+1%)	22% (+1%)
Base + MINOR + MAJOR + OWNERSHIP	50%* (+2%)	44%* (+1%)	72%* (+1%)	22% (+0%)

# Number of failures?

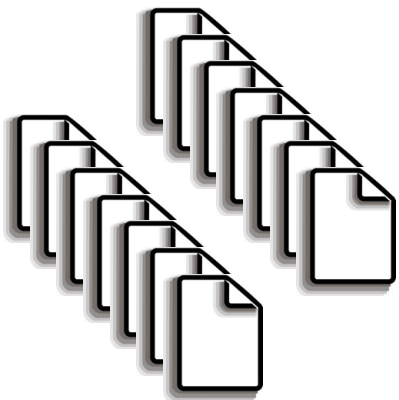


# Spreading Knowledge



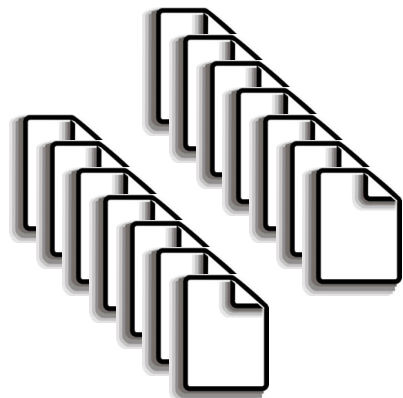
# Spreading Knowledge

Modified



# Spreading Knowledge

Modified

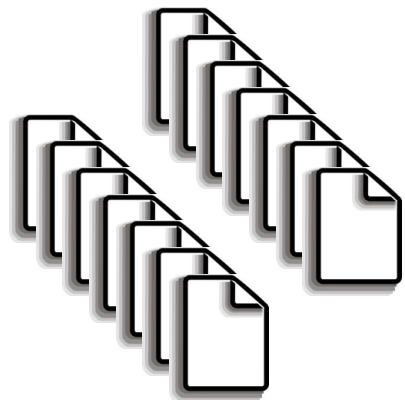


Reviewed



# Spreading Knowledge

Modified



Reviewed

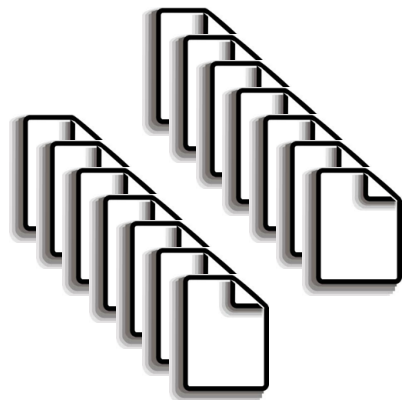


Knows About



# Spreading Knowledge

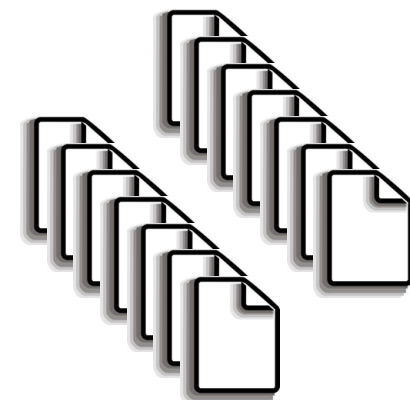
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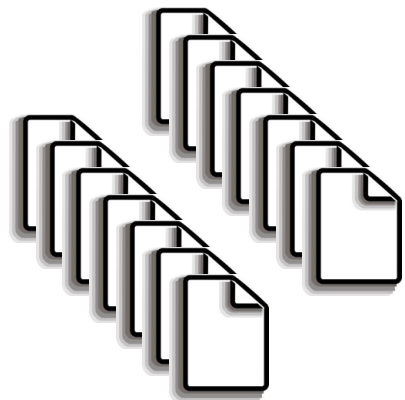


Knows About



# Spreading Knowledge

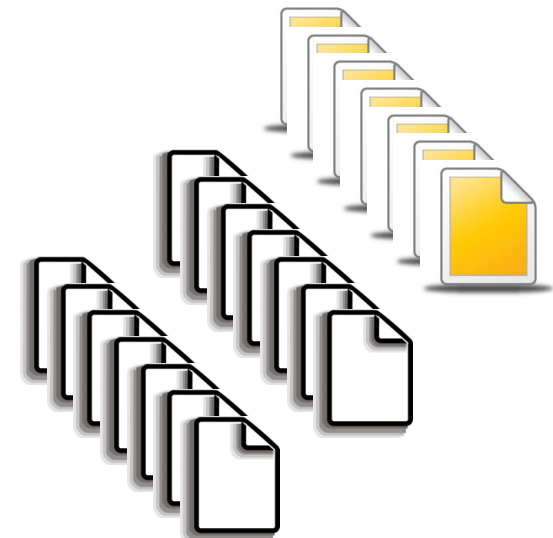
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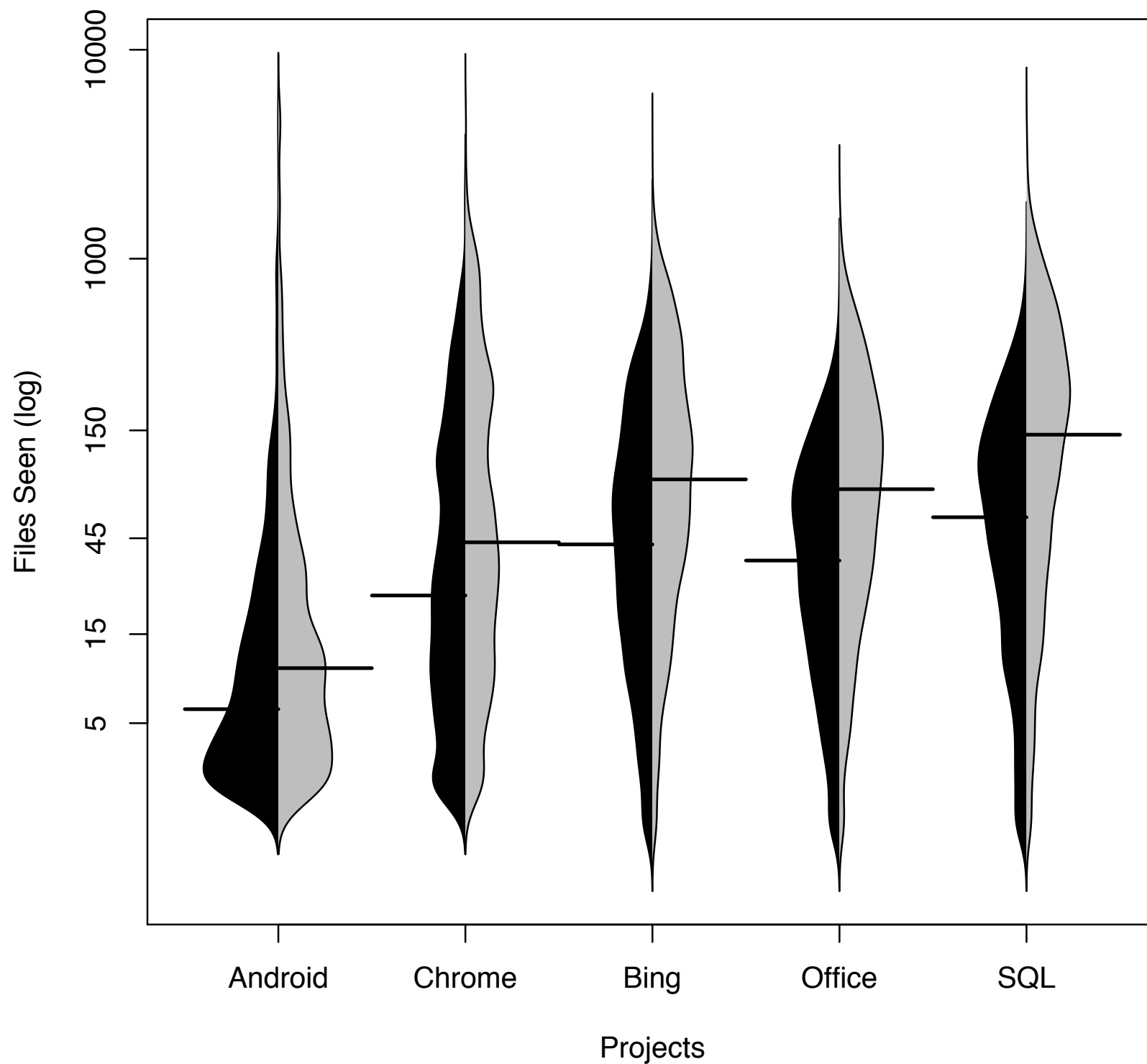


Reviewed



Knows About





# Files seen during review

Devs know about 66% to 150% more files

Files seen during review



# Software Peer Review

- Review Ownership and Code Quality
  - Starting point Rigby2013FSE

# Complexity of Software Changes

- See presentation “Churn”

# Social Networks

- Code Gods
- Modularity
- Bikeshed

# Modularity and latent structure

- How does the teams structure change from month to month?
- Bird2008FSE

# Bikeshed

- Divide devs into core and non-core
- What is the impact of non-core developers
- Distracting or open for new knowledge?
- Rigby2011 ICSE

# StackOverflow

- Which API elements are discussed on StackOverflow
- How long does it take a new element to get discussed?
- For an API, how many of its elements are discussed?
- Replication: Parnin2011TechReport

# StackOverflow

## Qualitative

- How do developers interact?
- Good and bad patterns
- What makes a good question?
- Treude2011 NEIR

# General Properties of OSS

- Mockus2000ICSE
  - How many people work on them?
  - How many fix bugs? etc



# Governance

- Rigby2013RelEng
  - Governance: Dictator vs peer group
    - How hierarchical are they?

# Business

- General properties of projects with different business models
  - How many non-paid devs
  - Density of devs (80-20 rule)
  - Developer generations?

# Licensing

- Number and type of license
- <http://flossmole.org/category/tags/licenses>
- What happens to a project when the license switches?
  - More contributors?
  - More money?

# Developer Motivation

- Lakani2005MIT
  - Surveys of OSS developers
- Qualitative: what are the types of OSS developers
  - Read bug reports and mailing lists

# Disruptive Events

- See presentation on “Disruptive Events”