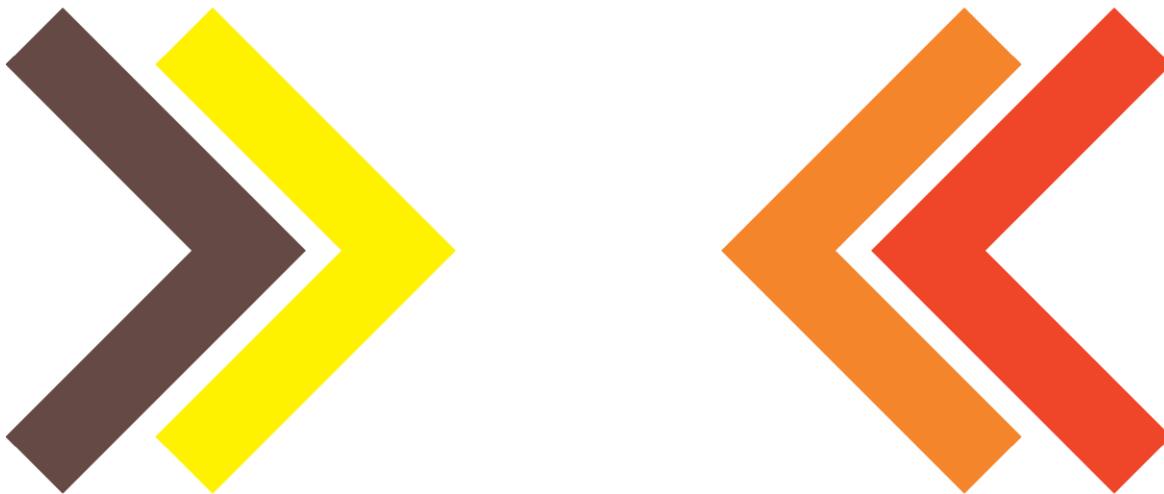# Open Science Beyond Open Access: For and with communities

A step towards the decolonization of knowledge

For further reading, see:

An introduction to UNESCO's Updated Recommendation on Science and Scientific Researchers
https://en.ccunesco.ca//media/Files/Unesco/Resources/2018/11/IntroductionToUNESCOUpdatedRecommendationOnScienceAndScientificResearchers.pdf (2018)

Is Science a Human Right? Implementing the Principle of Participatory, Equitable, and Universally Accessible Science
https://en.ccunesco.ca//media/Files/Unesco/Resources/2019/10/IsScienceAHumanRight.pdf (2019)

The Status of Science. The UNESCO Recommendation on Science and Scientific Researchers: Issues, Challenges and Opportunities
https://en.ccunesco.ca//media/Files/Unesco/OurThemes/EncouragingInnovation/IdeaLab/ReflectionPaperMicheleStanton-Jean.pdf (2019)

Toward a UNESCO Recommendation on Open Science: Canadian Perspectives https://en.ccunesco.ca/-/media/Files/Unesco/Resources/2020/04/UNESCORecommendationOpenScienceCanadianPerspectives.pdf (2020)

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Acknowledgements

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We were brought together by Rajesh Tandon and Budd Hall, who are also Co-Chairs of the UNESCO Chair in Community-Based Research and Social Responsibility in Higher Education. Collectively, we bring diverse perspectives and experiences to the challenges of Open Science.

Each being ought to have the strength to be tolerant of the beauty of cognitive diversity.
Leroy Little Bear[1]

Summary

- While many countries and scholars understand "Open Science" to mean the same as "open access" to publications and data, we argue that it can and should go further.
- Analyzing all the possibilities of "openness" during the COVID-19 pandemic, we explain how science could also open itself to society to be more relevant—particularly to civil society organizations and social movements.
- We suggest greater openness to knowledges and systems of thought that come from Indigenous Peoples, minorities, and cultures from the Global South. These knowledges are often ignored or excluded from Eurocentric science even though they could enrich scientific conversations across boundaries.
- Finally, we propose considerations for each form of openness to bring about a fair, decolonial Open Science—for and with communities, and beyond open access.

Introduction

UNESCO is launching international consultations aimed at developing a [Recommendation on Open Science](#) for adoption by member states in 2021. Its Recommendation will include a common definition, a shared set of values and proposals for action.

At the invitation of the Canadian Commission for UNESCO, this paper aims to contribute to the consultation process by answering questions such as:

- Why and how should science be "open"? For and with whom?
- Is it simply a matter of making scientific articles and data fully available to researchers around the world at the time of publication, so they do not miss important results that could contribute to or accelerate their work?
- Could this openness also enable citizens around the world to contribute to science with their capacities and expertise, such as through citizen science or participatory action research projects?
- Does science that is truly open include a plurality of ways of knowing, including those of Indigenous cultures, Global South cultures, and other excluded, marginalized groups in the Global North?

The paper has four sections: "Open Science and the pandemic" introduces and explores different forms of openness during a crisis where science suddenly seems essential to the well-being of all. The next three sections explain the main dimensions of three forms of scientific openness: openness to

publications and data, openness to society, and openness to excluded knowledges[2] and epistemologies[3]. We conclude with policy considerations.

1. Open Science and the pandemic

Writing this paper at the time of the COVID-19 pandemic, we have been struck by the place science has taken in this highly specific context, but also by the multiple forms of scientific openness that have appeared.

On the one hand, the research community is racing to produce a vaccine that some governments are suggest is the only way we can return to "normal" life. Laboratories clearly need prompt, unconditional access to relevant and quality publications and data. As a result, some publishers have "opened" their paywalled journals to make certain articles freely available[4]; databases have been created that are completely open access, such as the [Open COVID Pledge](#); and other journals or platforms that were already open access are speeding up their peer-review processes[5] by prioritizing access to data. This "opening" enables or assumes co-operation between laboratories rather than competition. Some laboratories are even sharing material[6], hardware and specimens[7].

On the other hand, while scientists have previously complained that governments do not listen to them, they are now in the spotlight and in the media, answering questions from the general public, guiding governments toward decisions and trying to predict the future[8]. But it is not clear whether science's new role in public debate marks a new form of openness, is sustainable, or will extend to other global challenges, such as the climate crisis.

Research and the pandemic

Governments and public granting agencies are calling for what could be termed "emergency research" in medicine, biology and the social sciences and humanities. For example, the [Canadian Institutes of Health Research](#) announced two critical research funding programs in April 2020. Does this form of research—far removed from the much longer timeframes of fundamental research—indicate a shift of publicly funded research toward societal needs and general well-being? The answer is unclear. It is also worth considering whether the change heralds a new form of social responsibility of universities and research centres that will lead them to science that is less frightened of society's interference and more open to concern for the common good.

Part of the answer to such questions will be perceptible in the status of the vaccine that may one day be found: it will either be patented (and therefore not free), or open source under an "open" licence (transformed into a common good)[9]. Another question worth asking is: will research focus solely on managing the economic, educational and health issues in this crisis, or will it also look at the effects of COVID-19 on social inequalities[10], particularly gender, race, age, handicap and ethnicity?

Examining science's place in society

The disruption of "normal" life caused by COVID-19 is transforming science's place in society, even its standard practices. For example, researchers are launching partnerships with associations to advance their work and their research networks are offering multiple webinars to all internet users instead of in-person seminars for peers in "closed" research centres. As e-learning becomes the new norm, more use is being made of resources like massive open online classes, known as MOOCs. Citizen science movements are also taking on a more influential role[11], as demonstrated by [Just One Giant Lab,](#) which brings scientists and non-scientists together "to develop innovations to adapt to the COVID-19 epidemic (detection tests, syringe pumps, etc.), all at a lower cost[12]. Fablabs[13] and other makerspaces are imagining new ways to produce masks[14], syringes and prototype respirators[15], while non-governmental organizations and scientists are bringing society into the fold by launching community-based, participatory research projects to fight inequalities[16].

 Critics of science and technology are also making themselves heard, most notably with regard to contact tracing applications and artificial intelligence. Meanwhile, suggestions emerging from Chinese traditional medicine, Ayurvedic medicine or African traditional medicine are neither being spoken about nor funded for clinical trials, and are sometimes quickly discredited[17]. This response purports to be based in science but could simply be a Western effort to silence other ways of knowing.

Challenging conventional research practices

This overview of the complex COVID-19 situation explores possible avenues for opening science. They include:

- Opening access to scientific publications
- Opening access to research data
- Scientists' participation in public debates and governance
- Openness to public welfare issues and concerns (not just those of industry or governments)
- Openness to research partnerships with civil society associations and social movements
- Openness to hybrid knowledge, from citizen science to open makerspaces and laboratories
- Openness to Indigenous knowledge and ways of knowing
- Openness to knowledge from the Global South or marginalized communities in the Global North
- Openness to the idea that science is made up of complex debates rather than enduring certainties

All these forms of openness challenge the framework in which scientific research is carried out today—that is, the publication of results in pay-to-access journals that some cannot access; the reluctance to enter into equitable, non-financial partnerships to co-construct socially relevant research projects in the name of refusing to let society or politics "meddle;" and the exclusion of types of knowledge deemed unscientific, especially those originating from Indigenous Peoples or from projects involving people who are not professional scientists or who are from universities of the Global South. In the rest of this paper we examine ways to challenge these types of closures and inject openness.

2. Openness to publications and data

It is often said that open access to publications and data is a new science practice, associated with the digital age. Is this true?

Evolving science policies and practices

Surprisingly, many science practices are actually fairly recent, including the idea that journals should be owned by for-profit publishers rather than universities or learned societies. Between 1852 and 1908, academic journals were regulated by default by open licences[18]. This did not stop researchers from making and disseminating countless discoveries. Generally, academic journals were associated with disciplinary associations and published on a non-profit basis.

The idea that knowledge can become a commodity and create markets (for journals and patented innovations) is linked to the emergence of the knowledge-based economy in rich countries[19]. This orientation of science policy is part of the neoliberal ideology based on the promotion of competition[20], notably among universities, laboratories and scientists. More recently, some for-profit publishers have co-opted the idea of open access and conflated it with the pay-to-publish model of open access, which in fact covers only a small portion of the entire open-access universe[21].

As a result one could argue that granting open access to scientific publications is less a daring innovation than a return to the conventional ethics of research[22], which consider that science is a common good and that scientists must collaborate to advance knowledge, whatever their country or beliefs. But several surveys have shown that most researchers will prioritize a journal's reputation over accessibility when choosing where to publish - a reputation that is marked by commercial indices, such as the journal impact factor[23]. More recently, digital technologies allow online and open-access journals to build their reputations through social networks rather than the journal impact Factor.

Understanding researchers' motivations

Researchers who advocate openness of publications and data may have varying motivations:

- Some see research as an immense scientific conversation and want full and immediate access to their colleagues' texts and data.
- Others appreciate open access for the chance to build a universal scientific legacy—a treasure trove of knowledge that would benefit humanity.
- Some believe the main purpose of open access is to democratize scientific knowledge.

Indeed, contrary to a widely shared preconception, many people outside of the scientific world can read, understand and use scholarly articles to improve their own knowledge base and working practices. Think about teachers, nurses, journalists, agronomists or social workers: all would benefit from continuous learning, but without a link to a university, they cannot access texts that might offer them opportunities to do so. In a true knowledge society[24], all knowledge is accessible to those who need it to advance and serve the common good.

Nowadays, an increasing number of public policies promote or require open access without forcing authors to pay to publish. In Latin America, most journals are operated by university departments. In South Africa, the Academy of Science of South Africa adopted the SciELO model of open access, pioneered by Brazil, for independent journal publishers to share publishing infrastructure[25]. But pressures to publish in market-owned journals persist. The problem is that authors, funders and policymakers lack awareness of the diversity of models and initiatives that are available. This is why we think that UNESCO should support independent, community-based publishing initiatives, the Latin American Council of Social Sciences (CLACSO), the Council for the Development of Social Science Research in Africa (CODESRIA), the African Books Collective, or the more recent Grenier des savoirs initiative. The Radical Open Access Collective is an interesting community of scholar-led, not-for-profit presses that publish open access books.

The risks of open access as a result of inequalities at the heart of science

We urge care in thinking about open access and most importantly not to reduce it to the pay-to-publish model promoted by for-profit publishers. That model has been designed through economic or market-based lenses that see it offering financial return on investment for funders, universities and libraries. This view normalizes the treatment of knowledge as a commodity, viewing the production and dissemination of science as a means of being economically competitive. This reasoning, typical of the knowledge-based economy, feeds into the growing trend of nationalism and regionalism, with European nations and the EU willing to make deals with multinational publishers to secure their presence in research outputs (e.g. Projekt DEAL).

Debates and policy recommendations from Global North institutions on Open Science and open access usually deal with access to and dissemination of research outputs (still largely in journals and books). Promotion of these policies has tended to focus on the benefits, such as increased visibility and citations, paying little attention to the burden and the risks—particularly for knowledge-holding communities on the margins or scholars from the Global South.

These risks are real. For example, open access as seen in francophone sub-Saharan Africa[26] reveals issues that are very different from those in the Global North. In this part of the world, open access cannot be separated from issues like difficult access to computers, the internet and local research grants, and weak digital literacy: many students touch a computer for the first time when they enter university. In this context, open access tends to reinforce the hegemony of science done and published in the Global North at the expense of local knowledge, seldom in open access. This reduces intellectual diversity and contributes to the homogenization of science and creativity. Ultimately, it leads to what Vandana Shiva[27] calls the "monoculture of the mind"—where Eurocentric and patriarchal knowledge structures are reflected and reproduced. Postcolonial open access[28] can thus be a tool of subjugation rather than empowerment. It can further entrench the deep-seated inequalities encoded in science's colonial and racial infrastructure[29].

One of these inequalities stems from the obsession of many universities in the Global South for rankings and impact factors, even if the latter are based on criteria set by powerful institutions in the Global

North which ignore their reality. Very few journals from the Global south are recognized as having enough value to be included in these rankings. Fortunately, impact factor and its clones are more and more contested in the Global North[30], for example through the [Declaration on Research Assessment](#) (DORA) and alternative models[31]. Organizations like the Directory of Open Access Journals reject rankings and aspire to index scientific and scholarly journals from all over the world according to their quality control system.

Policies and actions to implement open access have tended to strengthen the existing power structure and further marginalize small-scale, local and community-driven initiatives in the Global South. Therefore, we propose recommendations that criticize this flawed logic of open-access and instead challenge the deep-seated structural inequities it has created, while promoting open access as a tool for building the knowledge society.

3. Openness to society

The idea that science must be wary of society—especially of anything that seems political—dates back to the first learned societies. It was promoted by scholars to protect themselves from the arbitrariness of power, from threats and punishments against those who challenged religious dogma. It seemed to scientists of the time that only among equals (i.e., male peers) and protected from the whims of rulers and clergy could knowledge of the world advance. Scholarly communities thus closed themselves off from society for protection (or for creative space) in what is sometimes called an "ivory tower." The result was the exclusion of anything that was not them or like them. It also led to the establishment of complex rituals to gain access to the ivory tower. The doctorate degree is one example. Academics' use of jargon that outsiders find hard to understand is another isolation tool.

Shattering the ivory tower

However, the world has changed a lot. For instance, young researchers who wanted to do things differently began attacking "ivory tower syndrome" in the 1960s. They asked questions like: "How can we make science a 'truly' fair and egalitarian practice? How can scientific practice be made compatible with a concern for social justice?"[32] The environmental disasters of the 1980s would heighten awareness of the potentially harmful effects of scientific research and technological innovations, and lead to the adoption of the precautionary principle in addition to the major ethical codes.

In the 1970s, led by scholar activists in the Global South, participatory research was put forward as a way to co-create knowledge for and with communities, especially marginalized ones, experiencing and documenting the challenges of their daily lives[33]. However, this movement was largely ignored by mainstream academics. Around the same time in Europe, science shops[34] were invented. They invited civil society associations to propose research projects that students would carry out free of charge in the course of their training, particularly in environmental sciences[35]. Several political actors began to demand public participation in the scientific and technological choices made by governments. This gave

rise to citizens' juries, consensus conferences[36] and other mechanisms aimed at building a "third sector of research" that is still running today[37].

In other words, science was opening itself to society.

But the advent of the knowledge-based economy and the public finance crisis of the 1980s took a toll on this emerging scientific citizenship[38]. Dependent on governments or industry for funding, science became less concerned with social justice, equality and participation than with contributing to the prosperity of states and universities. Science was to become a source of income through patents and marketable innovations[39]. Funding for social and human sciences gradually decreased[40] while industry-university partnerships multiplied, as evidenced by the renaming of campus buildings after funders.

Science and society today

The second decade of the 2000s has seen the traditions of participatory action research and critical research continue. Indigenous scholars, such as Linda Tuhiwai Smith[41] with her seminal work on decolonizing research methodologies, have inspired a new generation of Indigenous and non-Indigenous scholars to work in engaged ways. Community-based and community-engaged research has become increasingly accepted in universities around the world, with many new structures to facilitate community-university research partnerships created[42].

In Europe, the science shops' pioneering work has found substantial support from European Commission funding and advocacy for the Science With and For Society (SWAFS) and Responsible Research and Innovation (RRI). International structures, such as the UNESCO Chair of Community-Based Research and Social Responsibility, the Talloires Network and the Global University Network for Innovation, have been established.

There are still tensions, as some scholars are wary of showing social or political commitment that could make them look "radical" and perhaps harm their careers. The normative expectation that scientists should separate their values and identities from their work remains powerful[43]. It can be a source of stress for young researchers who begin their careers believing in the power of science to change the world only to learn that what really counts is research funding, quantity of publications and impact factor.

Interestingly, digital technologies have created new forms of openness to society within technoscience, notably within the open-source software and hardware movements in computing (see Open Source Initiative, for example). The implementation of fablabs[44], makerspaces[45] and other do-it-yourself laboratories that integrate non-scientists and citizen science (using non-scientific citizens to collect or capture massive data via applications) have produced great advances in botany, biology, astronomy, geography and even mathematics[46].

Science at a crossroads

We are at a critical juncture. It is unclear whether we are moving closer to the 1960s ideal of scientific citizenship - making digital technology a tool for the democratization of science and knowledge - or

whether science is truly part of knowledge economy and cognitive capitalism[47], seeking industrial partners and "exploiting" citizen volunteers as cheap labour. The openness of science here is complex and uncertain, as exemplified by the fablabs in Africa, funded by organizations in the Global North: can they respect local values and practices to contribute to local sustainable development[48]?

The consultations around the creation of the UNESCO Open Science Recommendation offer an exciting chance to explore what we have learned so far from opening to society and will support future initiatives. We are calling for respectful and transparent collaboration between scientists and social actors as well as the co-creation of knowledge and social innovation that includes all world views.

4. Openness to excluded knowledges

In this section, we deal with two families of knowledge that are excluded from mainstream or conventional science in a systemic way:

- Indigenous knowledges, ways of knowing and epistemologies; and
- scholarly knowledge from marginalized groups of people in western English-speaking science, such as women, minorities, Indigenous scholars, non-Anglophone scholars, or scholars from the less-advantaged countries in the Global South.

We argue that science should become much more pluriversal[49] by opening itself to these families of knowledge that are ignored by so many scientists in the Global North.

Science as a product of history and culture

Feminist, Indigenous and decolonial studies, particularly in Latin America[50] and India[51], as well as social studies of science[52] and the deconstruction of the Western knowledge as set out in great books, have helped show the extent to which science was European and male, a product of the intersection of colonialism and capitalism. Examples of these books include Mudimbe's *The Invention of Africa*[53], Said's *Orientalism*[54]*,* Fanon's *Black Skin, White Masks*[55], and *Decolonizing the Mind* by Ngũgĩ wa Thiong'o[56].

The recent publication in English of the *Jewel of Reflection on the Truth about Epistemology* by the 12th century scholar Gangesa Upadhyaya[57], said to be one of the most important philosophical works in Indian and Sanskrit scholarship, is just one example of the vast bodies of knowledge that have been excluded from contemporary understandings of science. For an example closer to our times, the work on action research with Indigenous communities by the great Columbian sociologist Orlando Fals Borda had never been translated into French until very recently[58]. This is also the case for the classic decolonial work, *The Invention of Africa*[59]*.* Conversely, many scholarly books from the Global South published in French, Spanish or Portuguese have never been translated into English.

Contrary to the myth of scientific neutrality, science—steeped in history and culture—has always carefully selected the knowledge to which it will grant the status of "scientific". This knowledge has to prove that it meets certain normative and epistemological criteria. Depending on the era, these can

include the use of the experimental method, extensive doctoral training of its author, its ritualized presentation in meetings of learned societies, its publication in peer-reviewed journals, and more. Such filters obviously lead to exclusion.

Feminist social studies of science exposed the exclusion of women from this universe decades ago. Even today, during the COVID-19 crisis that closed universities, female academics had more trouble submitting papers and research proposals than did their male counterparts because of unequal divisions of household labour[60].

Some research indicates that Global South and Indigenous scientists have difficulty publishing in high-impact scientific journals, whose editorial boards are dominated by white males[61]. A full professor of physiology from Senegal told us that one of his articles was only accepted when he added a European author to the list of authors. Western science is increasingly unilingual English and hegemonic.

Beyond the nationality and language of the scientists and suspected systemic racism, exclusion also concerns epistemologies that come from outside the European tradition, especially Indigenous ways of knowing and political knowledges based on minority experiences of oppression[62]. Non-European or Indigenous epistemologies are so different from the framework that dominates Western science that the latter can neither see nor understand them and ends up ignoring and excluding them.

Western science vs. Indigenous ways of knowing: a fundamental divide

Leroy Little Bear, member of the Blood Tribe and an Indigenous constitutional scholar and philosopher, puts it this way: "One of the problems with colonialism is that it tries to maintain a singular social order by means of force or law suppressing the diversity of human world views"[63]. For example, Indigenous ways of knowing generally reject the division of life into a series of disciplines—the basis of conventional science in most universities. Instead, these epistemologies propose a global vision of life focused on relations. In this sense, they are close to what Edgar Morin calls complex thinking[64]. Can science open itself to these knowledges to enrich itself instead of excluding them?

According to Nakata[65],

> *an important aspect of Indigenous knowledge that is overlooked in some definitions is that Indigenous Peoples hold collective rights and interests in their knowledge. This, along with the oral nature, the diversity of Indigenous knowledge systems and the fact that management of this knowledge involves rules regarding secrecy and sacredness, means that the issues surrounding ownership and therefore protection are quite different from those inscribed in Western institutions. It therefore complicates things for our conception of openness. Western concepts of intellectual property have for some time been recognized as inadequate.*

As Snively and Williams[66] note in their breakthrough book, *Knowing Home: Braiding Indigenous Science with Western Science*, "for Indigenous peoples, Indigenous Knowledge (Indigenous Science) is a gift. It cannot be simply bought and sold. Certain obligations are attached. The more something is shared, the greater becomes its value."

Canada has developed a set of principles that apply to all research involving Indigenous communities. The [principles of ownership, control, access and possession (OCAP)](#) of data from Indigenous communities means those communities have control of ancient ways of knowing, but also of new knowledge that is being shared in contemporary research settings.

Conversely, scholars from the Global South are fighting the invisibility of their scientific work within dominant science in order to put it at the service of their country's development[67]. Open access can become a powerful tool in that fight.

Urgency of openness to excluded knowledge

Why is it important for mainstream science to open itself to these excluded families of knowledge? It is not only a social justice fight, but an epistemological one to improve the quality of science. As sociology Professor Boaventura de Sousa Santos famously said, no social justice can happen without cognitive justice[68]. Feminist studies have clearly shown that knowledge based on alternative viewpoints has an immense advantage: it can understand both the dominant and the subalternized[69] perspectives, whereas the dominant knowledge sees only itself. Including more ways of knowing and understanding our common world within the great scientific conversation would enrich and diversify its collective ideas and creativity for the common good.

The concept of cognitive justice argues for the opening of science to all knowledges and epistemologies in a fruitful and respectful dialogue that presupposes the opening of science to something other than itself, its habits and rituals. Conceived by the Indian anthropologist Shiv Visvanathan[70], this concept has been recently developed by students and researchers from the [Open Science in Haiti and Africa network (SOHA)](#) to include the other two dimensions of openness discussed in this paper: open access and openness to society. For them,

> *Cognitive justice refers to an epistemological, ethical and political ideal aimed at the blossoming and free circulation of socially relevant knowledge everywhere on the planet, and not only in the countries of the North (which have the resources to develop science and heritage policies that suit them), within a science practicing an inclusive universalism, open to all knowledge and all epistemologies, and not an abstract universalism based on Western standards that exclude what is different from themselves. This ideal is of course opposed to the cognitive injustices that Santos[71] first defined by referring mainly to the knowledge destroyed or killed by the positivist scientific hegemony: the epistemicides[72].*

We need to acknowledge that the dominant knowledge practices and institutions have been structured and implemented in such a way as to simultaneously privilege certain epistemic situated values (such as universality, objectivity and truth) while being unjust or dismissive with regard to other, more relational and complex modes of knowledge[73].

We need to restore the knowledge that has been erased or silenced in the current system.

5. Key considerations for UNESCO, other institutions, and decision makers

Interestingly and sadly, these three dimensions of science openness—to publications and data, to society, and to excluded knowledges—are rarely considered together. In fact, they tend to be ignored by the proponents of one or the other.

For instance, many action-research or citizen-science scholars do not really check if their work is accessible to society, since many choose to publish in "prestigious" journals or costly books published by for-profit publishers that only people linked to a university can access. The same can be said for many decolonial thinkers, who published in paywalled journals, making it impossible for Indigenous People, non-academics or even researchers and students from the Global South to read their work.

Conversely, open access practitioners, most of whom are from the Global North, tend to ignore the plurality of knowledge or even the fact that some interesting and important knowledge could exist outside of mainstream science.

We strongly suggest that UNESCO's future Recommendation on Open Science include all three dimensions. The 13 considerations below[74] would nurture such a move.

Consideration 1

Governments, universities and research funders should support strategies and systems for the co-creation and sharing of knowledge that are co-designed for and with the communities they serve—especially communities that have been historically marginalized or excluded from determining their own knowledge needs and provision. The goal is to regain knowledge autonomy and self-governance.

Consideration 2

To encourage fairer, more diverse open access practices worldwide, governments, research funders and UNESCO should financially and institutionally support a wide range of actors—including non-anglophone, small, local and endogenous publishing initiatives that can build local communication capacities, or university libraries that decide to become publishers—rather than giving precedence and fiscal advantage to international, for-profit, unilingual publishing industries.

Consideration 3

Universities and researchers should provide opportunities for all students and community members to understand the multiple dimensions of open access, including the perils of a homogenized science and the advantages of bibliodiversity and ecology of knowledges.

Consideration 4

Research funders and related bodies should provide targeted funding for translation and open-access sharing of scientific works from Indigenous knowledge holders and Global South researchers, especially

from non–English-speaking countries. This would support the creation of a truly plurilingual scientific commons.

Consideration 5

Research funders and related bodies should demand that publicly funded journals diversify their boards to include more women, Indigenous scholars and scholars from the Global South, and diversify their language practices by providing at least abstracts in many languages.

Consideration 6

Research funders and related bodies should provide targeted funding for research collaboration between communities and universities as exemplified by Canada's many programs on partnership research.

Consideration 7

Higher education institutions should create courses and engaged learning spaces so all scholars-to-be can learn the principles of Open Science for and with communities, including community-based participatory action research, citizen-science approaches, and open-access–related issues. This would lead them to care about who can read their work.

Consideration 8

Universities should provide administrative infrastructure and resources to support community-university research partnerships that empower people of *all abilities* to make and use accessible, open-source technologies.

Consideration 9

All higher education institutions should teach works from the Global South and scientific approaches drawn from Indigenous ways of knowing. This would support the decolonization of knowledge.

Consideration 10

Higher education institutions should appoint scholars and knowledge-keepers from Indigenous or excluded groups, such as immigrants from the Global South.

Consideration 11

Higher education institutions should ask their professors to teach and cite scholars from Indigenous and other sidelined bodies of knowledge and to encourage students and researchers to quote works from women, the Global South and non-English works, using digital translation tools where available.

Consideration 12

UNESCO should help universities from the Global South offer better internet access and shared, community-governed digital infrastructure for their researchers and students.

Consideration 13

Higher education institutions and governments should abolish university rankings and evaluation based on criteria established by powerful institutions in the Global North and rethink the incentive and reward structure of research funding and evaluation so that it is more based on local relevance and participation.

Conclusion

Among other questions, the [online consultation on Open Science](#) conducted by UNESCO asked: "In your experience, are current Open Science practices beneficial for all the relevant stakeholders in your country? In your experience, are the current Open Science practices beneficial for the scientists and other relevant stakeholders in both developed and developing countries?"

We believe the answer to both of these questions is an emphatic "No." But there is much that can be done about it.

In this paper, we offer a vision of Open Science that is just, fair and decolonial, but also realist and lucid. We have drawn attention to an understanding of science based on an inclusive universalism, open to Indigenous ways of knowing and all other theories, epistemologies and viewpoints.

We call for science to be a dialogue between knowledges rather than a knowledge that exists only insofar as it silences or eliminates other knowledges. We call for science that is based on values of co-operation, sharing, friendship, compassion, understanding and refusal to separate personal life and values from research. Science can support cognitive justice and situations where everyone contributes knowledge, regardless of their country, social class, gender and language. We call for science as a pluriversal and plurilingual open space—a science that is with and for communities and where knowledge is open and empowering.

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[1] Little Bear, L. (2000). Jagged worldviews colliding. In M. Battiste (Ed.), *Reclaiming indigenous voice and vision* (pp. 77–85)*. UBC Press. Page 78.

[2] Our use of the plural form is significant, as is shown further down in the paper.

[3] We distinguish between 1) Indigenous knowledges, ways of knowing or epistemologies and 2) scholarly knowledge coming from marginalized groups within hegemonic western English-speaking science. The latter group includes women, minorities, Indigenous scholars, non-Anglophone scholars or scholars from the less advantaged countries in the Global South. We consider both as excluded knowledges, albeit not in the same way.

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³² Quet, M. (2009). *Politiques du savoir. Une approche communicationnelle des rapports entre sciences, technologies et participation en France (1968–1983)* [Doctoral dissertation, Ecole des Hautes Etudes en Sciences Sociales (EHESS)]. HAL Archives-ouvertes. https://core.ac.uk/download/pdf/52818734.pdf; Quet recalls that "In December 1969, SESPA activists demonstrated in Boston at the annual meeting of the American Association for the Advancement of Science (AAAS), chanting 'Science for the People'. They thus forged a formula that would make their fortune in the years that followed and mark the entry into the scientific sphere of a type of activism that was foreign to it."

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