

Changes

Thursday, February 15, 2024

1. Migrated the content to match the updated design from the backlog document
2. Updated the “Interpreting Results” post-it to “Reporting Results”
3. Updated the results page to make it clearer which are the high priority stickies

Friday, October 20, 2023

1. Changed the number and content of the sticky notes - there are now only 8.
2. Added the content for the solutions / results screen
3. Added a label / tab for each solution screen (Organization | Documentation | Automation | Dissemination | Alignment | Validation | Containment | Interpretation)
4. Changed the color of the solutions / results screen so that it is not so garishly green.

User story

As a student, I want to share the challenges and pain points of working within my lab, as they relate to issues of rigor and reproducibility.

I want to privately organize a set of sticky notes that include common rigor issues on a whiteboard with 4 quadrants. This allows me to prioritize the issues that I am interested in and that I think would have a big impact on my work in my lab.

I want the results of this activity revealed so all lab members can see how they organized their sticky notes.

I want to be able to explore the resources and solutions available for the issues prioritized by my lab in the exercise.

Activity steps

Rigor Pain Check-Up Exercise (15 mins)

1. Each individual joins their own whiteboard to prioritize their rigor issues.
2. Individuals drag rigor issues and needs sticky notes into 4 quadrants:
 - a. High Interest
 - b. High Impact
 - c. Low Interest
 - d. Low Impact
3. Each individual submits their whiteboard.
4. The results of the exercise are shared:
 - a. Which sticky notes were highest impact and highest interest.
 - b. Click each issue to view how others prioritized each issue.
5. Short discussion about what is considered high impact and high interest.
6. After the discussion, click next to explore solutions. Click each issue to see the solutions and resources available to improve the lab's rigor issues.

Sketch

Updated:

<https://www.figma.com/file/0ZGgd8rUIEkGkmp8WTJUxe/Activity-1.3-Road-to-Rigor%2C-Lab-Version?type=design&node-id=0%3A1&mode=design&t=sFf121H2OwxRXiV0-1>

Definition of done / requirements

- ☐ Individuals can drag and drop sticky notes on a whiteboard.
- ☐ Individuals can view the results of colleagues' whiteboards.
- ☐ Individuals can see a summary of their lab's results as a list of highest to lowest impact and interest.
- ☐ Individuals can explore solutions and resources for each issue.

Content of sticky notes

Missed mistakes

Reporting results

Designing experiments

Hard to reproduce analyses

Hard to find files

Data loss or corruption

Deviating from lab protocols

Difficult onboarding and offboarding

Content of results / solutions screen

Missed mistakes

Solution = Validation

We all make mistakes! Brainstorming with your lab colleagues about approaches to check and validate your lab's work is a great way to make your work more rigorous.

- Error Tigt: Exercises for Lab Groups to Prevent Research Mistakes
- <https://osf.io/preprints/psyarxiv/rsn5y/>

Reporting results

Solution = Interpretation

Knowing how to appropriately report your results can be tricky - especially if there are unexpected findings. A reporting guideline can help you ensure you are reporting all the results in a systematic manner. Reporting guidelines include checklists, example text, and guidance on how to write a reproducible report. The EQUATOR Network has a database of health research reporting guidelines that are specific to study designs.

- Reporting Guidelines
- <https://www.equator-network.org/>

Difficult onboarding and offboarding

Solution = Documentation

Onboarding new lab colleagues can be time consuming for current members and frustrating for new members. Offboarding is often an afterthought, with files and methods and data leaving along with lab colleagues. An electronic laboratory notebook is one way to improve documentation of important aspects of your lab protocols, data, and systems.

- How to pick an electronic laboratory notebook
- <https://www.nature.com/articles/d41586-018-05895-3>

Designing an experiment

Solution = Alignment

What are the important factors to consider when designing an experiment? Ensuring that your experiment's rationale is aligned with the study design and the analyses helps to support the rigor of your research. Start by considering whether you are interested in exploratory research (discovery) or confirmatory research (hypothesis testing).

- Better Inference in Neuroscience: Test Less, Estimate More
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9665913/>

Hard to reproduce analyses

Solution = Automation

Ever try to rerun an analysis and get an error? Or a different result? Computational reproducibility can be difficult. There are many ways to improve reproducibility of your analyses that also make future analyses easier for you and your lab colleagues. Consider automating as much of your analyses as you can.

- Guide for Reproducible Research
- <https://the-turing-way.netlify.app/reproducible-research/reproducible-research.html>

Hard to find files

Solution = Organization

Designing and documenting simple organization rules for your research files is easy and impactful. File naming conventions can be as simple as short set of naming rules documented in a central README file. Choose naming rules that are both machine readable and human readable.

- File Naming Conventions
- <https://datamanagement.hms.harvard.edu/plan-design/file-naming-conventions>

Data loss or corruption

Solution = Dissemination

Data loss or corruption can be a common source of irreproducible research, not to mention headaches and wasted time. Many researchers consider using data repositories to share data after a publication. However, many repositories can be used as a backup and a way to preserve access for your lab colleagues and your future self.

- Registry of research data repositories
- <https://www.re3data.org/>
- Data repositories
- <https://datamanagement.hms.harvard.edu/share-publish/data-repositories>

Deviating from lab protocols

Deviation from a protocol in a study can lead to biased results. In large labs or complex studies, you may have multiple people working on the same method. Ensuring that they are doing the same thing can improve the rigor of your research. It also makes running protocols in your lab a breeze when you can rely on a checklist and automated documentation of what was done.

Solution = Containment of bias

- Protocol checklists
- <https://www.protocols.io/>