Framework for
Open and
Reproducible
Research Training

FORRT

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Talk for Open Research Week 2022 at

Northumbria University [Newcastle]

Virtual | 30 Jun 2022

Embedding open and reproducible science into teaching and mentoring with the Framework for Open and Reproducible Research Training (FORRT)

with *Flavio Azevedo*

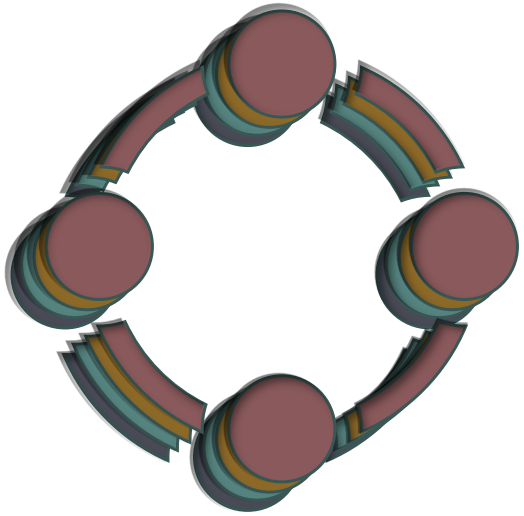
Introduction

The Problem

*The **teaching and mentoring** open scholarship practices*
*—but also, the **transmission** from researchers to researchers—*
*has **received** considerably **less attention**.*

As a result, it is still very common that graduates and undergraduates
finish their studies without having heard about
Open scholarship.
Also, there were few learning 'out-of-the-box' opportunities to scholars

Scientific Utopia



Open Scientific Communication

Crowdsourced Science

Re-structured Incentives

Integrating Open Scholarship into Higher-ED

FORRT

What is FORRT?

- Established in mid 2018 by PhD students
- Composed mainly of early career scholars: +**450** scholars & educators
- Representing fields such as *Psychology, Neuroscience, Communication science, Linguistics, Economics, Medicine, Mathematics, Computer science, Philosophy, Political science,* etc.
- Volunteer-based organization.
- Over 100 visits a day across the world

What are FORRT goals?

1. Build together with educators a pathway towards the ***incremental adoption of open scholarship practices into higher education***
2. Generate a conversation about the ***ethics and social impact of a higher-education pedagogy*** that emphasizes openness, epistemic uncertainty and research credibility
3. Promote a reflection about the ***perceived importance of different academic activities*** and ***advocate for greater recognition of educational resources***

FORRT
Open Educational Resources

What has FORRT accomplished?

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- *Dynamic*
- *Easy to incorporate*
- *$F_{indability}A_{ccessibility}I_{nteroperability}R_{eusability}$*
- *Meta-science*
- *Team-science*
- *Citizen-science*

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FORRT's Clusters

- *Embedding open scholarship tenets into teaching requires that educators are familiar with the current literature.*
- *Drawing on the know-how of experts in Open Scholarship, FORRT has identified **clusters of knowledge** that are central in this literature.*
- *Presenting information in a systematized way can help educators to identify major themes, as well as topics they would like to further explore.*

https://forrt.org/clusters/

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FORRT Clusters

Cluster 1
Reproducibility Crisis
&
Credibility Revolution

- *History*
- *Analyses*
- *QRPs*
- *Improvements*
- *Ongoing debates*
- *Ethics*

https://forrt.org/clusters

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Clusters

Cluster 3: Reproducible analyses

Description

Attainment of the *how-to* basics of reproducible reports and analyses. It requires students to move towards transparent and scripted analysis practices. There are 6 sub-clusters which aim to further parse the learning and teaching process:

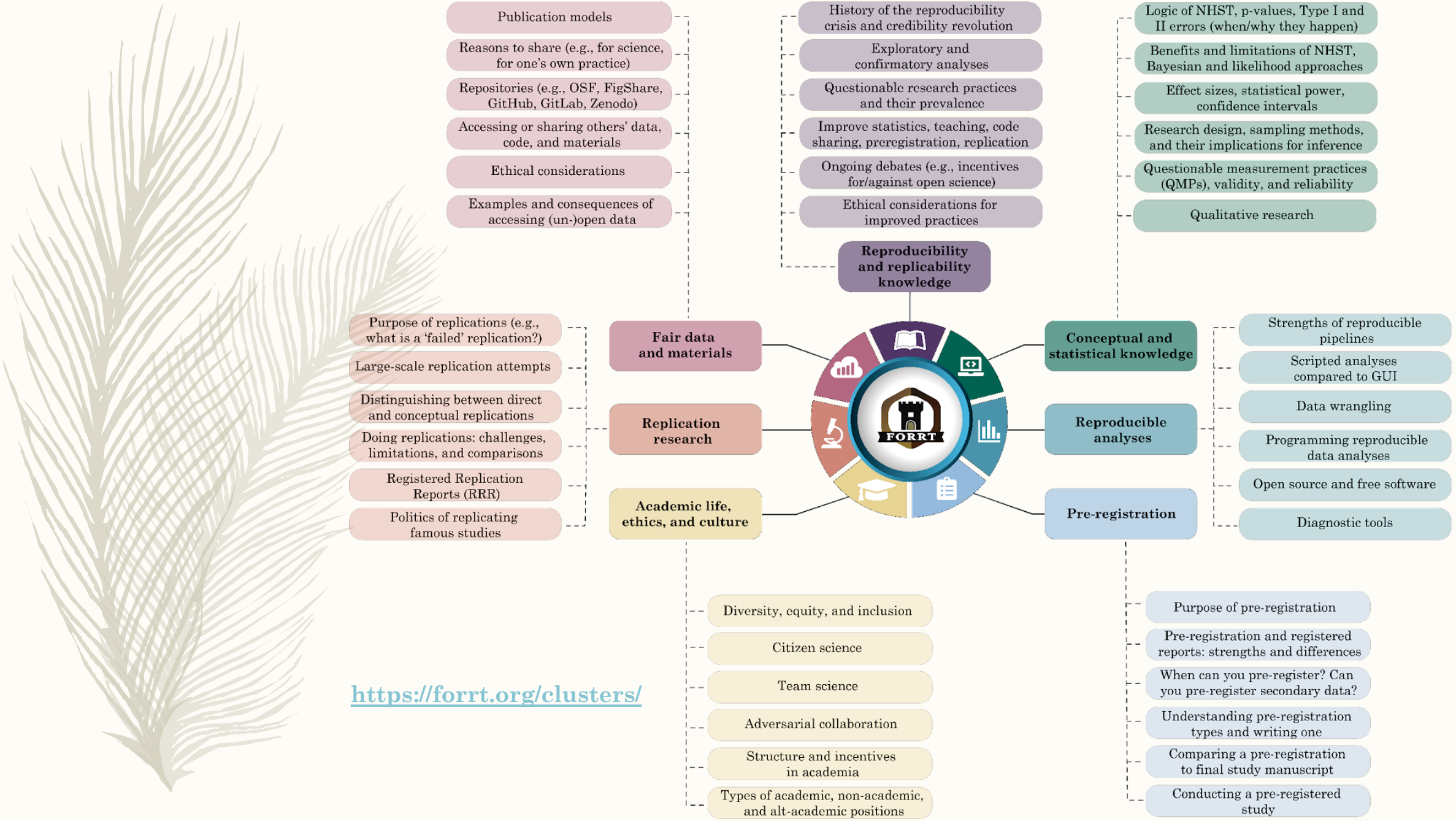
- Strengths of reproducible pipelines.
- Scripted analyses compared with GUI.
- Data wrangling.
- Programming reproducible data analyses.
- Open source and free software.
- Tools to check yourself and others.

Reproducible pipelines | Scripted Analyses | Data wrangling | Reproducible Analyses | Open source | Tools

Strengths of reproducible pipelines.

Automating data analysis to make the process easier

- Gandrud, C. (2016). Reproducible research with R and R Sstudio. New York; CRC Press
- Wilson G, Bryan J, Cranston K, Kitzes J, Nederbragt L, et al. (2017) Good enough practices in scientific computing. PLOS Computational Biology 13(6): e1005510. https://doi.org/10.1371/journal.pcbi.1005510
- Reproducible Research in R Workshop Overview
- Monash's Data Fluency Reproducible Research in R (RRR)
- ProjectTier



https://forrt.org/clusters/

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FORRT's Glossary

- *Devised to be an **access point** for those wishing to learn about OS*
- *Aims to provide **concise definitions** of the most important OS terms and clarify terminologies*
- ***110 contributors** from the academic community have defined more than **250 open scholarship terms***
- *Each term is presented together with a brief definition and appropriate references. Whenever is the case, we also present potentially competing definitions for a term.*

https://forrt.org/glossary/

Parsons et al. (2022). *In press.*

CARKing

Last updated on Jul 14, 2021

Definition: Critiquing After the Results are Known (CARKing) refers to presenting a criticism of a design as one that you would have made in advance of the results being known. It usually forms a reaction or criticism to unwelcome or unfavourable results, results whether the critic is conscious of this fact or not.

Related terms: HARKing, Preregistration, Registered Report

References: Bardsley (2018), & Nosek and Lakens (2014)

Drafted and Reviewed by: Mahmoud Elsherif, Ali H. Al-Hoorie, Ashley Blake, Adrien Fillon, Charlotte R. Pennington

Cumulative science

Last updated on Jul 13, 2021

Definition: Goal of any empirical science, it is the pursuit of "the construction of a cumulative base of knowledge upon which the future of the science may be built" (Curran, 2009, p. 1). The idea that science will create more complete and accurate theories as a function of the amount of evidence and data that has been collected. Cumulative science develops in gradual and incremental steps, as opposed to one abrupt discovery. While revolutionary science occurs scarcely, cumulative science is the most common form of science.

Related term: Slow Science

References: Curran (2009), d'Espagnat (2008), Kuhn (1962), & Mischel (2008)

Drafted and Reviewed by: Beatrice Valentini, Sarah Ashcroft-Jones, Mahmoud Elsherif, Helena Hartmann, Oscar Lecuona, Wanyin Li, Sonia Rishi, Flávio Azevedo

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FORRT's Summaries

- ***Reduce the burden*** *on educators wishing to get familiar and stay up-to-date with the OS literature*
- *Over* ***200 summaries*** *of academic articles related to OS*
- *Main* ***take-aways*** *and* ***suggestions*** *of articles on similar topics*
- *Peer-review process*

https://forrt.org/summaries/

Kalandadze et al. (2021). In preparation

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FORRT's Lesson Plans

- *Devised to **support** educators who wish to integrate OS into their teaching*
- *Draws on the expertise of the community of researchers and educators*
- ***9** evidence-based, high-quality **lesson plans** and almost **60 class activities** that can be incorporated into taught courses*
- *Each lesson plan was **categorized** based on theme, learning outcome, activity length and method of delivery*

https://forrt.org/lesson-plans/

Pownall et al. (2021). *Scholarship of Teaching and Learning in Psychology*.

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FORRT's Reversals & Replications

Replications of previous work are at the core of Open Scholarship

It can be challenging to keep up to date with replication efforts

***Collate** replication efforts and reversals across different fields*

***32 contributors** from the academic community*

~150 entries** across **20 different fields

https://forrt.org/reversals/

Social Psychology

No good evidence for many forms of priming, automatic behavior change from 'related' (often only metaphorically related) stimuli. Semantic priming is still solid, but the effect lasts only seconds.

- **Elderly priming**. Hearing about old age makes people walk slower. The p-curve alone argues against the first 20 years of studies.

  Statistics

  - Status: reversed
  - Original paper: 'Automaticity of social behavior', Bargh (1996); 2 experiments with n=30. [citations = 5938(GS, October 2021)]
  - Critiques: Doyen (2012) [n=120, citations=757(GS, October 2021)], Pashler et al. (2011) [n=66, citations=XX(GS, October 2021)]. Meta-analysis: Lakens (2017) [citations = 21(GS, October 2021)]
  - Original effect size: d=0.82 to d=1.08
  - Replication effect size: Doyen: d= -0.07. Pashler: d= -0.22

- **Distance priming**. Participants primed with distance compared to closeness produced greater enjoyment of media depicting embarrassment (Study 1), less emotional distress from violent media (Study 2), lower estimates of the number of calories in unhealthy food (Study 3), and weaker reports of emotional attachments to family members and hometowns (Study 4).

  Statistics

- **Flag priming**. Participants primed by a flag are more likely to be more in conservative positions than those in the control condition.

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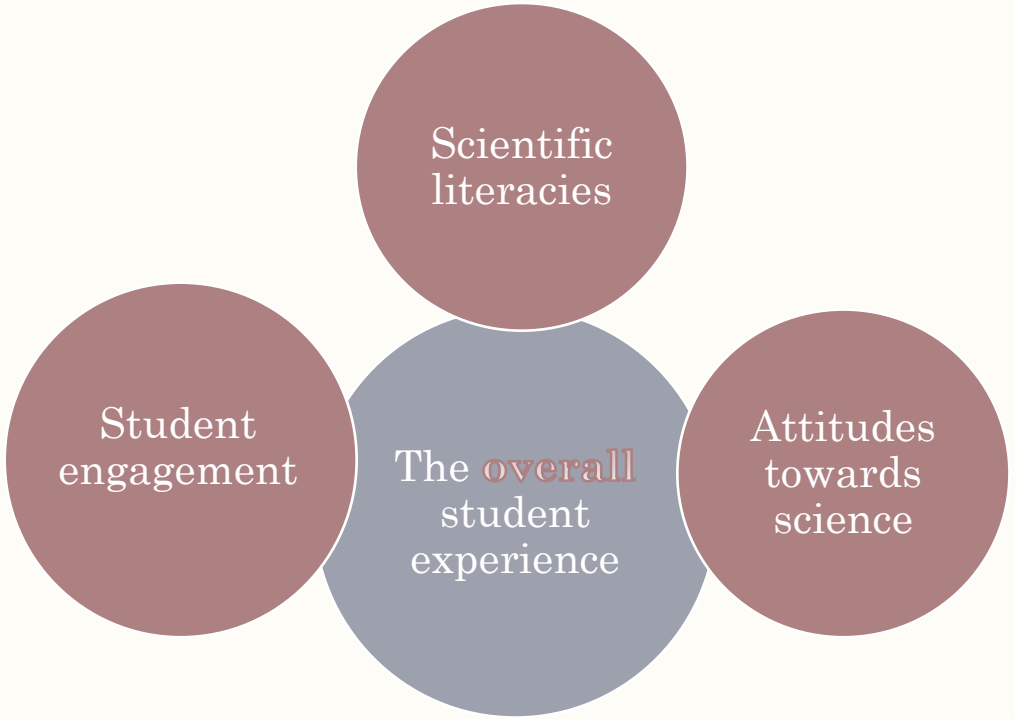
FORRT's Impact on students



forrt.org/impact
osf.io/th254

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Neurodiversity Project

- *Neurodiversity is the non-pathological variation in the human brain regarding sociability, learning, attention, mood and other mental functions (Singer, 2017).*

- *Team Aims to **raise awareness to diversity** in academia, **build community, empower under-represented scholars,** and **increase the visibility** of the work produced by neurodivergent scholars and educators.*

Position Statement

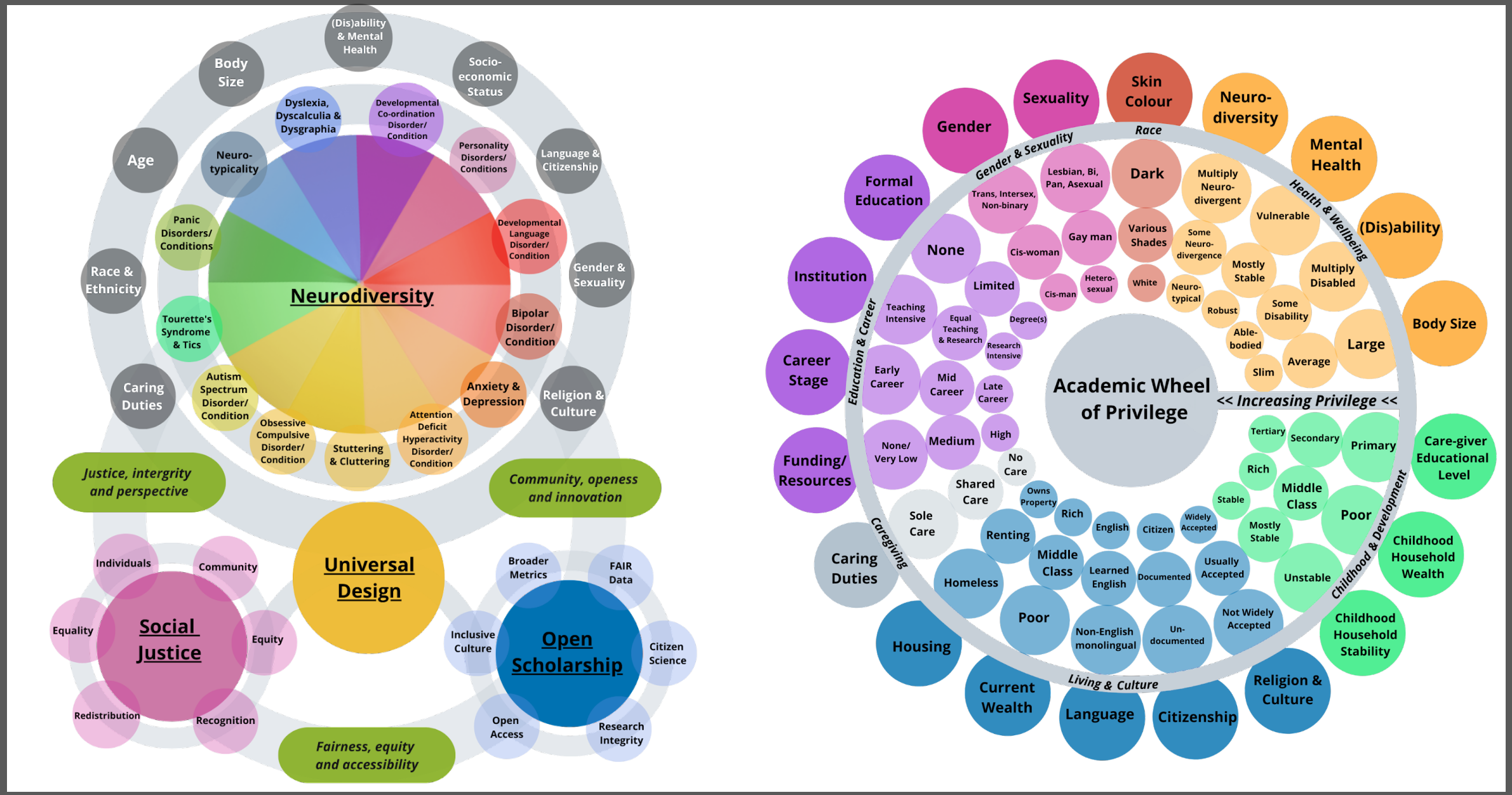
Bridging Neurodiversity and Open Scholarship:

How Shared Values Can Guide Best Practices for

Research Integrity, Social Justice, and Principled Education

Elsherif et al. 2022

osf.io/k7a9p


(Dis)ability & Mental Health
Socio-economic Status
Language & Citizenship
Gender & Sexuality
Religion & Culture
Anxiety & Depression
Bipolar Disorder/ Condition
Attention Deficit Hyperactivity Disorder/ Condition
Stuttering & Cluttering
Obsessive Compulsive Disorder/ Condition
Autism Spectrum Disorder/ Condition
Caring Duties
Race & Ethnicity
Age
Body Size
Neuro-typicality
Dyslexia, Dyscalculia & Dysgraphia
Developmental Co-ordination Disorder/ Condition
Personality Disorders/ Conditions
Developmental Language Disorder/ Condition
Panic Disorders/ Conditions
Tourette's Syndrome & Tics
Neurodiversity
Justice, intergrity and perspective
Community, openess and innovation
Fairness, equity and accessibility
Universal Design
Social Justice
Individuals
Community
Equality
Equity
Redistribution
Recognition
Open Scholarship
Broader Metrics
FAIR Data
Inclusive Culture
Citizen Science
Open Access
Research Integrity
Academic Wheel of Privilege
<< Increasing Privilege <<
Race
Gender & Sexuality
Health & Wellbeing
Childhood & Development
Living & Culture
Caregiving
Education & Career
Gender
Sexuality
Skin Colour
Neuro-diversity
Mental Health
(Dis)ability
Body Size
Formal Education
Institution
Career Stage
Funding/ Resources
Caring Duties
Housing
Current Wealth
Language
Citizenship
Religion & Culture
Trans, Intersex, Non-binary
Lesbian, Bi, Pan, Asexual
Dark
Multiply Neuro-divergent
Vulnerable
Gay man
Various Shades
Some Neuro-divergence
Mostly Stable
Multiply Disabled
Cis-woman
Hetero-sexual
White
Neuro-typical
Robust
Some Disability
Able-bodied
Slim
Average
Large
None
Limited
Cis-man
Teaching Intensive
Equal Teaching & Research
Degree(s)
Research Intensive
Early Career
Mid Career
Late Career
None/ Very Low
Medium
High
No Care
Shared Care
Sole Care
Owns Property
Renting
Rich
English
Citizen
Widely Accepted
Stable
Mostly Stable
Unstable
Usually Accepted
Not Widely Accepted
Documented
Un-documented
Learned English
Non-English monolingual
Middle Class
Poor
Homeless
Tertiary
Secondary
Primary
Rich
Middle Class
Poor
Care-giver Educational Level
Childhood Household Wealth
Childhood Household Stability

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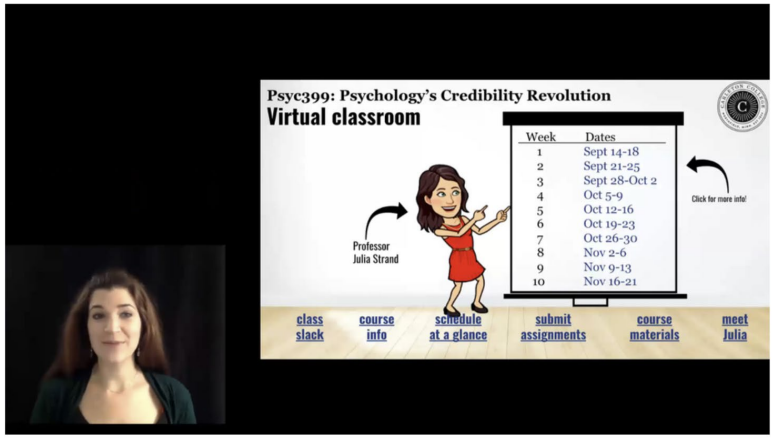
Julia Strand



Open and Reproducible Science walks into a classroom

Julia Strand shares her *know-how*, didactics, and teaching materials for her course on Psychology's Credibility Revolution.

Syllabus | Course Materials | Teaser Video | Course technicals | Interview (pdf)

Pedagogies

- *Collection of exemplary instances of **principled education***
- *Aims to:*
  - ❖ *Inspire other educators in the creation of their own pedagogies*
  - ❖ *Give visibility to educators and their educational method*
  - ❖ *Encourage the dissemination and re-purposefulness of educational resources*

https://forrt.org/pedagogies/

https://forrt.org/resources/

Curated resources

There are more than 700 resources submitted so far in our database. We are currently curating a new and improved version that is compliant with OER Commons for greater findability, accessibility, interoperability, and reusability (FAIR) of these resources.

If you notice there is an educational resource, research article or pedagocial tool missing in our database, please consider adding it here on FORRT's resource submission form or via the direct link.

Enter keywords below to find relevant resources for you or use the filters below:

Enter search text

No items found.

All | Reproducible Analyses | Open Data and Materials | Reproducibility and Replicability Knowledge | Replication Research | Conceptual and Statistical Knowledge | Preregistration

HAIL THE IMPOSSIBLE: P-VALUES, EVIDENCE, AND LIKELIHOOD.

Significance testing based on p-values is standard in psychological research and teaching. Typically, research articles and textbooks …

Author(s): Johansson, T.

Type of resources: Primary Source, Reading, Paper

Primary user(s): Student

Subject area(s): Math & Statistics

Tag(s):

Link to resource

1,500 SCIENTISTS LIFT THE LID ON REPRODUCIBILITY

Survey sheds light on the 'crisis' rocking research.

Author(s): Monya Baker

Type of resources: Primary Source, Reading, Paper

Primary user(s): Student

Subject area(s): Applied Science, Social Science

Tag(s): Reproducibility Crisis and Credibility Revolution, Open Science

Link to resource

A 21 WORD SOLUTION.

One year after publishing "False-Positive Psychology," we propose a simple implementation of disclosure that requires but …

Author(s): Simmons, Joseph P. and Nelson, Leif D. and Simonsohn, Uri, A

Type of resources: Primary Source, Reading, Paper

Primary user(s): Student

Subject area(s): Applied Science, Social Science

Tag(s): Reproducibility Crisis and Credibility Revolution, Open Science

Link to resource

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FORRT's Syllabus

- *To provide educators with an example of how they can use FORRT's resources on their teaching*
- *Seminar series building on FORRT's clusters framework – 9 weeks of teaching*
- *Suggestions of core and additional readings, assignments and activities*

https://forrt.org/syllabus/

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Towards Social Justice in Academia

- *FORRT's Open Office Hours*
- *FORRT's Remote Mentorship Program*
- *FORRT's Support for Underrepresented and Underprivileged ECRs*

https://forrt.org/dei/

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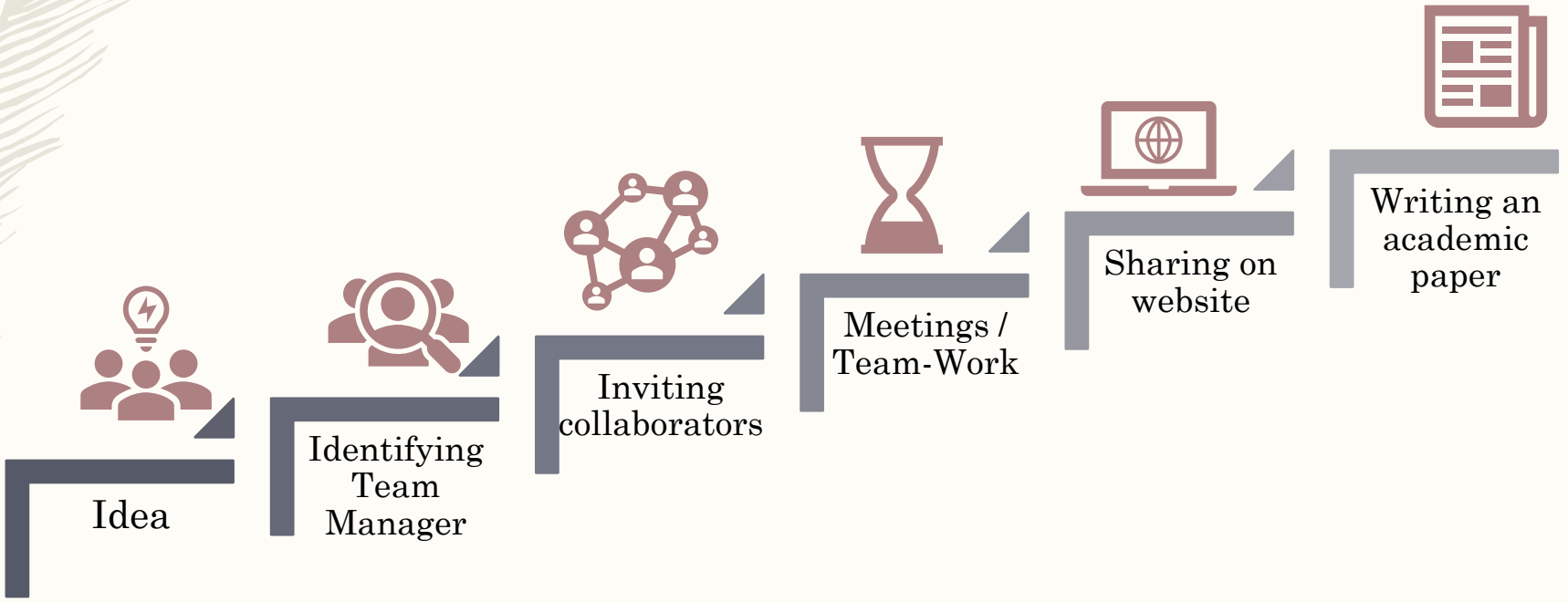
From ideas to reality



Thank you!

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