UWE Bristol | University of the West of England

Building trust in research

Reproducibility, verification and transparency

Data Research Access and Governance Network

uwedragon.org

SDAP meeting on reproducibility

8th June 2021

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Access modes

- Open data
  - eg internet downloads

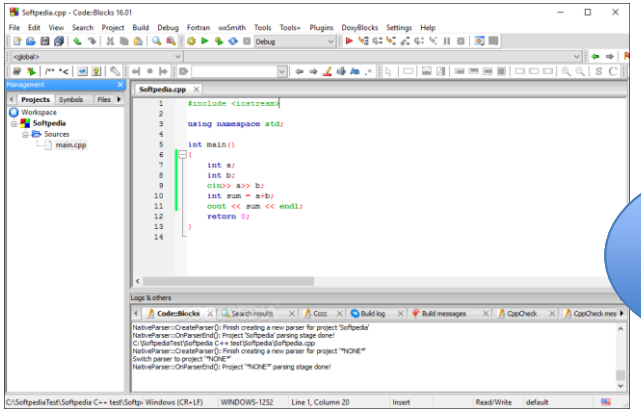
- Open access
  - Distributed data: eg UK Data Archive EUL
  - Ideal for easily de-identifiable social data
  - RDCs eg Secure Research Service
  - Ideal for business, health, longitudinal data
  - RJSs eg microdata.no, OpenSafely
  - Alt. to RDCs where less need to view data

- Restricted access
  - private data stores
  - self-collected data (where funders don't enforce access requirements)

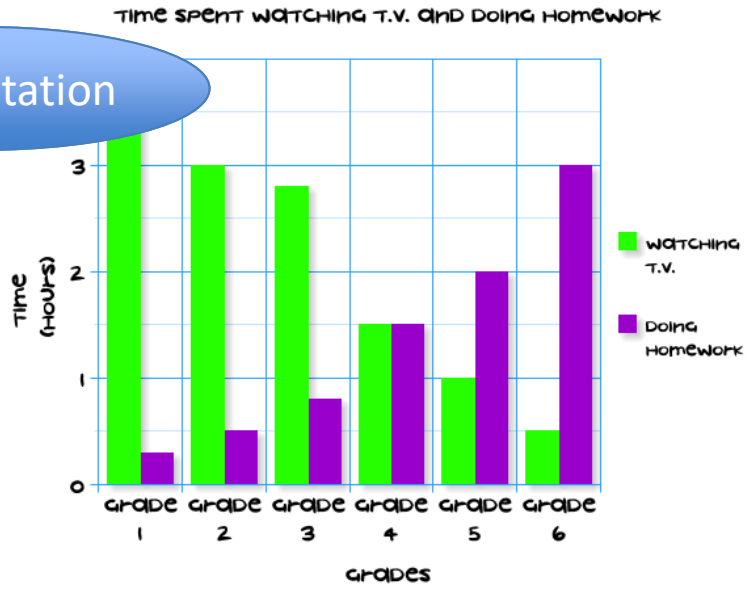
More valuable
Less traceable

Where does research come from?

Data



Code/ analysis

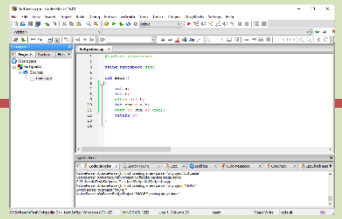


Interpretation

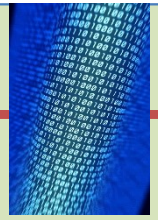
Presentation

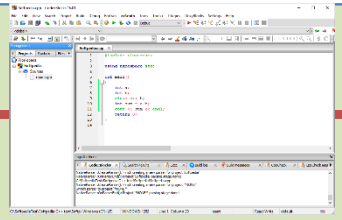
What makes reliable evidence?

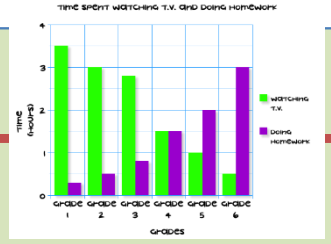
data verification



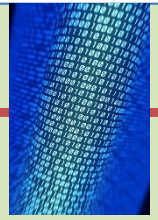
data and code verification

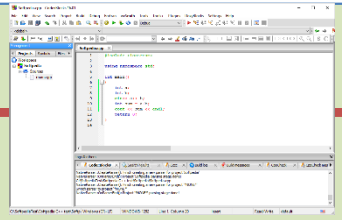


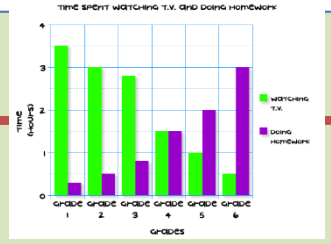




Research reproducibility







Research validation

Data Code Interpretation Presentation

Data verification

- What version of the data is used?
  - Vintage (esp for repeated surveys/cohort studies)
  - Subsets/linked data
  - Revisions
  - …
- Problem: how do users know version number?
- But doable eg DOIs, INEXDA annodata, RDA report
  - https://datascience.codata.org/articles/10.5334/dsj-2021-012/
- What about researcher-created data? ➔

Code verification

- Ideally, complete coding from source data to output
  - Including intermediate datasets
  - Advantage to data holders: no archiving of user data
- Slightly tricky…
  - requires discipline on the part of the researcher
  - Often not a linear path from input to output
  - Multiple researchers working on projects
- But doable and enforceable in TREs

Research reproducibility

- Interpretation (eg Excel) not coded as such
  - Needs version control
- Manual intervention to get coded outputs into interpretation engines
- Much more tricky…
  - Excel etc treated as 'live' interpretation engine
  - Often lots of extraneous information generated
- Doable, but with lots of scope for error

Research validation

- Central function of the peer-review process
  - But: mostly limited to what methodology section says
    - eg Reinhart and Rogoff
- Should it include data/code validation?
  - American Economic Review trying to validate all analysis
  - CASC offering this as a service
- What if you disagree with the method?
  - When does validation becomes approval?
- Limited objectivity – limited value?

Incentives to validate

- Researcher: self-validation
  - workflow management
  - credibility of research
  - journals
  - ethics
- Access managers: validation as a service
  - eg MedConf NHS TRE reports
  - credibility of environment
  - value of environment
  - internal audit
  - data management/archiving
  - commercial value

Disincentives to validate

- Researcher:
  - Time/effort
  - Discipline
- Access managers
  - Time/effort
  - Skills
  - Lack of co-operation from researchers
- Reviewers
  - Time/effort
  - Legal restrictions

Optimal model?

- Complete data versioning by data holder/manager
- + data & code validation by (researcher?)
- + publication of raw (coded) outputs?
- + separate peer review?

- Trust+transparency-based model?