Application form NWO – Open Science Fund – 2023

Section 1a – Details of the applicant	
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Affiliation – department	Faculty of Behavioural and Social Sciences
Position	Professor (adjunct)
End date of contract	Permanent position
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Section 1b – Details of the team member(s)	
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Name team member 2	Dr. Chris H. J. Hartgerink
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Section 2 - Public summary

English public summary

The effort to open up science has generated many new tools; however, community participation is necessary to convert short-term shifts in research practice to lasting, sustainable cultural change. In this project, we team up with modular publishing platform ResearchEquals to develop a community of practice around modular research dissemination. We will collect feedback from the community to develop training sessions to get researchers started with publishing each step of their project pipeline, and to inform development of the ResearchEquals platform. To sustain training materials beyond the grant runtime, we will create an open educational handbook.

Word count (max 100): 95

Dutch public summary

Veel nieuwe hulpmiddelen worden gecreëerd ten behoeve van Open Science, echter is deelname van de onderzoekersgemeenschap nodig om korte-termijn veranderingen in duurzame culturele en gedragsveranderingen om te zetten. In dit project werken wij samen met modulair publicatieplatform ResearchEquals om een praktijkgemeenschap te ontwikkelen omtrent modulaire verspreiding van onderzoek. We verzamelen feedback van de praktijkgemeenschap om trainingssessies te ontwikkelen, waarmee onderzoekers op weg geholpen worden met het publiceren van elke stap van hun projectpijplijn en om ontwikkelingen van het ResearchEquals-platform te stroomlijnen. Om het trainingsmateriaal ook na de looptijd van de subsidie te ondersteunen, maken wij een 'open educational handbook.'

Word count (max 100): 99

Section 3 – Project proposal	

3.1 The details of proposal

Proposed project title and acronym	Publishing Research Output Continuously (PROCess): The case of modular publishing
Project duration (in months)	12 months
The project will primarily address	Culture change towards Open Science
The project will secondarily address	Open scholarly communication
Relevance for a specific discipline	All disciplines

3.2 The vision for your project (Criterion: Alignment with the aim of the Call for proposals)

Modular publishing is a recent innovation [1, 2] where each step of the research process is published, instead of only the research report. Each module is registered with a third-party (i.e., CrossRef) and linked in sequential order. This ensures the order of events as part of the scholarly record (e.g., data [3] before results [4]) and puts continuous transparency of the process at the center of publishing. Modules can provide detail *and* context of research findings.

Modules are flexible and help publish outputs that are hard to capture in a traditional paper format, such as data, code, open hardware designs, grant proposals (like this one [5]), and ethics review applications. It allows for creative communication of research (e.g., zines [6] or podcasts [7]), encouraging valorization.

Increased uptake of modular publishing provides opportunities and challenges in the ongoing efforts to improve research. One such opportunity is to reshape the dynamics in the publishing landscape. Another opportunity is that it directly addresses issues that led to the reproducibility crisis [8], providing more insight into the research process. As modular publishing requires participants to reconsider their approach to research communication, widespread adoption can be a challenge.

We will (a) train junior researchers to adopt modular publishing, (b) align developments in modular publishing with the day-to-day needs of Dutch researchers, and (c) scope barriers that prevent researchers from adopting modular publishing. We target 'pre-tenure' researchers in this project as they are likely to be (1) amenable to change, and (2) needing these skills in future, if modular publishing becomes more widely adopted.

We team up with open access publishing platform ResearchEquals, to achieve these goals. As part of the project team, they support the development of training materials. They also are committed to implementing changes suggested by this project, providing a unique opportunity for the needs of Dutch researchers to be woven into this platform.

Planned outputs of this project are:
- An open educational handbook on modular publishing, curated by the wider community of practice from ResearchEquals. This will build on the ResearchEquals Cohort pilot training [9].
- We conduct 1 pilot training and (at least) 4 training sessions throughout the Netherlands.
- Qualitative and quantitative research results on factors promoting and hampering adoption of alternative publishing formats, specifically modular publishing.

Through this project we will (1) **transform the way researchers publish** their work; (2) **adapt open platforms for wider community use**; and (3) expand the community of practice involved in modular publishing plus its ongoing developments and **stimulate wider adoption of open science practices among researchers**. This also lays the groundwork for new data sources for qualitatively evaluating and rewarding researchers [1].

Word count (max 450): 437

3.3 Project plan (Criterion: Feasibility of the project plan)

The project consists of four stages: (1) Scaffolding, (2) designing, (3) training, and (4) evaluating.
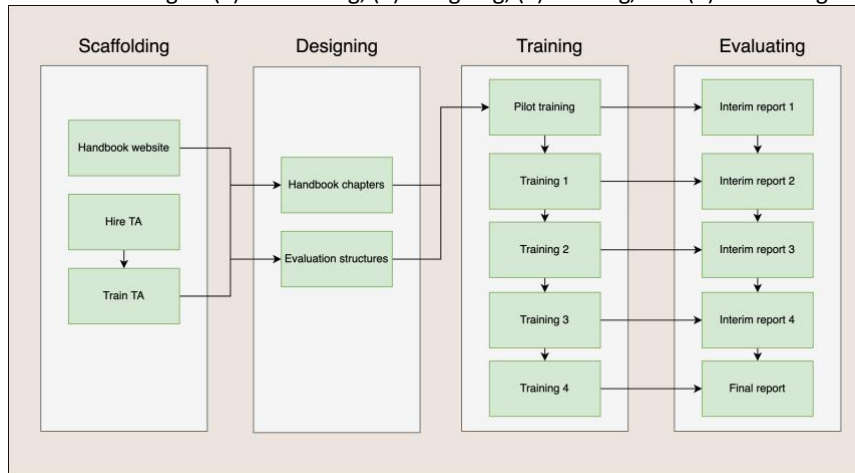
We begin by **scaffolding** the resources needed for this project, including the hiring and training of the teaching assistant (TA). We train the TA on modular publishing itself (train the trainer) and provide basic pedagogical training around lesson plan development. We also train the TA to recognize that their role is to support junior researchers throughout this project and help the team identify barriers and opportunities in modular publishing.

We also scaffold the open educational handbook, which includes setting up the website and its open-source production pipeline. This production pipeline will allow for easy editing by any member of the project team, and researchers who want to add chapters (akin to Wikipedia). To ensure scalability, we will conduct an informal consultation with the Turing Way about best practices for setting up and growing a community-run open handbook (they have >400 contributors to their handbook on reproducible, ethical, and collaborative data science).

During the **designing** stage of the project, we develop the chapters of the handbook. The initial chapters of the handbook are based on the ResearchEquals Cohorts training [9], including:
- Introduction to research modules
- What steps to take in a research project?
- Research as team science
- Building a research portfolio
- Curating research outputs

These are added into the open educational handbook, after which we will invite a small group of peers to review the content for a revision round.

We also develop the evaluation structure for the training sessions during the designing stage. We gather rich individual-level insights from qualitative methods and identify group-level trends with quantitative surveys. Specifically, we interview participating junior researchers on immediate barriers and needs to adopt modular publishing. The survey will be conducted on the whole sample, asking specific questions around the challenges of modular publishing and suggestions on how ResearchEquals can align its service with what Dutch researchers want. We also develop a follow-up survey, to evaluate how participants' workflow changed after having received the training.

In the **training** stage, we run at least five training sessions. Each of these training sessions will be combined with 2-3 interviews (10-15 interviews in total). The first training session, serving as the pilot, will be conducted at the University of Groningen, to be organised within the lab group of the PI and the wider graduate school. During this time, we plan (at least) four further training sessions with help from OSC-NL and by reaching out to various graduate schools (e.g., IOPS) across the country.

After each training session, we make interim evaluations based on the interviews and survey responses. The interviews are thematically analysed and the survey responses are quantitatively analysed. Based on the interim

reports, the team formulates concrete improvements for modular publishing platforms. We can subsequently observe whether evaluations change in subsequent training sessions. The final evaluation is also the final report, which will be published as a preprint and submitted.

Stage		Sep 23	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug
Scaffolding	Handbook website												
	Hire TA												
	Train TA												
Developing	Handbook chapters												
	Evaluation structures												
Training	Pilot training												
	Plan trainings 1-4 in NLD												
	Conduct trainings 1-4 in NLD												
Evaluation	Interim reports												
	Final report												
	Adjustments to ResearchEquals												

Word count (max 500): 491

3.4 Project roles and expertise (Criterion: Feasibility of the project plan)

Prof. dr. Don van Ravenzwaaij (Rijksuniversiteit Groningen) - Principal Investigator
Has made data and publications freely available for 15 years in empirical projects. Has published papers on the selection of studies to replicate, the best way to statistically evaluate replications, and has written a tutorial paper with concrete examples on how to make your data publicly available. In addition to experience in writing, Don also lectures on open access and open data, so is experienced in thinking about ways to teach open science practices.

Dr. Sarahanne Field (Rijksuniversiteit Groningen) – Qualitative expert
One of the first academics to first-author a registered report since its inception, has published on the selection of studies to replicate when resources are scarce. Wrote a dissertation on the community of open science practitioners and is an expert on thematic analysis, which is relevant for this proposal.

Dr. Chris Hartgerink (Liberate Science GmbH) - ResearchEquals liaison
OpenCon Next Generation Leadership awardee (2016), Mozilla Open Science Fellow (2017-2018), Shuttleworth Fellow (2019-2022). Brings a decade of open science experience and founded Liberate Science GmbH to make modular publishing a reality, resulting in ResearchEquals.

Word count (max 250): 183

3.5 Budget table

Type of costs	Short description	Costs in euros
Personnel	Non-scientific personnel MBO, .5FTE, 12 Months	€ 31,193
Travel and accommodation costs	Visits to other open science communities at Dutch universities	€ 600
Dissemination	ResearchEquals Community Collection	€ 150
Implementation costs	Development time for ResearchEquals (€150 * 100)	€ 15,000
Dissemination	APC costs Quantitative Science Studies	€ 1,200
Total request from NWO		**€ 48,142**

3.6 Budget justification (Criterion: Feasibility of the project plan)

- Personnel
  - o Teaching assistant costs, according to UNL CAO rates for half-time.
- Travel and accommodation
  - o Travel costs to provide trainings
- Dissemination
  - o ResearchEquals Community Collection – Used to track all the outputs from the grant in one place, for easy reference and project management.
  - o APC cost Quantiative Science Studies – non-member cost

- Implementation costs
  - Costs to buy development time from the ResearchEquals team, to implement suggested changes to the platform that are the result of this project.

Word count (max 200): 78

Section 4 – Open Science track record of the applicant

The main applicant has made all data, analysis code, and supplementary materials (such as stimulus lists and appendices) accompanying his publications publicly available from the very beginning of his career, first through his website (www.donvanravenzwaaij.com) and later on osf.io when the Center for Open Science was founded in 2013 (with accompanying links on the list of publications on his website). The main applicant has made all the accepted versions of his publications available throughout his career, originally uploaded to his website and later with links to a preprint server. The main applicant is currently chair of a working group in the faculty of Behavioral and Social Sciences whose objective is to integrate diverse top-down (policy documents of the faculty board) and bottom-up (ReproducibiliTea meetings, preregistration seminars, etc.) open science initiatives in the faculty. Finally, NWO awarded the main applicant a vidi grant in 2018 with title "Back to Bayesics: Solving the Reproducibility Crisis in Biomedicine", which revolved around making the endorsement decisions of new medications more transparent, a project that did not just follow Open Science principles, but was about Open Science itself. Applicant also trains their research group in practices that are aligned with open science principles.

Word count (max 200): 198

Section 5 – Data management (Criterion: Feasibility of the project plan)

5.1 Will this project involve re-using existing research data?

No: Have you considered re-using existing data, but discarded the possibility? Why?

We considered re-using existing data, and existing data do not pertain to the use of modular publishing in this specific form.

5.2 Will data be collected or generated that are suitable for reuse?

Yes: Please answer question 5.3 and 5.4

5.3 After the project has been completed, how will the data be stored for the long-term and made available for the use by third parties? Are there possible restrictions to data sharing or embargo reasons? Please state these here.

All collected data will be published as research modules themselves on ResearchEquals. ResearchEquals is a CrossRef member and is required to archive the materials published. These data will be made available under either a CC0 Public Domain Dedication or CC BY-4.0 license.

5.4 Will any costs (financial and time) related to data management and sharing/preservation be incurred?

No: All the necessary resources (financial and time) to store and prepare data for sharing/preservation are or will be available at no extra cost.

Section 6 – Software sustainability (Criterion: Feasibility of the project plan)

6.1 Will software be generated during the project?

Yes: Please answer questions 6.2, 6.3, 6.4 and 6.5

6.2 How will the software be licensed and be made available for re-use?

The ResearchEquals software is open-source and available under a MIT license.
https://github.com/libscie/ResearchEquals.com

The open educational handbook will be made available under a CC0 Public Domain Dedication (content) and MIT license (code).

6.3 What measures are needed to make the software appropriate for long-term (re-)use by third parties?

Each of the pieces of software will be automatically archived upon release in Zenodo.

6.4 How large do you expect the community that will potentially use the software to be, and do you expect outside contributors to the software?

All changes to ResearchEquals are made available to the entire userbase (354 researchers at the time of writing; real-time statistics available on ResearchEquals).

The open educational handbook that we create is expected to reach 50-100 researchers during the training sessions. It will be used afterwards and can reach a multiple of $x * 10$ people (x being the amount of training sessions conducted using it).

6.5 What expertise do you expect to be needed to make the software appropriate for long-term re-use by third parties? Is this expertise available?

No additional expertise is required to make the software appropriate for long-term reuse.

Section 7 – Literature references

[1] Hartgerink, C.H.J., & van Zelst, M. (2018). "As-You-Go" Instead of "After-the-Fact": A Network Approach to Scholarly Communication and Evaluation. *Publications*. https://doi.org/10.3390/publications6020021
[2] Dhar, P. (2023). Octopus and ResearchEquals Aim to Break the Publishing Mould. *Nature*. https://doi.org/10.1038/d41586-023-00861-0
[3] Wicherts, J., Klein, R., & Hartgerink, C. (2022). Aggregate dataset of open data without identifying information. *ResearchEquals*. https://doi.org/10.53962/g9j4-v2gy
[4] Hartgerink, C., Klein, R., & Wicherts, J. (2022). Precision of detecting identifying information. ResearchEquals. https://doi.org/10.53962/r5gg-jjv0
[5] Van Ravenzwaaij, D., Field, S.M., Hartgerink, C.H.J. (2023). Publishing Research Output Continuously (PROCess): The case of modular publishing. *ResearchEquals*. https://doi.org/10.53962/p7ec-pxxb
[6] Berti Suman, A. (2022). Story of a Civic Sentinel. *ResearchEquals*. https://doi.org/10.53962/k5e5-t1dn
[7] Harrison, H.L. & Loring, P. (2023). PubCast - Alternative Seafood Networks During COVID-19. *ResearchEquals*. https://doi.org/10.53962/tqv8-3raw
[8] Munafò, M. R., Nosek, B. A., Bishop, D. V. M., Button, K. S., Chambers, C. D., Percie du Sert, N., Simonsohn, U., Wagenmakers, E.-J., Ware, J. J., & Ioannidis, J. P. A. (2017). A manifesto for reproducible science. *Nature Human Behaviour*. https://doi.org/10.1038/s41562-016-0021
[9] https://libscie.org/researchequals-cohorts-pilot/

By submitting this form, I declare that:

I and all the individuals involved in this proposals satisfy the nationally and internationally accepted standards for scientific conduct as stated in the Netherlands Code of Conduct for Research Integrity (The Universities of the Netherlands): Yes

The research organisation has been informed of this grant application and the research organisation accepts the grant conditions of this programme: **Yes**

The team members named in this form have read and agreed with the submission of this proposal and have agreed with their role and intended contribution to the project, should this be awarded: **Yes**

I have completed this application form truthfully: **Yes**