Framework for
Open and
Reproducible
Research Training

FORRT

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Talk for

OpenAIRE

Introducing Framework for Open and Reproducible Research Training (FORRT)

Virtual | 05 December 2022

with *Flavio Azevedo*

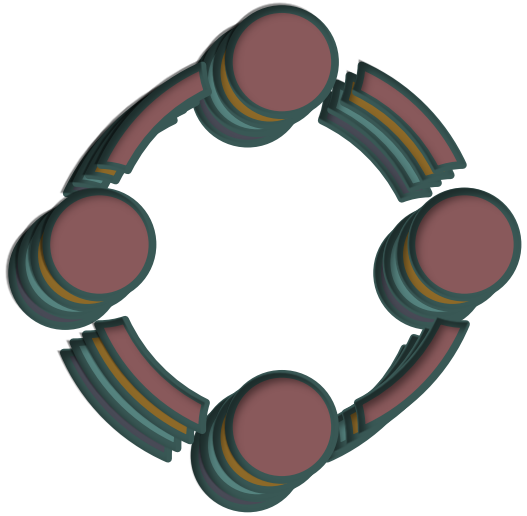
Introduction to FORRT

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

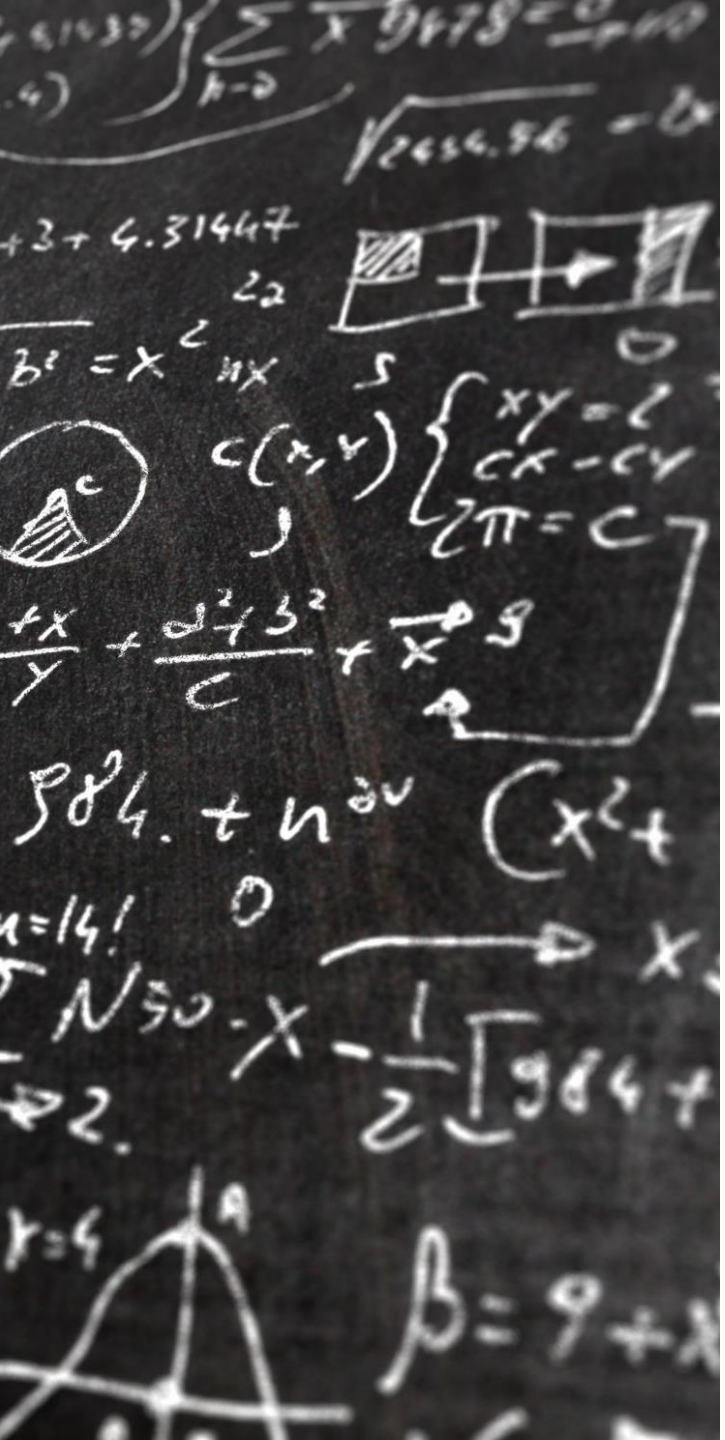
FORRT

What is FORRT?

- Established in mid 2018 by PhD students.
- Composed mainly of +**600** early career researchers
- Representing fields such as *Psychology, Neuroscience, Communication Science, Linguistics, Economics, Medicine, Mathematics, Computer science, Philosophy, Political science,* etc.
- Volunteer-based organization.
- Website **100 visits/day** across 🌍, 2000+ followers , 1000+ Newsletter
- Partnerships with major Open Science/Scholarship organizations

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***



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***How** FORRT accomplishes its projects?*

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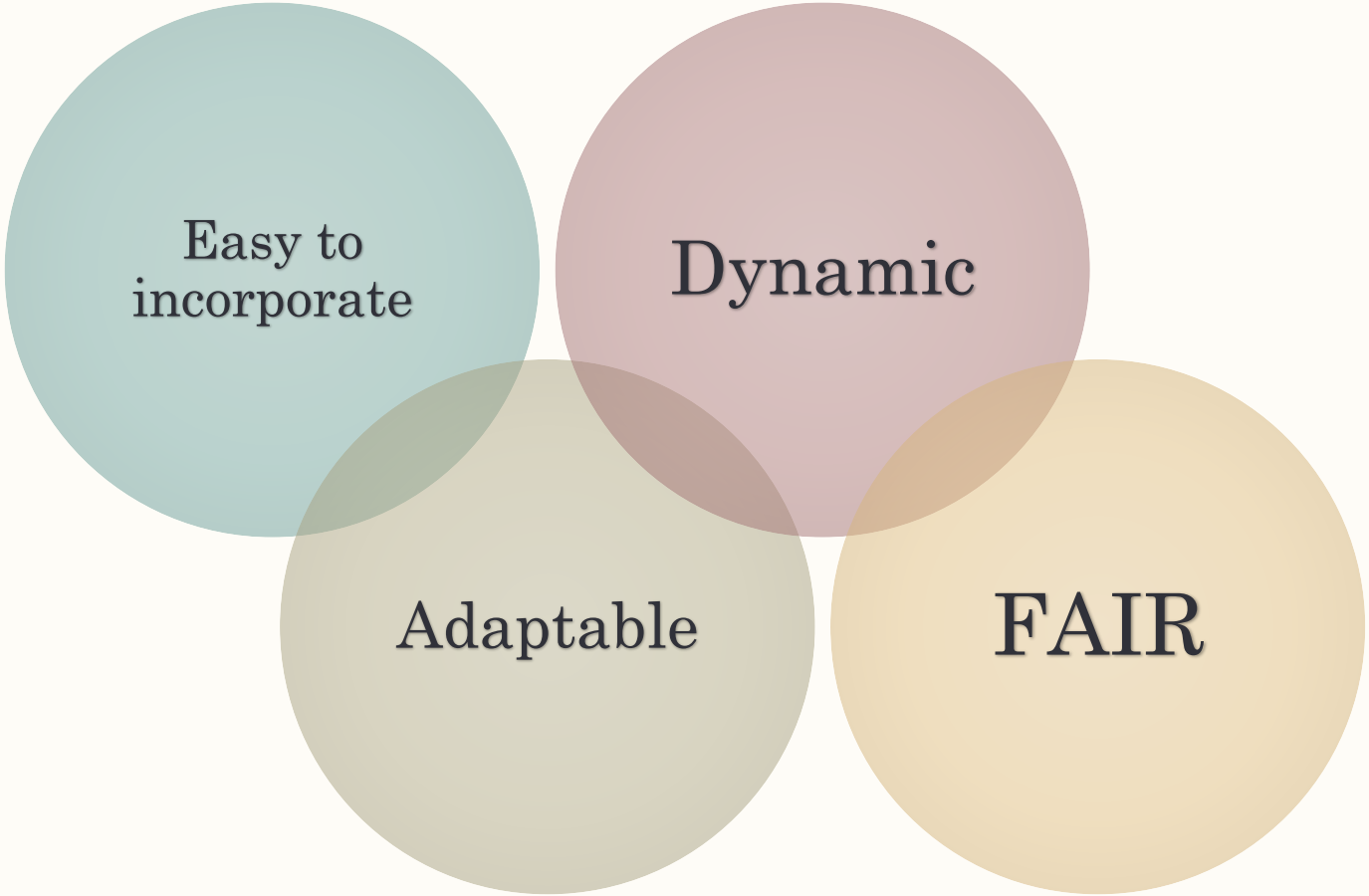

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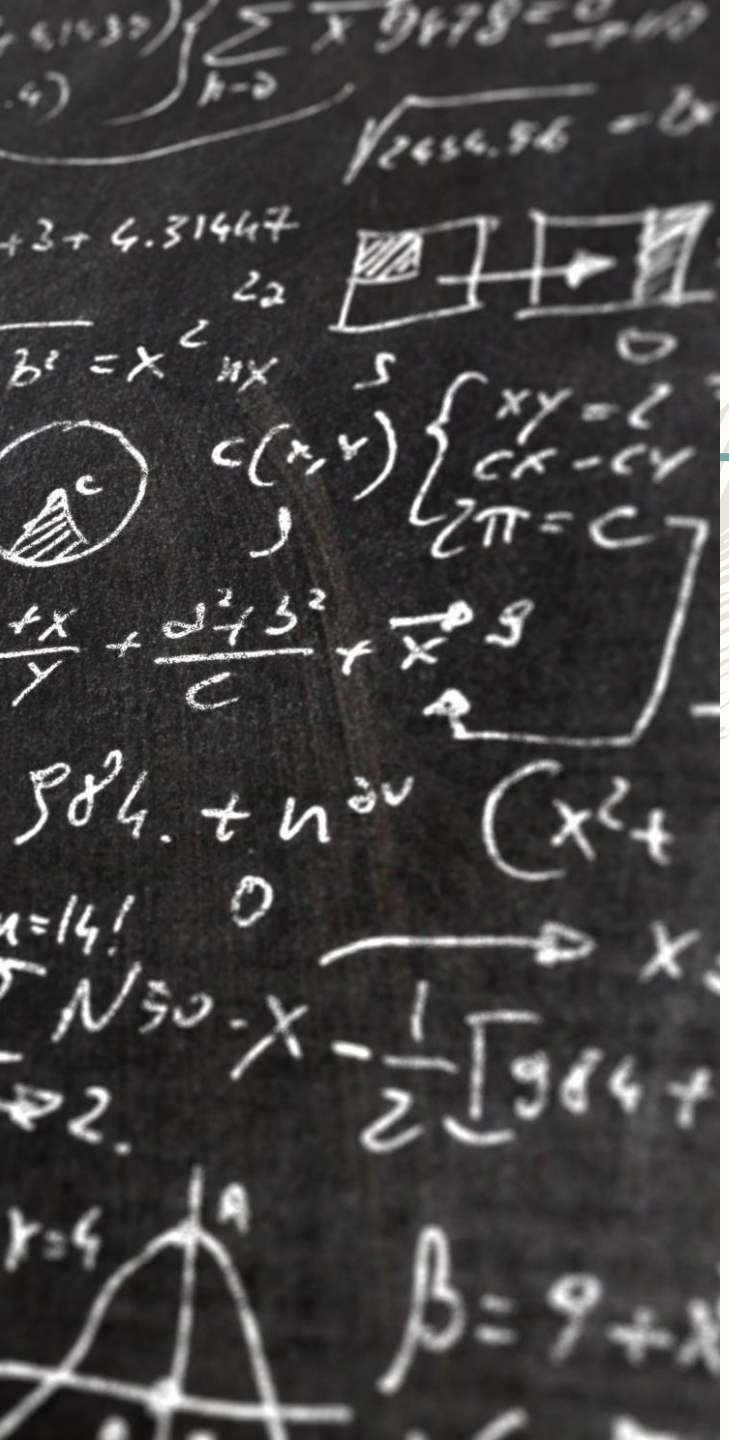
Approach

- ***Meta-science***
- ***Citizen-science***
  - Open to all
- ***Team-science***
  - Setting norms (CoC, Ethos)
  - Open practices
  - Modularity

- Clear instructions & goals
- Low barrier to entry
- Leverage available skills
- Use of collaborative tools and documentation
- Light leadership with strong communication
- Participation incentives
  - Personally/Professionally Rewarding

Open Science Collaboration (2014). The Reproducibility Project: A model of large-scale collaboration for empirical research on reproducibility.



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***What** has FORRT accomplished?*

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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

FORRT

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:

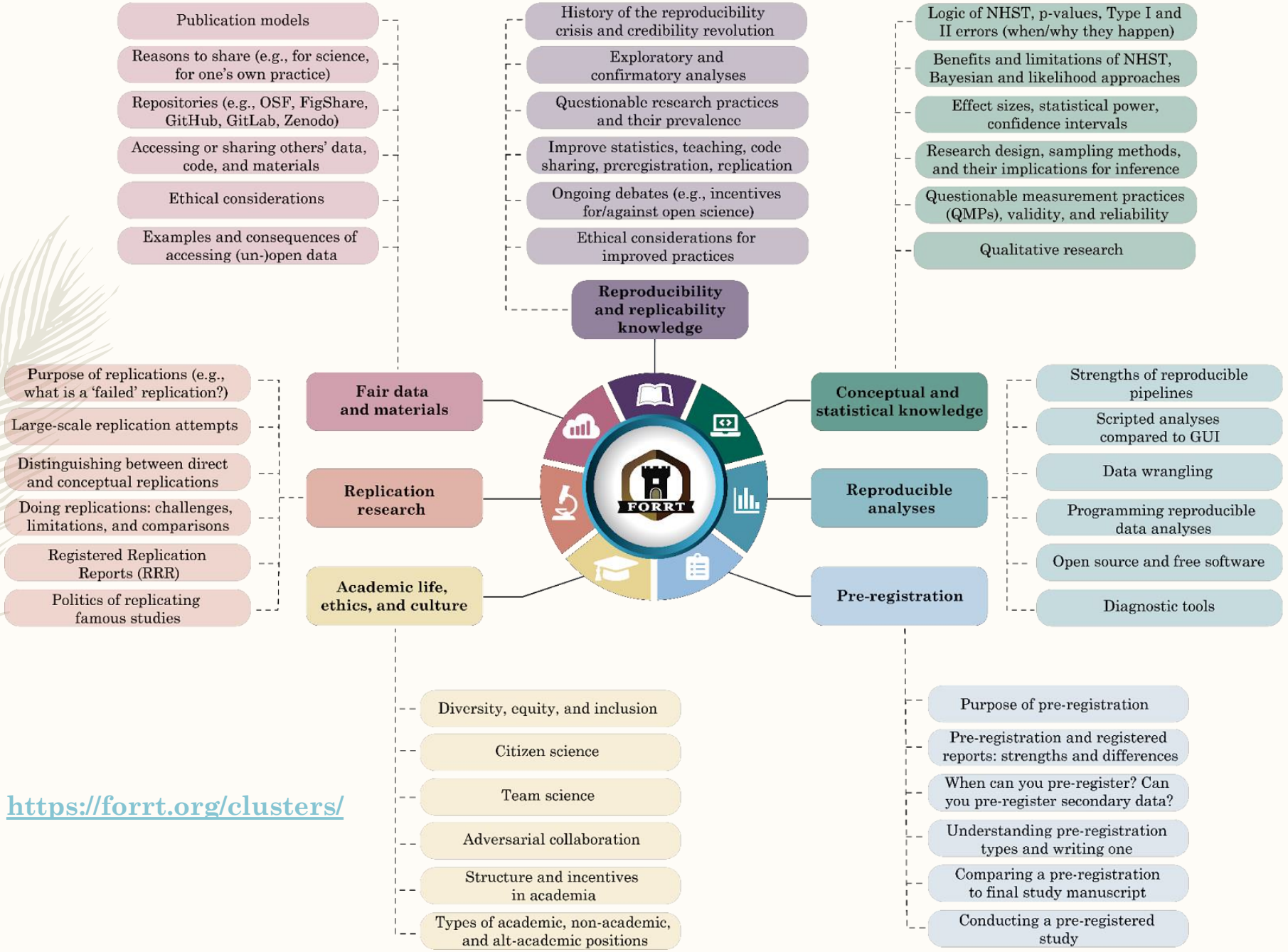
- Strengths of reproducible pipelines.
- Scripted analyses compared with GUI.
- Data wrangling.
- Programming reproducible data analyses.
- Open source and free software.
- Tools to check yourself and others.

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*
- ***112 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). *Nature Human Behavior*.

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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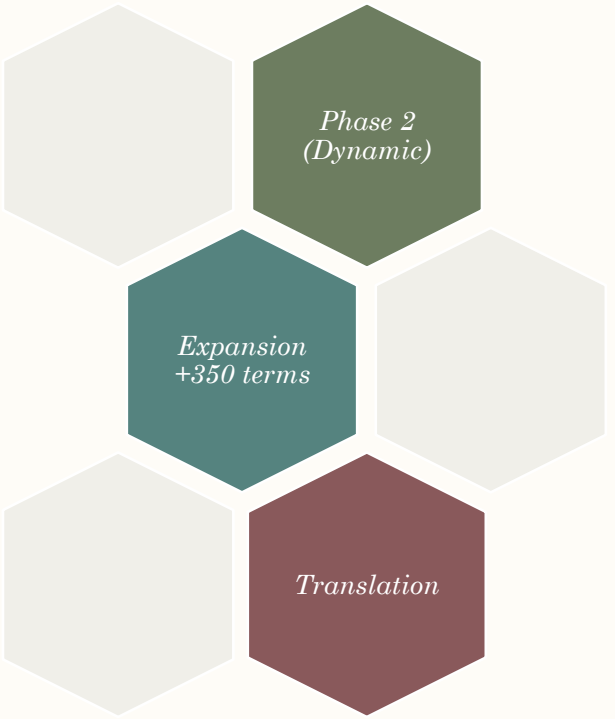
FORRT's Glossary



https://forrt.org/glossary/

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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

https://forrt.org/summaries/

Search...

Overview

Open and Reproducible Science

Diversity, Equity, & Inclusion

Registered Reports: A new publishing initiative at Cortex (Chambers, 2013)

Main Takeaways:

- We value novel and eye-catching findings over genuine findings, thus increasing questionable research practices.
- Editorial decisions are one cause of questionable research practices, as they make decisions based on results.
- Science undergraduates are taught about data analysis and hypothesis generation before the data is collected, ensuring the observer is independent of observation.
- Cortex provides registered reports to allow null results and encourage replication.
- Registered reports are manuscripts submitted before the experiment begins. This includes the introduction, hypotheses, procedures, analysis pipeline, power analysis, and pilot data, if possible.
- Following peer review, the article is rejected or accepted in principle for publication, irrespective of the obtained results.
- Authors have to submit a finalised manuscript for re-review, share raw data, and laboratory logs.
- Pending quality checks and a sensible interpretation of findings, the manuscript is, in essence, accepted.
- Registered reports are immune to publication bias and need authors to adhere to pre-approved methodology and analysis pipeline to prevent questionable research practices from being used.
- A priori power analysis is required and the criteria for a registered report is seen as providing the highest truth value.
- Registered reports do not exclude exploratory analyses but must be distinguished from the planned analyses.
- Not all modes of scientific investigation fit registered reports but most will.

Abstract

This is an editorial by Chris Chambers who encouraged Registered Reports in Cortex as a viable initiative to reduce questionable research practices, its benefits, limitations and what information to include in a registered report.

APA Style Reference

Chambers, C. D. (2013). Registered reports: a new publishing initiative at Cortex. Cortex, 49(3), 609-610. https://doi.org/10.1016/j.cortex.2012.12.016 [ungated]

You may also be interested in

- Registered Reports: A step change in scientific publishing (Chambers, 2014)

Fame: I'm Skeptical (Ferreira, 2017)

Let's Look at the Big Picture: A System-Level Approach to Assessing Scholarly Merit (Pickett, 2017)

"Fame" is the Problem: Conflation of Visibility With Potential for Long-Term Impact in Psychological Science (Shiota, 2017)

Why a Focus on Eminence is Misguided: A Call to Return to Basic Scientific Values (Corker, 2017)

Don't let transparency damage science (Lewandowsky & Bishop 2016)

Unequal effects of the COVID-19 pandemic on scientists (Myers et al., 2019)

Am I Famous Yet? Judging Scholarly Merit in Psychological Science: An Introduction (Sternberg, 2016)

Against Eminence (Vazire, 2017)

Giving Credit Where Credit's Due: Why It's So Hard to Do in Psychological Science (Simonton 2016)

Eminence and Omniscience: Statistical and Clinical Prediction of Merit (Foss, 2016)

Improving Departments of Psychology (Diener, 2016)

Varieties of Fame in Psychology (Roediger III, 2016)

Scientific Eminence: Where Are the Women? (Eagly & Miller, 2016)

Intrinsic and Extrinsic Science: A Dialectic of Scientific Fame (Feist, 2016)

Scientific inbreeding and same-team replication: Type D personality as an example (Ioannidis, 2012)

The Nine Circles of Scientific Hell (Neuroskeptic, 2012)

Check for publication integrity before misconduct (Grey et al., 2020)

Credibility of preprints: an interdisciplinary survey (Soderberg et al., 2020)

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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 *are at the* ***core*** *of Open Scholarship*

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

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

32 contributors *from the academic community*

220+ 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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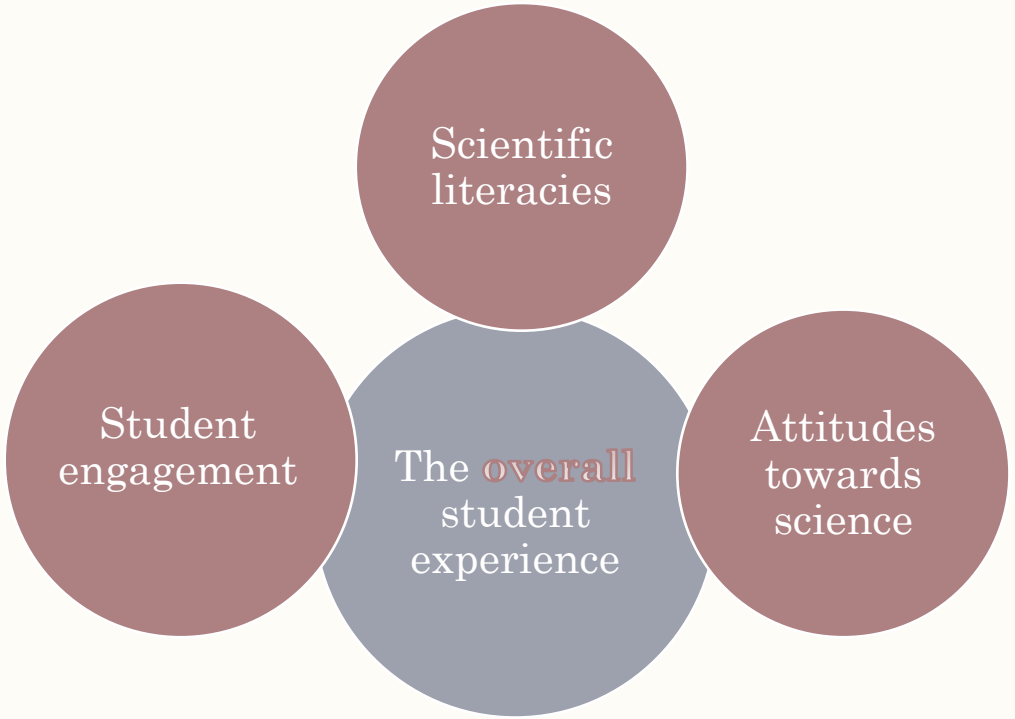
FORRT's Impact on students



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.*

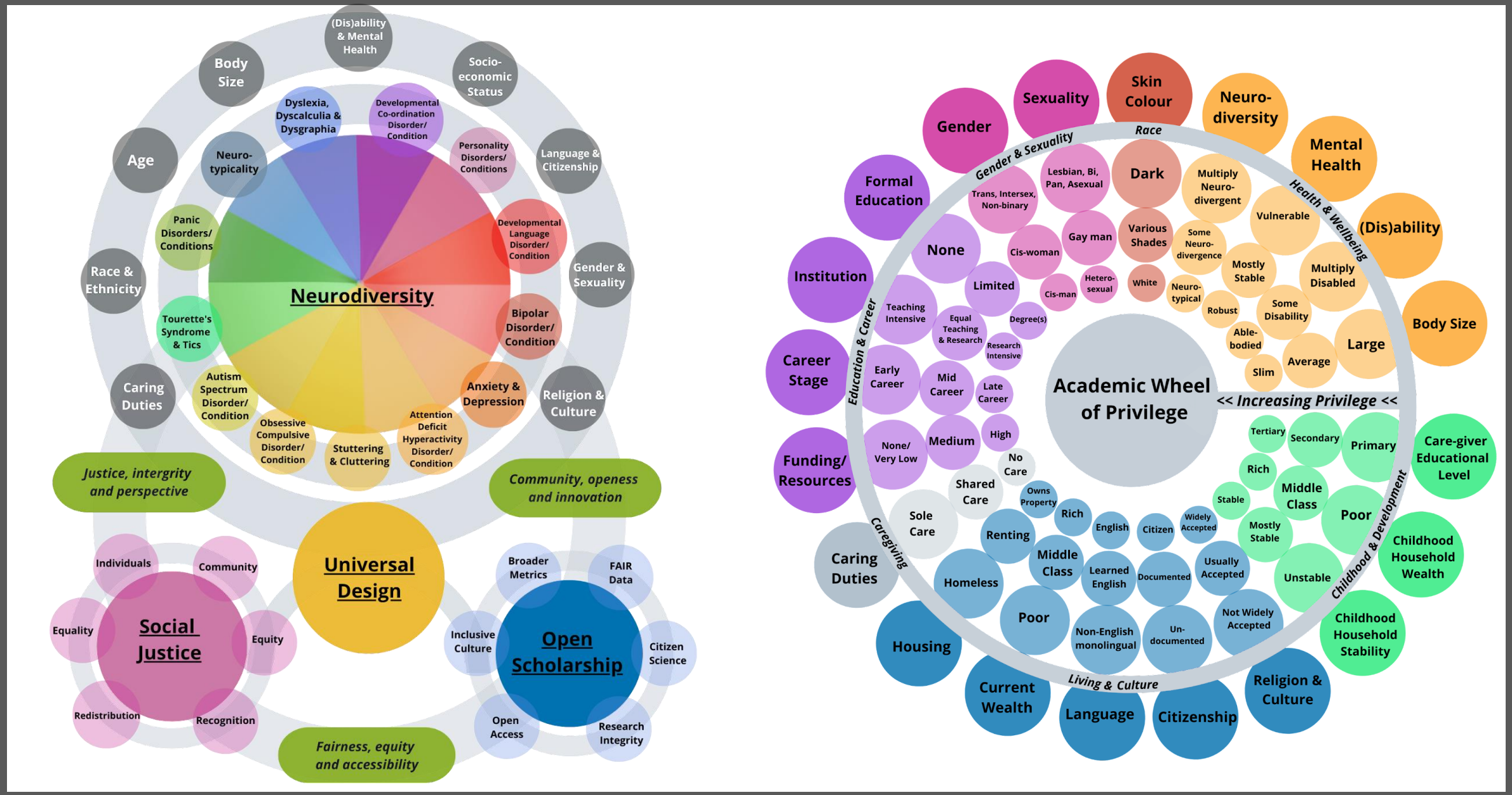
Position Statement

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

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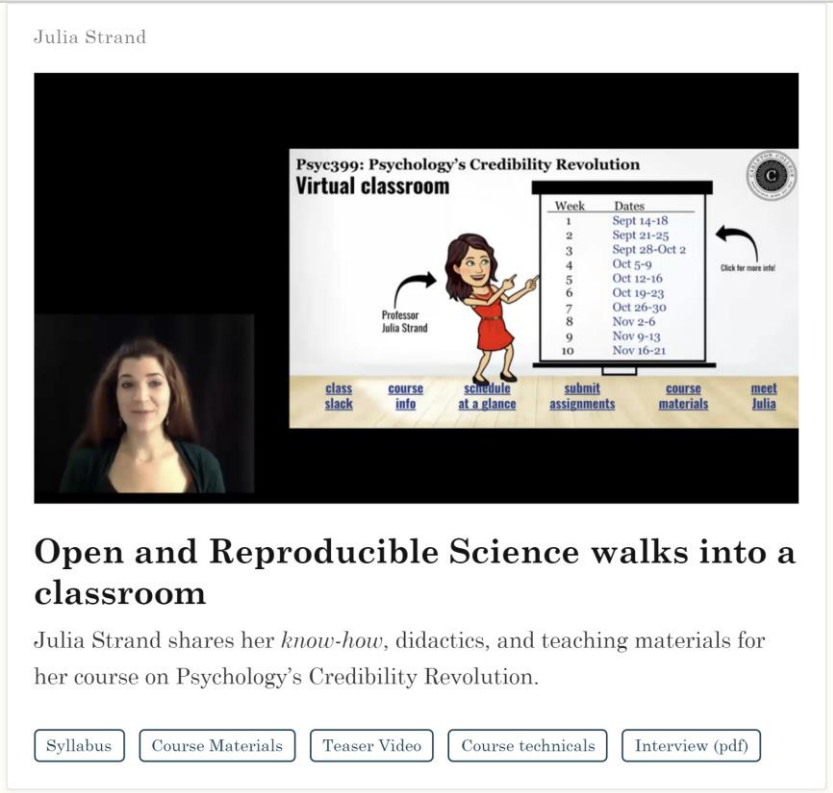

Pedagogies

- *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/

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FORRT's Syllabus

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

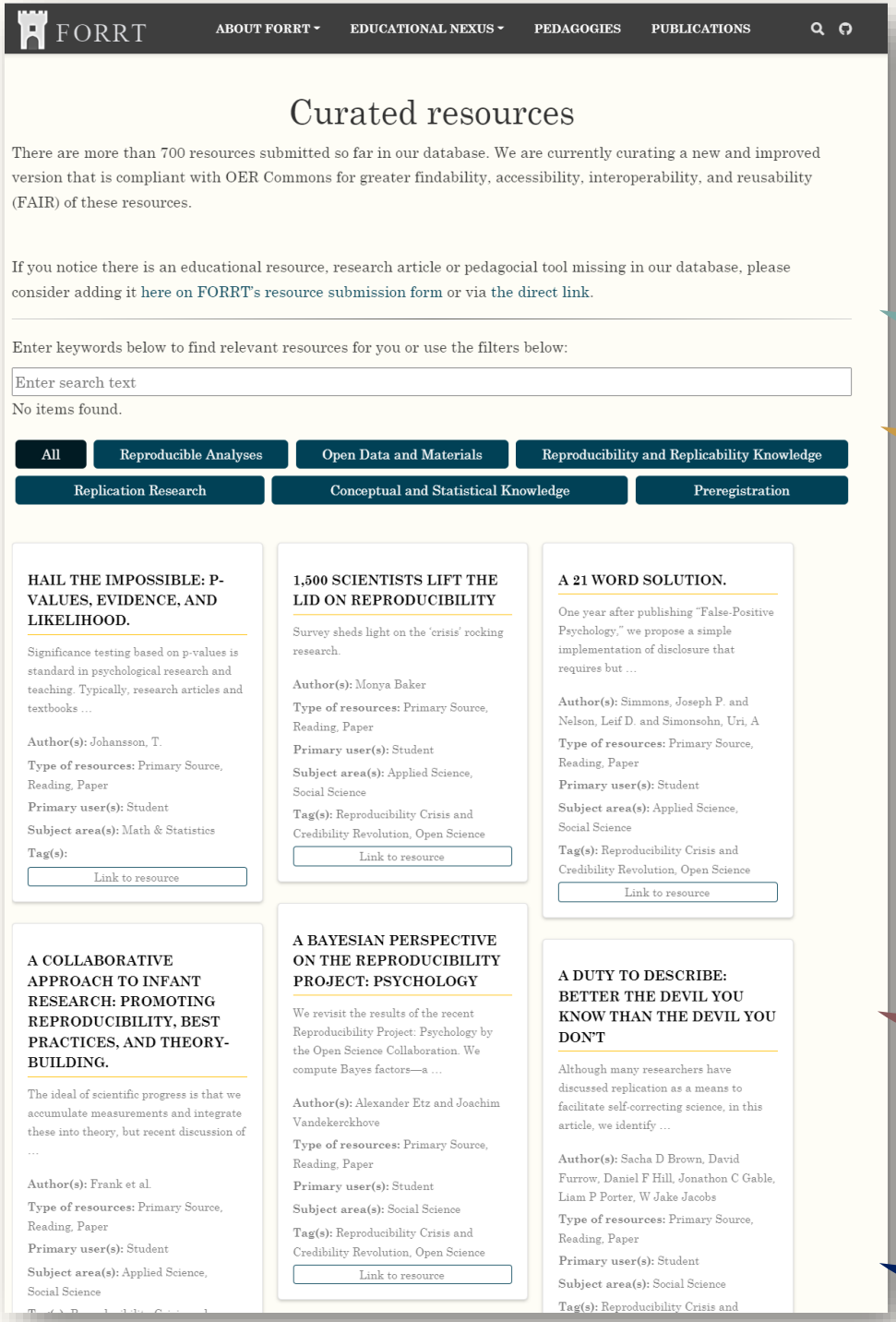
75+ syllabi, materials & resources.

https://forrt.org/syllabus/

FORRT's

Curated Resources

https://forrt.org/resources



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ABOUT FORRT ▾ EDUCATIONAL NEXUS ▾ PEDAGOGIES PUBLICATIONS

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

A COLLABORATIVE APPROACH TO INFANT RESEARCH: PROMOTING REPRODUCIBILITY, BEST PRACTICES, AND THEORY-BUILDING.

The ideal of scientific progress is that we accumulate measurements and integrate these into theory, but recent discussion of …

Author(s): Frank et al.
Type of resources: Primary Source, Reading, Paper
Primary user(s): Student
Subject area(s): Applied Science, Social Science

A BAYESIAN PERSPECTIVE ON THE REPRODUCIBILITY PROJECT: PSYCHOLOGY

We revisit the results of the recent Reproducibility Project: Psychology by the Open Science Collaboration. We compute Bayes factors—a …

Author(s): Alexander Etz and Joachim Vandekerckhove
Type of resources: Primary Source, Reading, Paper
Primary user(s): Student
Subject area(s): Social Science
Tag(s): Reproducibility Crisis and Credibility Revolution, Open Science
Link to resource

A DUTY TO DESCRIBE: BETTER THE DEVIL YOU KNOW THAN THE DEVIL YOU DON'T

Although many researchers have discussed replication as a means to facilitate self-correcting science, in this article, we identify …

Author(s): Sacha D Brown, David Furrow, Daniel F Hill, Jonathon C Gable, Liam P Porter, W Jake Jacobs
Type of resources: Primary Source, Reading, Paper
Primary user(s): Student
Subject area(s): Social Science
Tag(s): Reproducibility Crisis and

A collaborative approach to infant research: Promoting reproducibility, best practices, and theory-building.

By Frank et al..

Last updated on Aug 31, 2020 Reproducibility and Replicability Knowledge, Replication Research

Edit this page

Reproducibility Crisis and Credibility Revolution | Open Science

Abstract

The ideal of scientific progress is that we accumulate measurements and integrate these into theory, but recent discussion of replicability issues has cast doubt on whether psychological research conforms to this model. Developmental research—especially with infant participants—also has discipline-specific replicability challenges, including small samples and limited measurement methods. Inspired by collaborative replication efforts in cognitive and social psychology, we describe a proposal for assessing and promoting replicability in infancy research: large-scale, multi-laboratory replication efforts aiming for a more precise understanding of key developmental phenomena. The ManyBabies project, our instantiation of this proposal, will not only help us estimate how robust and replicable these phenomena are, but also gain new theoretical insights into how they vary across ages, linguistic communities, and measurement methods. This project has the potential for a variety of positive outcomes, including less-biased estimates of theoretically important effects, estimates of variability that can be used for later study planning, and a series of best-practices blueprints for future infancy research.

Link to resource: https://doi.org/10.1111/infa.12182

Type of resources: Primary Source, Reading, Paper

Education level(s): College / Upper Division (Undergraduates)

Primary user(s): Student

Subject area(s): Applied Science, Social Science

Language(s): English

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Towards Social Justice in Academia

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

https://forrt.org/dei/

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Over 2000 followers on Twitter @FORRTproject

~1000 subscribers to the FORRT newsletter

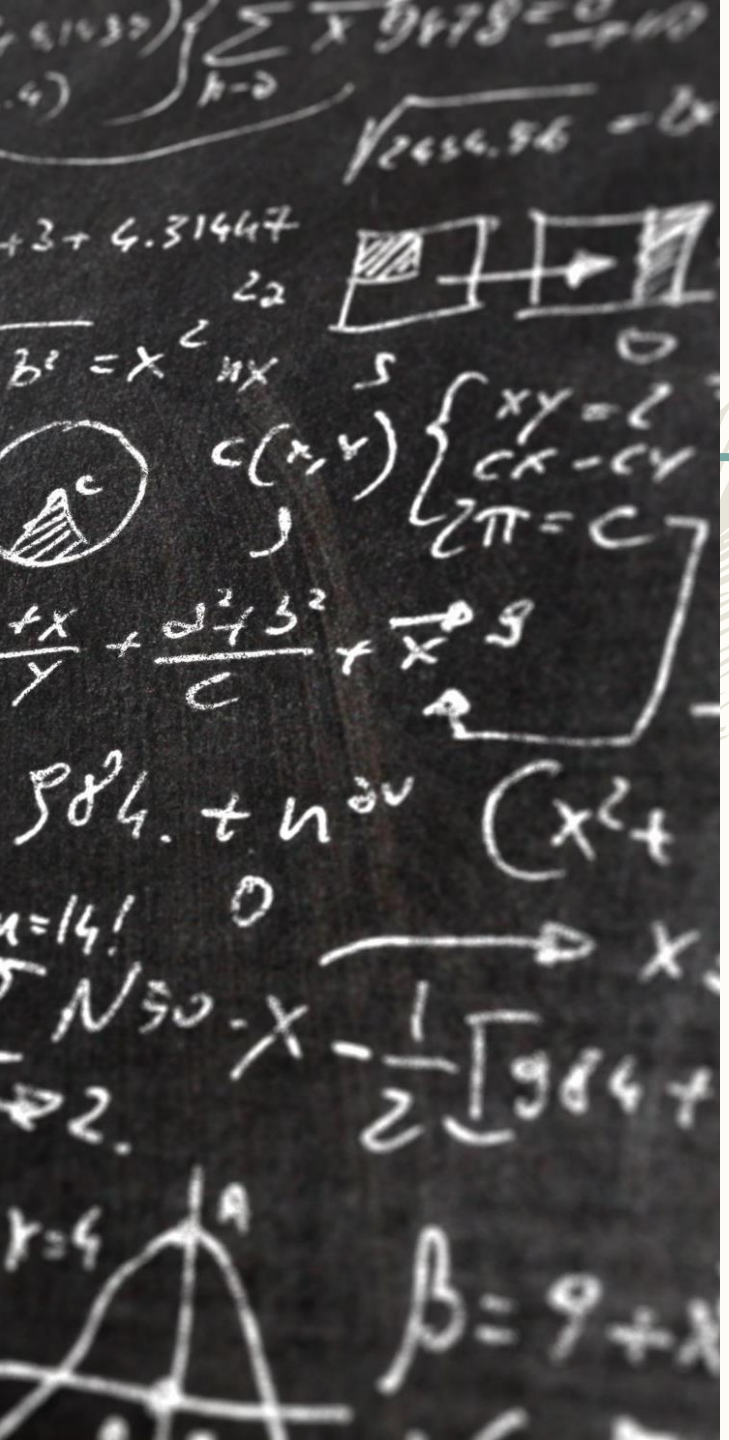
11 active FORRT projects: Outreach, Pedagogies, Website, Landscape, Summaries, Ideas, Neurodiversity, Glossary, Ethics, Lesson Plans, and Reversals

1 official FORRT open day with 8 project presentations

~507 of FORRT's members are on Slack

9 formal institutional partnerships

3 FORRT publications, **3** preprints, **~73** citations and **5** awards



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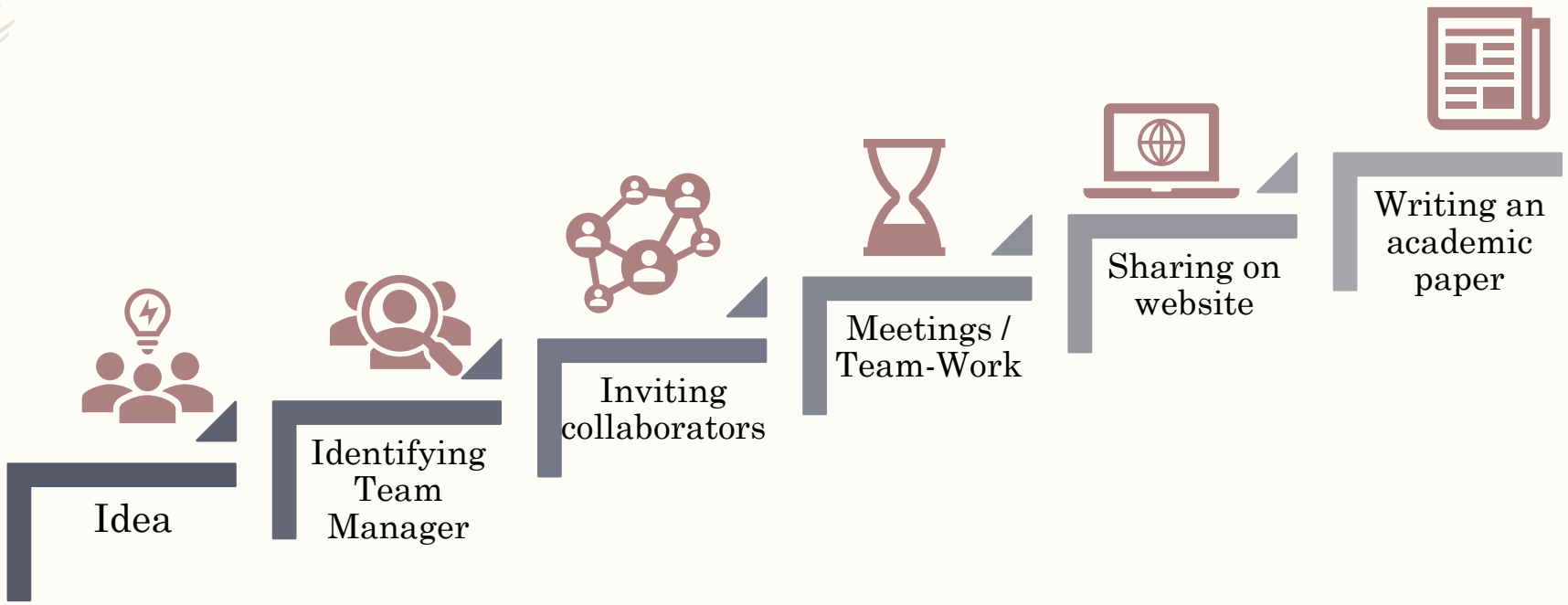

Thank you!

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