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CAREER Workshop Presentation
Intro

- James Howison @jameshowison
- PhD 2009 Syracuse University, Post-doc 2009-2011 CMU
- Social scientist, but I think a deep understanding of technologies is key
- I study:
  - The work of building software
  - Especially how we work together differently when we build things out of 1s and 0s.
Alerts

• $n = 1$

• Anecdote alert

• Selection on the dependent alert

• But: a case study is an existence proof and rich detail can make it relatable.

• Today: ideas to prompt you to think and act.
My study

- What happens at the end of a software grant?
  - Abandonment? Commercialization?
  - Or: transition to an active open source project?
- What actions can PIs take, during their grant period, to help build active communities?
- If transition is not successful, what can we learn?
## Initial Cases

**(6 letters of commitment)**

**Goals**

Develop baseline understanding of transition antecedents. Narrative history of project changes, Y5: return to examine impact of any new grants.

**Illustrative Activities**

10-15 interviews per project (~80 total). Recover history of source code. Analyze transcripts, websites, mailing lists (~250 pages per project). Develop content coding scheme and code. Member checking for validity.

## NSF SISI Panel Study

**Goals**

Identify factors shaping decision to abandon attempt. Test hypotheses developed in initial case studies.

**Illustrative Activities**

Build rapport (see main text). "Crash team" to capture material before destroyed. 10-15 interviews per case (6 cases likely). Analysis as above.

## Source code repository Study

**Goals**

Identify metrics to quantitatively indicate a) project change, b) patterns of collaboration, c) best practices.

**Illustrative Activities**


## Theory Development

**Goals**

Theorize on necessary and/or sufficient conditions for peer production success in science. Understand role of scientific reputation in motivating collective activity

**Illustrative Activities**

Analysis of narratives in both case study phases and source code data. Constant comparison with existing and new literature. Consideration of alternative explanations, testing interpretations with studied projects

## Paper preparation and dissemination (illustrative)

**Goals**

Publish and disseminate findings, both to organization sciences and to cyberinfrastructure practitioners.

**Illustrative Activities**

I publish both shorter papers (6-12 months writing and review), and org science papers (35 pages, 2-3 rounds review, 1-2 years to publication.

## Doctoral Mentoring

**Goals**

Take 1 student from enrollment to graduation and employment in infrastructure studies academic position

**Illustrative Activities**

Y1&2 student helps in interviews, builds source repository analysis skills. Student dissertation of mentored independent work in SISI panel study cases. Meeting, writing, support.

## Short Courses (Software Carpentry/TACC)

"Managing Open Projects" semester course

**Goals**

Develop, contribute, disseminate modules on organization of scientific software projects.

**Illustrative Activities**

Development begins immediately. Y1&2 will involve "training the trainers". Y3&4 course will be delivered by Software Carpentry. Y5: return to initial participants to identify impact of training.

## "Managing Open Projects" semester course

**Goals**

Develop and deliver semester long course for students across UT Austin.

**Illustrative Activities**

Prepare curricula materials, invite guest speakers, prepare evaluations. Delivering course takes 10 hours a week.

## Science Exec Ed Harvard Style cases

**Goals**

Publish formal business case on transitioning scientific software project.

**Illustrative Activities**

Formal cases involve ~25-30 pages of tested materials: background, student role sheets, discussion guidance, event and strategy reaction sheets. Equiv. to large research paper.
Preparation

• Not my first time writing an NSF grant

• I had privilege of serving on a couple of review panels beforehand.

• Also met with NSF Program Officers, but the best interactions were at topical workshops

• Previous research had built credibility with research subjects and likely reviewers
How I write grants

• 2-3 Months out:
  • Review call in detail and examine previously funded grants (I assume ~50% of reviewers were previously funded in that program/division.)
  • Build draft budget with our finance people
  • I always begin with Project Summary
Drafting a Project summary

- Starts as a ~2 pager
- 3 months out (~end of April)
- 2–3 drafts, then circulate to friends and mentors
- Interview them afterwards:
  1. Do they understand what I will do?
  2. Do they think it’s worth doing?

Tell the *story of the research*:

- What do we want to be able to do (practice or theory)?
- Why can’t we do it yet?
- What I’ll do, concretely
- Why my work will help
Summary becomes outline

• Each section has a page budget, with cumulative total

• Outline has sentences about what each part (and sub-part) must accomplish

• Work on turning sections into full text

• Every couple of days, review and synchronize Summary and Outline/Budget with full text.

  • Are the sections/sub-sections accomplishing their goals? Which are too long? Shorten or take from another section?
## Outline with page budgets

<table>
<thead>
<tr>
<th>Section</th>
<th>p</th>
<th>cum.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grand tour:</strong> problem, method, qualifications, expected contribution, include timeline graphic.</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td><em>Convince them even if only section read.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Literature and previous research</strong></td>
<td>5</td>
<td>8.5</td>
</tr>
<tr>
<td><em>Build credibility, build analytic lens, show my previous work</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Research Plan</strong></td>
<td>3</td>
<td>11.5</td>
</tr>
<tr>
<td><em>What, concretely, will I do? Convince sufficient.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Education Plan</strong></td>
<td>3</td>
<td>14.5</td>
</tr>
<tr>
<td><em>What, concretely, will I do? Convince possible.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Conclusion:</strong> intellectual merit/broader impacts</td>
<td>0.5</td>
<td>15</td>
</tr>
</tbody>
</table>
My writing day

- From “The Clockwork Muse” (Zerubavel, 1999)

- My goal:
  - Write immediately on sitting down
  - Pick a section, review outline statement about what it must do, begin writing. Let it flow.
  - Separate your “inner critic” to avoid deletion and cycling
  - I write for ~2 hours every morning, anything more is a bonus.
Managing your “inner critic”

• Our training is in reading critically; this can interfere with writing, forcing us to cycle over the same paragraph.

• Constant deletes and re-starts make it hard to know whether an approach works.

• Keep a separate document open (mine is called “nasty things”) and fill it with vicious criticism of your own writing.

  —> But don’t stop writing!

• A day later, after you finish, review what you wrote and your criticisms. Re-assess, plan changes, then make them.
2013: First try

- Summer at end of my 2nd year as faculty
- Sketched ideas during semester, but only began writing in June. Too late.
- Still working on final draft day of submission.
- No pilot data.
Interpreting reviews

• Give yourself a few weeks to calm your emotions

• 3 Questions to ask yourself:

  1. Did they understand? (communication/writing)

  2. Did they think the problem worthwhile? (justification)

  3. Study and method appropriate/sufficient?

• Poor, Fair, Good tend to fail on first two, VG or E tend to fail on method and scope.
2013 reviews

• Split reviews: 1 Poor, 1 Fair and 1 Very Good, 1 Excellent.

• Panel summary: “In the panel discussion there was some controversy …” but clearly the negatives won out.

• I paid most attention to negative comments of otherwise good reviews (VG and E). Primarily: under scope and lacking detail.

• For Poor and Fair - What didn’t they understand? Why not? Is it about being clearer?

  • My worst reviewer simply did not think my approach is research and thought the question was trivial. Nothing to be done there.
Responding

• Consulted friends who had been successful and I thought were likely to have reviewed CAREERs (even in other divisions)

• Shared my reviews with them (and sketches of my planned response). Major feedback was:
  • Tighten focus (remove one RQ and body of literature)
  • Increase breadth (to balance depth) be more ambitious
  • Provide pilot study to demonstrate method and results
2014 try

• Planned to submit to 2 divisions (SciSIP and ACI/CISE). Spoke with program officers in both divisions. Balancing act (same text).

• I had started my pilot study in Fall 2013 (before seeing reviews)

• Added a panel study (increased effort by ~25% overall)

• Again began with a 1-2 pager which I circulated, then outline.

• Obtained letters of commitment much earlier (~1 month out)

• Had near-final draft (and budget) 1 week out from Texas review deadline. Had a colleague read complete draft. Completely finished 2 days before. Very odd feeling.
2014 Result

• Declined by one division, funded by the other. You only need 1!
  • Do check with Program Officers (in Nov) that both are considering it.

• Decline reviews: G, G, VG, VG
  • Key concern: (still) under-scoped for CAREER, compared to other in that program.
  • I was invited to submit as research only “regular 3 year grant”
  • Probably would have changed topic for 3rd try.

• Funded reviews: all Excellent
  • Understood urgency and relevance of the question.
  • Understood depth and value of cases, as well as breadth of panel study
  • Liked innovativeness of Education component (cases especially)
Best advice I received

1. Do a pilot study (that’s what startup funds are for!)

2. Have a clear timeline graphic around page 3.

3. How to talk to Program Officers:
   
   • Your goal is to **gain insight into how panel members might react** (topic, justification, method, and scope)
   
   • Don’t say: “Should I do X?”
   
   • Do say: “How do you think a panel might react to X?”