Framework for
Open and
Reproducible
Research Training

FORRT

Integrating principles of open and reproducible science into higher education and raising awareness of its pedagogical implications.

Briefing note for degree accrediting societies   May, 2020

Purpose

The purpose of this briefing note is to introduce a Framework for Open and Reproducible Research Training (FORRT) - a grassroots educational initiative aiming at supporting teachers and mentors in addressing the pedagogical challenges ensuing from combining openness and reproducibility into courses.

Background

There is a pressing need to incorporate open and reproducible practices in higher education. A number of initiatives aim to improve the rigour and transparency of the research process. Yet, few focus on teaching or mentoring, and none focus on the added value of pedagogies related to open and reproducible principles in research training and education. FORRT's purpose is to provide support to incrementally integrate principles of open and reproducible science into higher education and raise awareness of its pedagogical implications.

FORRT (www.forrt.org) is an evolving and community-driven framework focused on helping researchers and consumers of science across multiple disciplines adopt principled teaching and mentoring practices as well as reimagining educational structures such that these practices are rewarded. FORRT supports educators by collating existing teaching pedagogies and educational resources to be reused and adapted for use within new and existing courses (see below).

For example, FORRT is partnering to advance the production and curation of pedagogical materials including an upcoming (non subject-specific) special call for the journal Meta-Psychology, and partnering with the Open Science Knowledge Base to make our resources interoperable. FORRT is seeking partnerships from all disciplines to achieve its mission. Recently, FORRT has led learning labs (e.g., on Revolutionizing (Open) Pedagogy Methods) at the

International Communication Associations Conference, and we have been reaching out to individuals from various fields - i.e., political science, mathematics, psychology, biology, and linguistics - who are now helping make FORRT a reality.

Discussion

FORRT aims to reduce burden on instructors and institutions seeking to incorporate open and reproducible research in their educational content in two ways:

Self-assessment educational tool: FORRT offers educators a comprehensive, straightforward, and accessible framework to understand the literature on open and reproducible science through an education lens:

1. History of discussions surrounding reproducibility and open research practices, including recent initiatives
2. Conceptual and applied statistical knowledge
3. Reproducible analyses
4. FAIR (Findable, Accessible, Interoperable, Re-usable) data and materials
5. Pre-registration and Registered Reports
6. Replication research
7. Research life and academia

These clusters are then implemented into a self-assessment tool which (a) assess the extent to which open and reproducible research is integrated in the curricula in terms of both *breadth* (e.g., whether activities are opportunities versus requirements) and *depth* (e.g., whether activities promote knowledge, practice, or application); (b) can track ongoing implementation of open and reproducible research practices across modules, courses and programs, as well as across a broad range of educational content; and (c) provides personalized feedback with actionable suggestions and literature to foment change.

Educational NEXUS: FORRT's learning e-platform curates existing teaching materials and pedagogies to support instructors wishing to integrate this material into their own courses. Teachers and researchers are time-limited and overburdened; implementing curriculum changes is no trivial matter. FORRT reduces this burden with the provision of excellent teaching materials, including all of the pedagogical information teachers require to reuse and adapt the materials for their own classes. FORRT advocates the continuing implementation and improvement of research training. The platform is currently under development and we expect to release the first version in the next few months.

Considerations

FORRT aligns with, and can be used to provide support for, educational strategic aims of the societies that accredit undergraduate degrees and mission statements of higher education institutions to continually improve its education quality.

Enduring threats to these goals are substantial constraints on teachers' and researchers' time and the increasing rate of change across the landscape of research and pedagogy, particularly with regard to reproducibility and open science initiatives. Moreover, academia is in need of better incentives and recognition of quality teaching and mentoring. With FORRT, this threat can be mitigated, and the strength of the teaching community can be maximised.

FORRT supports teachers by building a platform that (a) curate educational, research, and teaching materials and implemented successful pedagogies; (b) recognise outstanding contributions teachers make to improving research and pedagogy; and (c) advocate for a better science education system with structural support and healthy incentive and evaluation structures.

Recommendations / next steps

We have three recommendations:

1) We ask that degree accrediting societies and higher education institutions endorse FORRT as a valuable tool for educators. Both as an educational self-assessment of current teaching content, and as a resource for successful implemented pedagogies.

2) We ask that degree accrediting societies and higher education institutions support and promote the opening of teaching materials, to support educators to integrate principles of open and reproducible research in their own teaching and mentoring materials.

3) We ask that representatives from degree accrediting societies and higher education institutions meet with FORRT to discuss partnerships and shared educational aspirations with FORRT.

On behalf of FORRT community
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