

Bridging the Global Divide: Building Local Capacity for Open and Reproducible Science

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Introduction

As we celebrate **Open Access Week 2025**, we are reminded that openness in science is about much more than free access to information. It's about **equity, trust, and shared participation** in the creation of knowledge. This year's theme: *Closing reproducibility gaps, building local capacity for open and reproducible science, and rethinking global participation*, invites us to reflect on what true openness really means for researchers around the world.

In many ways, open science has transformed how we collaborate, share, and communicate research. Yet, beneath this progress lies a persistent challenge: **not everyone benefits equally**. For some, open access has created a world of possibility. For others, especially in low- and middle-income countries, structural barriers still limit participation. To move forward, we must ensure that openness is not only about *access to information* but also about *access to opportunity*.

Closing Reproducibility Gaps: From Access to Understanding

The term *reproducibility gap* describes the growing divide between research that can be verified and research that cannot. While open data repositories and preprint servers have made scientific findings more transparent, **openness does not automatically guarantee reproducibility**.

Often, datasets are shared without adequate documentation or standardized formats, making them difficult to interpret or reuse. Moreover, researchers in resource-limited settings may lack the computational tools or technical training needed to replicate complex analyses (Baker, 2016).

To truly close these gaps, we must go beyond uploading data, we must make data **usable and contextual**. Initiatives like *The Turing Way* (2022) provide open, community-led guides that teach reproducibility skills in accessible ways. Likewise, universities and funding agencies can integrate reproducibility training into graduate programs, ensuring that young researchers grow up seeing transparency as a normal part of good science, not an afterthought.

Building Local Capacity for Open and Reproducible Science

A truly open science ecosystem depends on **local capacity**, the infrastructure, knowledge, and confidence that enable researchers everywhere to contribute meaningfully. While global conversations on openness often focus on technology,

capacity building is about **people first**: developing skills, mentorship, and institutional support.

In many regions, researchers still face challenges such as unreliable internet access, limited funding, or lack of training in data management. Addressing these barriers requires a shift from top-down solutions to **collaborative partnerships** that value local expertise. When institutions in the Global South lead open science projects rather than merely participate in them, they not only build skills but also redefine what global research collaboration looks like (Bezuidenhout et al., 2020).

Small steps matter. Community workshops, locally hosted data repositories, and mentorship networks can all foster ownership and sustainability. By focusing on *open capacity*, not just *open content*, we empower researchers to move from knowledge consumers to knowledge creators.

Rethinking Global Participation: Inclusion Beyond Access

Global participation in research is often framed in terms of publication metrics or citation counts. But numbers alone don't tell the full story. **True participation means having a voice and influence** in setting research agendas, defining data standards, and shaping how openness evolves.

As UNESCO (2021) highlighted in its *Recommendation on Open Science*, inclusivity is a moral and practical necessity. Knowledge must flow in multiple directions, North to South, South to North, and across all borders. To achieve this, we must address the subtle forms of exclusion that persist in academic publishing: language barriers, high article processing charges, and cultural biases in peer review.

Rethinking global participation also means recognizing the value of **diverse knowledge systems**. Indigenous and local knowledge traditions, for instance, offer insights into environmental and social issues that global research often overlooks. Integrating these voices enriches science and makes openness truly universal.

Integrating Openness, Capacity, and Collaboration

Openness, capacity, and participation are not separate goals, they are **interconnected pillars** of a healthy scientific ecosystem. When research is reproducible, it becomes credible. When local capacity is strengthened, reproducibility becomes more achievable. And when participation is inclusive, science becomes more representative of the world it seeks to understand.

To make this integration possible, collaboration must move beyond symbolic partnerships toward shared decision-making and resource allocation. For example, initiatives that support open-source tools, multilingual publishing, and cross-border mentorship not only make research more inclusive but also more innovative. After all, diversity is not just fair, it's *productive*.

Conclusion

As Open Access Week 2025 unfolds, it's worth remembering that the most valuable outcome of open science is not faster publishing or wider reach. It's **shared understanding**. To close reproducibility gaps, we must make openness practical and teachable. To build local capacity, we must invest in people as much as in technology. And to ensure global participation, we must listen to every voice, not just the loudest ones.

If openness is to live up to its promise, it must evolve from being a *policy* to being a *practice* daily commitment to inclusion, empathy, and collaboration. In doing so, we can build a global research community that is not only open in access but also open in spirit.

References

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