

**Project 1: Open Research Toolkit Paper**

Samantha Baine

University of Tennessee, Knoxville

INSC 563: Data Management

Christopher Eaker, Associate Professor & Data Curation Librarian

September 30, 2022

## **Introduction**

The Open Research Toolkit, or ORT, is an open education resource consisting of 14 modules used for learning about open research concepts. There are many different facets of the open research ecosystem. The ORT discusses it all, from preliminary data collection and publishing to reproducing results and peer review stages. Free and openly accessible research can, and does, benefit everyone, which is why everyone should be an advocate for it. As show by the ORT modules, open platform research effectively supports and further develops the future of interdisciplinary study and data management.

Interdisciplinary research and worldwide collaboration are crucial in today's political and societal landscape. Conducting research openly and subsequently having the results shared is crucial for fostering inclusivity, diverse viewpoints, and scientific progress over profit margins. Transparent research has broader reach and greater impact on our world because the results and data are shared quickly and easily and are accessible for reuse by those outside the normal journal-subscribing parameters. While this can be seen as a shift away from traditional research, it is a shift in the right direction towards a more open and just future. As stated in the very first module, the ORT shows users that there is an entire system encapsulating the spirit of openness that goes beyond the limit of finalized data and publications (Eaker, 1, 2021). The aim is to show that it is possible for the entire research lifecycle to consist of the principles of openness, sharing, and collaboration from the very beginning of the research process.

### **What are the major benefits of conducting research openly?**

Module One outlines and defines the open research ecosystem. Major benefits include the four core values mentioned in the module. When looking to transition to a more open and transparent model of research, these core values of diversity and inclusion, quality and integrity,

collective benefits, and equity and fairness should be considered (Eaker, 1, 2021). In an open science framework, the benefit of diversity and inclusion cannot be understated, as it leads to accessibility for all. Diversity refers to many aspects of the research ecosystem, like an expansive background of knowledge, along with an array of bountiful practices, workflows, languages, research outputs and research topics. By fostering diversity, the scientific community gains new knowledge through a diverse research and scholarly community consisting of the wider public, like marginalized voices, local citizens, and those from different countries and regions (Eaker, 1, 2021). These groups not only have vital roles to play in advancing scientific knowledge, but they will also come to reap the benefits of its transparency—all due in favor of academic freedom supported by wide open research. Equal access to research data enables all, regardless of any factor (race, age, income, educational background, location, gender, to name a few) to pursue passion and knowledge. Furthermore, this openness, similar in ways to open-source software, promotes a rigorous review standard (Eaker, 1, 2021). Most open-source software is regularly maintained by hundreds, if not thousands, of people who all play a part in the larger community in keeping the software error-free and bug-free. When a user identifies and reports a bug or error, and since the source code is available to everyone, the community is there to fix it immediately. I believe that this same sort of scrutiny would smoothly transfer over to the research process. Having a larger collective involved in the open research process aids both transparency in the research and quality control evaluation processes.

On top of the benefits mentioned in Module One, I believe Module Two highlights a huge benefit of conducting research openly, especially in today's times. Module Two touches on the principles and practices of open research, with reproducibility being one of the 11 principles. Reproducibility leads to a higher quality of research outputs and thus to greater trust in science

(Eaker, 2, 2021). This transparency, along with the ability to reproduce results, would lead to an increased trust in the scientific process and credible information. Many of those that distrust scientific knowledge would be able to follow the evidence and decisions made during the research, which would foster public participation in science (Eaker, 12, 2021). Open research workflows laid out from the very beginning of a project and initial data collection through to the interpretation and reporting of results, along with rigorous documentation and organization, would be beneficial for this reason (Eaker, 2, 2021).

### **How does each aspect of the open research ecosystem support open research?**

Open research, as previously explored, is a catch-all term consisting of many parts, principles, definitions, and more. When combined, they are intended to make the research process open, transparent, accessible, and reusable by anyone and universally benefited by all involved (Eaker, 1, 2021). Expanding on this is Module Six, which discusses FAIR data principles. This is a framework for making data FAIR, or findable, accessible, interoperable, and reusable. This framework provides users with structured goals that their data tools, resources, infrastructure, and vocabularies should reach toward to be easily discovered and reused by others. One such tool used to support open research is rich metadata creation and record storage and is considered a best practice of data management (Eaker, 6, 2021). However, having data that is easily discoverable is only part of the end goal; this structure of good data management practices upholds and support knowledge creation by making the research data better organized, more open, more trustworthy, and better quality (Eaker, 6, 2021). As far as any guidelines, principles, or policies go, they are not the practices, techniques, or tools used to accomplish the goal of open research, but they do provide structure to them and work together to make data more open and better suited for sharing and reuse in the grand scheme of open research.

**How will you change the way you conduct your own work or research based on what you learned?**

Learning about open research has allowed me to expand on the ways I could change my research or work habits. As I am not an academic researcher by trade, two ways to do this came to mind: understand and become aware of the principles and meaning behind open research practice, and become an advocate for open access (Eaker, 2, 2021; Eaker, 11, 2021). To be an advocate for open research is to give a voice to those left outside of traditional research for so long and would benefit the most from involvement in open research. As a Metadata Technician for a local government's records management department, I consider myself a public servant in many ways. While it may be hard to see the result of the work, it feels good to know my labor goes toward a greater good. Working in government records management means that people's rights are protected and that they have open access to their government's information when they should require it. It also means that the governing body is held accountable to taxpayers and other departments alike. All that to say that serving the public and advocating for open access to documents is very important to me. Openness in research, like in government, leads to transparency and trust. Advocating for these ideals are very important to me, and the ORT gave me some applicable tools and methods to go about campaigning for change to peers, administrators, and policymakers of all kinds. They include writing about advocacy: sending emails to stakeholder, mailing letters to university administrators, posting an opinion piece in a journal, or write a bulletin about open research (Eaker, 11, 2021). Another way I can see myself advocating is by becoming part of a collective community for change: enlist a volunteer group, build a partnership with research groups on campus, lead online discussions about different aspects of open research, hold public events, and post on social media (Eaker, 11, 2021). These

concrete methods have given me ways to show that Open Research can relieve the current challenges researchers and the public deal with when it comes to open data. Participation in advocacy at any level can help bolster inequality found at all levels of the scientific process. Having more people, with differing viewpoints, approaches, and goals, work together instead of competing will lead to recognition and reward for all involved. Open Research would take research back to its true meaning of why it is important: to foster active learning and growth through collaboration and innovation (Eaker, 12, 2021).

**Are there other ways you can think of to introduce openness into the research process?**

**What are they?**

Another way I have been thinking of to introduce openness into the research process would be to amplify the conversation surrounding diversity, equity, and inclusion (DEI) in Open Research. Doing this would mean listening to those in research and academia in low-paying (or no-paying) positions, like non-tenured professors, graduate students, and community colleges. Let them speak about their troubles in the traditional research process versus the open research model. Just like how Citizen Science involves citizens in science, the open research framework, and any project that is said to be open to all, must involve direct input and collaboration from those that would benefit from it the most (Eaker, 12, 2021). With ideas taken from Module 12, I would suggest that marginalized voices and low-income academics should be collaborators on the planning and policy creation phases of their school's Open Research initiatives. Their involvement would need to be respected and their input valued. As touched on in Module Two, the more diverse the viewpoints are that are included, the wider the net of benefits for the worldwide research community. The scientific community evolves due to this greater inclusion, by getting those into research and publishing who would not normally be there. This focus on

DEI gives equal access to scientific knowledge and research data to the next generation, regardless of location, nationality, race, age, gender, income, socio-economic circumstances, career stage, discipline, language, religion, disability, ethnicity, or migratory status (Eaker, 2021).

### **Conclusion**

In summary, the ORT provides a basic understanding of the interconnectedness of open research, from principles to practices, and discusses why openly accessible research is important even outside of academia. I have come to view open research as vital to a collaborative and innovative society—one that fosters interdisciplinary transparency and trustworthiness—to produce better research for all.

References

Eaker, C. (2021) The Open Research Ecosystem. In *Open Research Toolkit*. Retrieved from <https://doi.org/10.17605/OSF.IO/A4FTW>

Eaker, C. (2021) Principles & Practices of Open Research. In *Open Research Toolkit*. Retrieved from <https://doi.org/10.17605/OSF.IO/A4FTW>

Eaker, C. (2021) F.A.I.R. Data Principles. In *Open Research Toolkit*. Retrieved from <https://doi.org/10.17605/OSF.IO/A4FTW>

Eaker, C. (2021) Open Advocacy. In *Open Research Toolkit*. Retrieved from <https://doi.org/10.17605/OSF.IO/A4FTW>

Eaker, C. (2021) Citizen Science. In *Open Research Toolkit*. Retrieved from <https://doi.org/10.17605/OSF.IO/A4FTW>