Introduction

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Introduction

Why this workshop?

- In the *social sciences* few attention to what tools to use (and why they make sense)
- Increasing *need* for/in openness & transparancy
    - from journals, universities and governments
    - increase in cooperation (over wider distances)
    - access to your own files
    - make yourself more visible
- Why *we* want to give this workshop
    - intrinsic interest
    - our goal: pre-conferences workshops / courses

What we want (and don't want) with this workshop

- We are mostly interested in the principles behind a good open (scientific) workflow, aware of the facts that
  - there is no final, optimal, set of workflow tools
  - investment is very, very costly
- However, being a practical workshop we do
  - work with a specific set of tools (markdown, R, RStudio, git) which
  - enables us *in this workshop* to make a paper reproducable and open

Related work

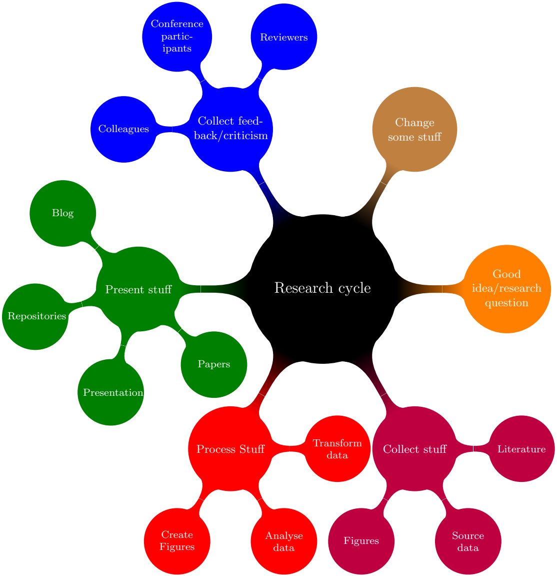
- Inspired by Kieran Healey's (associate professor in sociology) work: Choosing your Workflow Applications
- Courses for reproducable research seems to pop up everywhere (but mostly in datascience courses):
  - Datascience course: `https://www.coursera.org/`
  - Tools for Reproducible Research `http://kbroman.org/Tools4RR/`

Workflow

Open?

- Workflow: *Progression of steps (tasks, events, interactions) that comprise a work process, involve two or more persons, and create or add value to the organization's activities* (BusinessDictionary)
- Open workflow: One that enhances *transparency*, *collaboration* and *reproducibility*

Research cycle



Why bother about a workflow or tools?

- Good scientific practice: *document how you have achieved your results*; this ensures
  - Reproducibility
  - Transparency
  - Modularity
  - Portability (across systems and users)
  - Efficiency
  - Self-sanity

Why should it be open?

- Open Science
- Reproducibility
- Transparency
- Modularity
- Portability (across systems and users)
- Efficiency
- Visibility

When should I adopt an open reproducable workflow?

- The sooner the better
- But think twice about which one (switching is costly)
- Start one step at a time

A journey of a thousand miles begins with a single step

Lao-tzu

Reproducability

In general

In science consensus is irrelevant. What is relevant is reproducible results. The greatest scientists in history are great precisely because they broke with the consensus (Michael Crichton)

In computation science:

The data and code used to make a finding are available and they are sufficient for an independent researcher to recreate the finding (Peng, 2011)

- Literature programming (Donald E. Knuth, 1984):
  - weaving of **code**, **documentation** and **output** (articles, presentations, websites)

In the social sciences?

- Complete reproducability often not feasible
  - qualitative research
  - propietary data (?)
- but you can come a long way, especially with
  - theoretical work
  - quantitative (e.g., statistical or simulation) work
- Goal should be more to make your research as reproducable *as possible*

Code, documentation and output

1. Synonyms
2. All based on text files
3. Encompasses almost anything
   - data itself
   - set of commands for data cleaning and statistical analysis
   - database with references
   - transcript of interviews
   - text for aticles, presentations or websites
4. Only output is displayed/interpreted differently (e.g., in a browser or pdf viewer)

Our goal (not being ambitious)

What we want is that with *one single* command we

- read in and transform our data
- run the analysis
- create output (tables and figures)
- combine output with text and references
- create presentation material (paper, slides, webpages) and
- publish presentation material on an open repository

This all under a full fledged versioning control system

Tools for reproducability

- Markup lanaguages
  - Markdown
  - LaTeX
  - HTML
- Terminal tools (GNU make, diff, pandoc)
- Versioning system (Git & VCN)
- Reference manager (bibdesk/Mendeley)

Tools for reproducability (cnt.)

- Statistical software (pure command line driven): Python and R
- Environments
  - R and Rstudio environment
  - Python and iPython notebook environment
  - Python and Sumatra
  - Emacs org mode

Tools for openness

- Repositories:
  - Github (host webpages as well)
  - Bitbucket
- R packages `http://cran.r-project.org/`
- iPython notebook viewer `http://nbviewer.ipython.org/`

Examples

Reproducible Research with R and RStudio Book1

- `https://github.com/christophergandrud/Rep-Res-Book`

Amsterdam paper example using ipython notebook:

- `http://darribas.org/buzz_adam`

What we use in this workshop

1. R and RStudio (with the `knitr` package)
2. Markdown language
3. Bibdesk/Mendeley
4. Git and Github
5. GNU make

Only implicitly we make use of LaTeX, BibTex, HTML and pandoc (all under the hood of RStudio)

Schedule Day 1 - Friday Sept. 5th

- **[9am-12am]** Introduction
  - Concepts behind open workflows/Overview of tools
  - Install session

[Lunch]

- **[1pm-3pm]** Version control and task automation
  - Terminal/git/make

[Break]

- **[3:30pm-5:30pm]** Typesetting
  - Markdown/LaTeX/bibtex/pandoc/RStudion

[Diner]

- Location and time: To be announced

Schedule Day 2 - Saturday Sept. 6th.

- **[9am-11am]** Data analysis
  - R

[break]

- **[11:30am-1pm]** Publishing
  - Slides
  - Publishing on GitHub
  - Other publication channels

[Lunch]

Loose ends. . .

- Questions?

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