Open Knowledge Primer for African Universities
Revised and Updated Edition

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Lisbeth Levey (levey180@gmail.com)

Cover photograph from Next Einstein Forum (https://nef.org/)

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Introduction

Open licensing, Open Educational Resources (OER) and Open Access came first. Now, increasingly, academics and researchers are making Open Science and Open Data integral to discussions about scholarly communication. Rather than segmenting them, many practitioners use the phrase "Open Knowledge." Much of this primer is focused on open access although open licensing, open science, and OER are also discussed. It is meant to complement work carried out at OER Africa on OER and IPR/copyright.[1] This primer is an updated and revised version of a primer that we published in 2019.

Librarians are especially important in any discussion of openness. They bring insights into the interrelationships among the components integral to open knowledge systems. The last section discusses the role of librarians in support of academics, researchers, students, and university leadership, although they are also mentioned throughout this primer.

Figure 1: Open Knowledge Systems
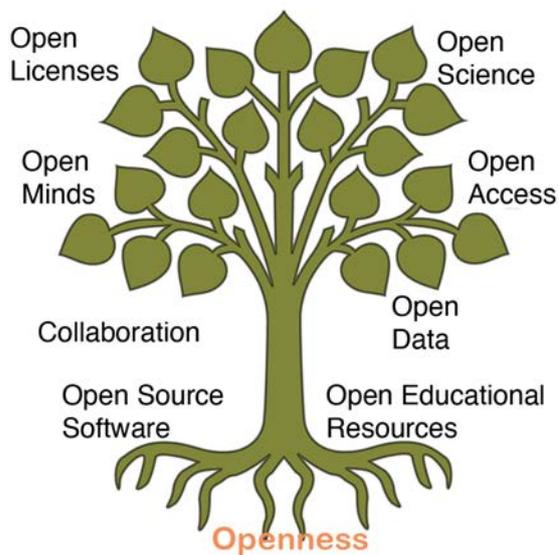
Openness is at the root level of the open knowledge tree at the left, all open content stems from this root.

This primer has six main sections:
- Open licensing and intellectual property rights
- Open science and Africa
- Open data and Africa
- Open access publishing
- African university repositories and policies
- Open knowledge and African librarians

These are followed by two appendices—one with an annotated list of major sub-Saharan African institutional repositories and one on further reading.

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[1] OER are teaching and learning materials that can be used and reused, without charge. Go to https://www.oerafrica.org/understanding-oer for more information. A number of OER Africa online learning tutorials can be found here: https://www.oerafrica.org/book/learning-pathways-open-education-online-tutorials

> This primer is meant to present the basic elements of open knowledge within an African context. It is quite detailed and might be best approached by reading the sections that are most relevant to you and then consulting the primer as additional issues arise.
>
> Please consult the table of contents so that you can go directly to the sections are most pertinent.

Open licensing and Intellectual Property Rights (IPR)

Open licensing underpins all components of open knowledge systems because it makes possible the free use, distribution, adaption, and translation of resources without requesting permission. Open licenses do not replace copyright; they revise 'all rights reserved' licences to 'some rights reserved'. Output can be online and/or offline. Some licenses only permit sharing, while others enable sharing and adaptation. Unless explicitly stated otherwise, all open licences require that the original work, author, and publisher be acknowledged. The Creative Commons (CC) licences[2] are the most widely used open licences in education and publishing.

CC has created a range of easy-to-use copyright licenses that offer a simple, standardized way to give people permission to share and use an author's creative work — within the usage restrictions of his or her choice. Open licences permit the copyright owner to determine the extent to which others are allowed to reuse material. They range from very permissive, allowing copying and modification (CC BY), to those that are more restrictive, permitting distribution of a work in its original form, but no modification (CC BY-ND).[3] Figure two, below, shows how a license moves from the most permissive to one that does not allow any modifications.

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[2] About the Licenses. (n.d.). Retrieved November 30, 2018, from https://creativecommons.org/licenses/
[3] Go to https://creativecommons.org/licenses/ for an explanation of the different licences.

Figure 2: Degrees of licensing[4]
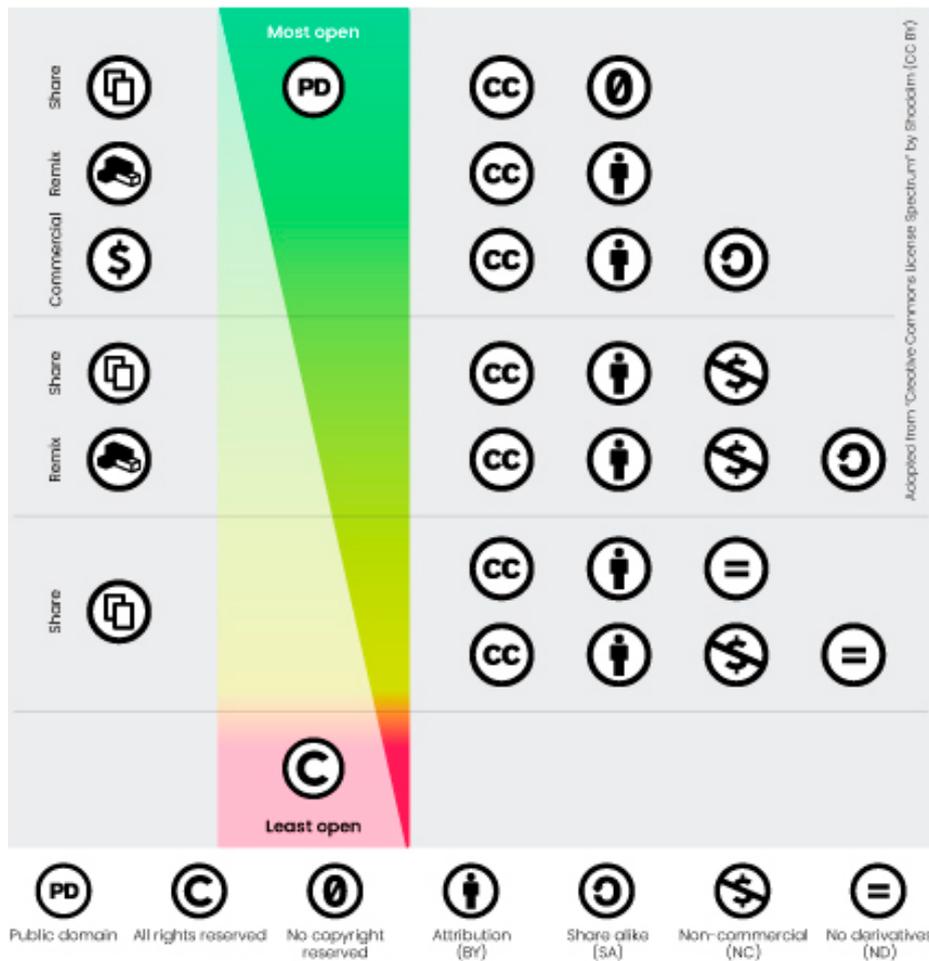
There are eight licences. Six build on the CC Attribution licence (CC BY), which allows users the most rights. All seven require that the content creator or publisher receive full credit for the work. The eighth covers only material in the public domain.

The licences are:
- Public domain (CC0) allows full sharing and adaptation, without attribution, either because the material is already in the public domain or because the author has waived all rights.
- Attribution (CC BY) allows sharing and adaptation for **any use**, including for commercial purposes.
- Attribution-share alike (CC BY-SA) allows the user the same rights, but content **must** be licensed under identical terms as the original CC resource.
- Attribution-non-commercial (CC BY-NC) gives the user the same rights as CC BY, but **not** for commercial purposes.
- Attribution-non-commercial-share alike (CC BY-NC-SA)
- Attribution-no derivatives (CC BY-ND) gives the user the right to distribute content, but **not** to alter it in any way.
- Attribution-non-commercial-no derivatives (CCY BY-NC-ND) gives the user the same rights as CC BY-ND, but **not** for commercial purposes.

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[4]Image adapted from https://commons.wikimedia.org/wiki/File:Creative_commons_license_spectrum.svg
by Shaddim (CC BY); original CC licence symbols by Creative Commons

Most open access journal articles carry a CC BY license, which means that they can be adapted. But they most often are available only in PDF format, which makes changes very difficult.

Open science and Africa

Wikipedia defines open science as:[5]
> the movement to make scientific research (including publications, data, physical samples, and software) and its dissemination accessible to all levels of society, amateur or professional. Open science is transparent and accessible knowledge that is shared and developed through collaborative networks. It encompasses practices such as publishing open research and campaigning for open access, …broader dissemination and engagement in science, and generally making it easier to publish, access and communicate scientific knowledge.

In 2019, the Academy of Science of South Africa completed a landscape study of open science in Africa, with open data as a subset of open science. The study was funded by the National Research Foundation of South Africa. The African Open Science Platform (AOSP) was established two years before, in 2017.[6] The Chair is Dr Heide Hackmann, Director of the Future Africa Institute, University of Pretoria. Members come from the scientific community around Africa. Recognizing the importance of librarians to open science, Dr. Helena Asamoah-Hassan, Executive Director of the African Library and Information Associations (AfLIA), is also a member.

The Association of African Universities (AAU) has been very active in promoting open science. It has organized workshops on open science in Egypt, Tanzania, and Senegal and webinars. AAU has also partnered with the Global Coalition of Open Science Services (SCOSS), which was founded in 2017. It is a network of organizations committed to helping secure open access and open science infrastructures.[7]

The African Academy of Sciences (AAS) has joined open science, open access, and open data through the Open Research Africa platform. The platform's goals are seen as:[8]
> All articles are published using a fully transparent, author-driven model; the authors are solely responsible for the content of their article. Invited peer review takes place openly after publication, and authors play a crucial role in ensuring that the article is peer-reviewed by independent experts in a timely manner. Articles that pass peer review will be indexed in multiple bibliographic databases.
>
> Open Research Africa is an open access research platform: all articles are published open access under a CC-BY license; the publishing and peer review processes are fully transparent and authors are asked to include detailed descriptions of methods and to provide full and easy access to the source data underlying the results in order to improve reproducibility.

The science is open because it is freely and publicly available. Articles must include a source data statement about in which repository data are housed and cited within the research. Open Research Africa has a detailed data fact sheet for researchers, including recommendations on data repositories.[9]

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[5] https://en.wikipedia.org/wiki/Open_science
[6] https://aosp.org.za/wp-content/uploads/2022/05/aosplandscape-12aug2019_compressed.pdf
[7] https://scoss.org/
[8] https://openresearchafrica.org/
[9] https://openresearchafrica.org/for-authors/data-guidelines

- Open science and colonialism

Open science may be open, but the questions are to whom and to what. Scientific research, including research about Africa, is primarily carried out by scholars in the global North. This is true for all science, but it seems an anomaly to discuss open science when it is not entirely open. In an interview for *Nature*, Evelyn Gitau, Director of research capacity at the African Population and Health Research Centre, Nairobi pointed to the lack of qualified scientists in Africa and insufficient support from governments and policy makers for African science.[10]

At a conference on reinventing higher education, organized by IE University based in Spain[11] and South Africa's University of Cape Town (UCT),[12] participants signed on to a charter to make African researchers equal players in the global scientific world. An article about the conference in *Africa World News* cited one of the speakers, who pointed to the subservience of African researchers to their Northern counterparts:[13]

> *Describing the research ecosystem that gives rise to the need for the charter, panellist Isabella Aboderin, director of PARC and Perivoli Chair in African Research and Partnerships, cited UNESCO World Science data statistics which show that more than 85% of research done in Africa is conducted in collaboration with the Global North, representing a "huge power imbalance" which underpins so much, if not most, of the research on the continent.*

The charter has been approved by the Association of African Universities,[14] the African Research Universities Alliance (ARUA),[15] the African Academy of Sciences,[16] the Council for the Development of Social Science Research in Africa (CODESRIA),[17] the Inter-University Council for East Africa (IUCEA),[18] the Association of West African Universities (AWAU),[19] the International Network for Higher Education in Africa (INHEA),[20] University of KwaZulu-Natal)[21] and the African Union Commission (AUC).[22] It will be formally launched in June 2023 in Accra, where AAU is headquartered.

Publishing, including open access publishing is equally disproportionately focused on and researchers from the global North, even when the research is about Africa.

The slant towards publishing in the global North in the health sciences is discussed in detail in the section on *Open access, visibility, and impact factors*. Generally, bias towards basic research and not applied problems is an issue in all journal publishing.

There is also a slant towards the North in terms of access and publishing. Most scientific journals are published in English. According to Pisana Ferrar, in a 2021 article, more than 90% of the indexed

[10] This article interviewed seven African scientists, both those living on the Continent and those elsewhere. Go to: https://media.nature.com/original/magazine-assets/d41586-019-02311-2/d41586-019-02311-2.pdf

[11] https://www.ie.edu/

[12] https://www.uct.ac.za/

[13] https://www.universityworldnews.com/post.php?story=20230315085144945&utm_source=newsletter&utm_medium=email&utm_campaign=AFNL0397

[14] https://aau.org/

[15] https://arua.org.za/

[16] https://www.aasciences.africa/

[17] https://codesria.org/

[18] https://www.iucea.org/

[19] https://awau.org/

[20] https://www.sareco.org/institution/inhea-international-network-for-higher-education-in-africa/

[21] https://ukzn.ac.za/

[22] https://au.int/en/commission

articles in the natural sciences are now published in English.[23] This fact is a disadvantage for both readers and authors for whom English is a foreign language.[24]

A 2023 UN conference on *Accelerating the Sustainable Development Goals, Democratising the Record of Science* devoted a section on open access publishing and its slant towards the North. In her presentation, Dr. Arianna Becerril García of the Autonomous University of the State of Mexico and Executive Director, Redalyc (Network of Scholarly Journals from Latin America, the Caribbean, Spain and Portugal), presented an infographic on the inequities of the science system, particularly in publishing:[25]

Figure 3: where is the Global South in the scientific enterprise?
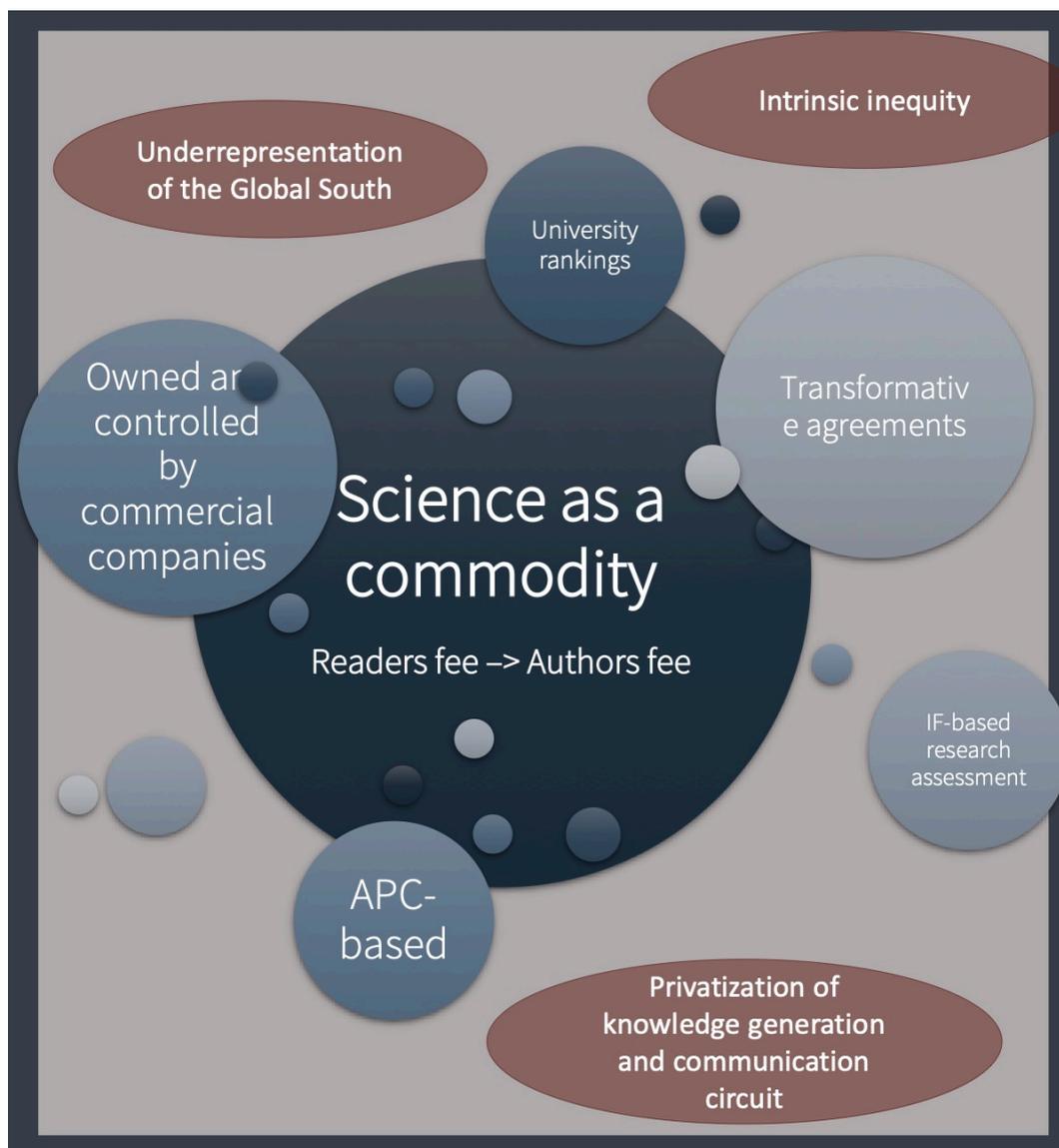
She pointed to lessons from Latin America in another slide, which could be a model for African open access journals and repositories.

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[23] https://www.capstan.be/today-more-than-90-of-the-indexed-articles-in-the-natural-sciences-are-published-in-english-that-wasnt-always-the-case/
[24] https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0238372
[25]https://www.un.org/sites/un2.un.org/files/keynote_arianna_becerril.pdf

Figure 4: Lessons from Latin America
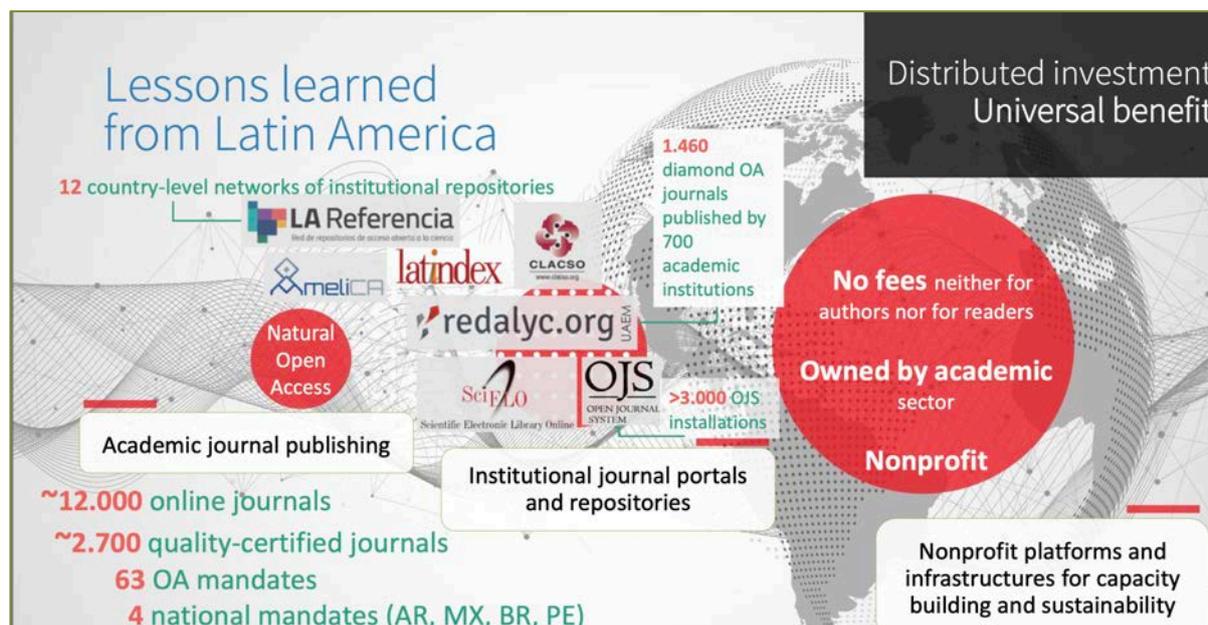
Other speakers discussed how to reform open access publishing for the public good. The UN has made available webinars for the speakers and links to some of the presentations.[26]

Open data and Africa

Open data is a relatively new concept, but its application is growing quickly. Open data means that users can make free use of data without requesting permission and without copyright or patent restrictions. The data is stored in a non-image, non-proprietary format, which allows manipulation. Open data is usually given an "Attribution and Share-Alike for Data/Databases' license.[27]

Availability of open data can streamline teaching, learning, and research, as well as promote transparency and accountability. In all instances, full attribution must be given. Researchers can protect sensitive data to protect confidentiality and anonymity, when necessary,[28] and is discussed in more detail below.

Many open-access journals require authors to make their data publicly available, sometimes by depositing them in an appropriate and approved data repository. In addition, the same donors that require grantees to publish in open-open access format, such as the Gates Foundation, are also likely to have rules about open data. As an author you can consult the journal in which you are publishing or the funder who is supporting your research. If you are interested in knowing more about data repositories, visit the Registry of Research Data Repositories at http://www.re3data.org/.

Some African governments and research organizations are also involved in promoting the open availability of data. Kenya established the first African governmental open data portal in 2011.[29] The African Development Bank Group maintains a portal for data, statistics, and visualizations for

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[26] https://www.un.org/en/library/OS23
[27] https://opendatacommons.org/licenses/odbl/index.html
[28] Go to the *Open Data Handbook* for more information on the legal, social, and technical aspects of open data: http://opendatahandbook.org/en/index.html.
[29] https://kenya.opendataforafrica.org/

the continent.[30] The African Academy of Sciences (AAS), mentioned above, is a partner in the Open Research Africa platform for scientists who receive support from the AAS to mount their research results, including data. Open Research Africa also provides guidance on privacy issues:[31]

> *All articles in Open Research Africa that report original results should include the source data underlying the results, together with details of any software used to process the results. It is essential that others can see the source data in order to be able to replicate the study and analyse the data, as well as in some circumstances, reuse it. Failure to provide the source data for publication without good justification is likely to result in the article being rejected… We recognize that there may be cases where openly sharing data may not be feasible (because of ethical or security considerations, or data protection issues). If you think that this applies to your article, please let the editorial team know at the submission stage, as we have policies in place to allow the publication of papers associated with such data, whilst maintaining the appropriate level of security.*

Sharing research data openly and freely can depend on the type of data that is to be shared. The International Institute for Tropical Agriculture (IITA), which is headquartered in Nigeria, has an open data and information policy that sets out the requirements of scientists who conduct research on behalf of IITA.[32] This policy conforms to the policy of the Consultative Group on International Agricultural Research (CGIAR) and all of its member centres around the world.

Research data obtained by some organisations, can be sensitive, even though they are anonymized. Research Africa, for example, includes a statement on sensitive data and ethical considerations, as does the Gates Foundation. *PLOS One* requires authors to deposit their data in open repositories except when there are extenuating legal or ethical circumstances:[33]

> *PLOS journals require authors to make all data underlying the findings described in their manuscript fully available without restriction at the time of publication. When specific legal or ethical requirements prohibit public sharing of a dataset, authors must indicate how researchers may obtain access to the data.*

The African Population Health Research Consortium (APHRC) in Nairobi, Kenya collects data in population and reproductive health. APHRC believes in freely sharing data, but because of the subject matter, it will only do so upon request. The APHRC data sharing statement includes the following text:[34]

> *Cognizant that data is the primary resource for generation of knowledge and evidence to promote scientific, policy and program discourses on development issues, APHRC adheres to the principle that data should be made available to all **authorized** [emphasis mine] users in a timely manner and in the most user-friendly formats. Also, the Centre subscribes to the Code of Conduct for the collection, analysis and sharing of health-related research data which recognizes health data as a public good.*

APHRC's desire to vet researchers who want to access to its data because of sensitivity and ethical considerations can coexist with open data requirements. The key is the last sentence in the PLOS policy, which is like the policies of other organizations. Authors are permitted to restrict access in certain circumstances, which is what the authors in the article figure five below were allowed to do.

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[30] http://opendataforafrica.org/
[31] https://openresearchafrica.org/about/policies/ - dataavail
[32] https://www.iita.org/wp-content/uploads/2018/01/IITA-DATA-AND-INFORMATION-MANAGEMENT-POLICY.pdf
[33] https://journals.plos.org/plosone/s/data-availability
[34] http://microdataportal.aphrc.org/index.php/why-sharing-data

Figure 5: APHRC data sharing statement on PLOS One

🔓 OPEN ACCESS

Citation: Doyle AM, Floyd S, Baisley K, Orindi B, Kwaro D, Mthiyane TN, et al. (2018) Who are the male sexual partners of adolescent girls and young women? Comparative analysis of population data in three settings prior to DREAMS roll-out. PLoS ONE 13(9): e0198783. https://doi.org/10.1371/journal.pone.0198783

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Data Availability Statement: The de-identified individual datasets used in this analysis are easily and widely accessible, through a suite of datasets and accompanying documentation. Africa Health Research Institute data are available at: https://data.africacentre.ac.za/index.php/home. APHRC and KEMRI data are available in the Supporting Information files.

Funding: Africa Health Research Institute is supported by a grant from the Wellcome Trust

Box 2: The role of African libraries in open data

African libraries have an important role in open data. They must understand how data and open repositories fit into research, teaching, and learning. Librarians must also manage the data in their libraries, and the data should be open.

AfLIA has started introducing African librarians to linked data through Wikidata. It has received a grant from the Wikimedia Foundation to design and run training for librarians in English and in French. Getting theses and dissertations on the platform is the next step once they are done with introducing the basic skills to librarians in an ongoing course.[35]

Open access publishing

- ## Definition and relevance to Africa

Open access typically refers to the publication of research results in journals, books, case studies, and other scholarly materials. The term was coined at a meeting convened by the Open Society Institute in Budapest in 2002, which resulted in the founding of the Budapest Open Access Initiative

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[35] https://web.aflia.net/aflia-receives-a-grant-for-promoting-open-knowledge-practices-in-african-libraries-through-wikidata/ and https://training.aflia.net/course/index.php?categoryid=13&lang=pt

(BOAI). The BOAI definition of open access in 2002 was further refined in 2012 and is widely used today:[36]

> By "open access" to this literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited.

Open access is compatible with copyright, peer review, prestige, quality, and indexing. Most open access journals have clear policy statements on plagiarism, which will be discussed in more detail below. Open access licences do not replace copyright; they supplement it. Copyright reserves all rights; open licensing permits users to utilize content, depending on the restrictions, if any, that content creators put on the licence. **These principles are the same as those for Creative Commons.**

Research has demonstrated that open access brings increased visibility, usage, and impact to the work of academics, researchers, and students. In 2014, the European branch of the Scholarly Publishing and Academic Resources Coalition (SPARC) enumerated how open access benefits different stakeholder communities—authors, researchers, students, universities, libraries, and others.[37]SPARC also provides information on the citation advantage of open access publishing.[38] It is an important organization because it represents the interests of national libraries, library consortia, and universities in the United States and in Europe. SPARC also has an Africa branch, which is headquartered at AfLIA, which is headquartered in Accra, and has branches, with institutional and individual members throughout the Continent.[39]

Universities worldwide have cut back on journal subscriptions because the costs have become overwhelming. Price increases are usually higher than inflation costs. But in Africa, where budgets are far smaller, the relative burden may be even greater. Most African universities and research institutions can read journals online at no charge through several international organizations. These include the Food and Agriculture Organization's AGORA for agriculture,[40] the World Health Organization's HINARI for health,[41] the UN Environmental Program's OARE for the environmental sciences[42]and the e-journals delivery service for physical and mathematical sciences organized by the International Centre for Theoretical Physics.[43] These services will not last forever, however, and the journals are expensive.[44]

In addition, like library systems elsewhere in the world, some African countries have established academic library consortia. With start-up assistance from Electronic Information for Libraries (EIFL)[45]

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[36]https://en.wikipedia.org/wiki/Budapest_Open_Access_Initiative

[37]https://sparceurope.org/what-we-do/open-access/oa-benefits/.

[38]https://sparceurope.org/what-we-do/open-access/sparc-europe-open-access-resources/open-access-citation-advantage-service-oaca/

[39]https://web.aflia.net/

[40]https://agora.research4life.org/

[41]https://portal.research4life.org/content/hinari

[42]http://www.teeal.org

[43]http://ejds.ictp.it/ejds/

[44] Unfortunately, there is no equivalent program for the social sciences and humanities. But JSTOR (Journal Storage Online Repository) does offer free subscriptions to African not-for-profit institutions, including universities. For more information about the African Access Initiative, go to https://about.jstor.org/librarians/fees/jai/.

[45]https://www.eifl.net/

and the International Network for the Availability of Scientific Publications (INASP),[46] these consortia can obtain journals at reduced cost. In Uganda, for example, university libraries that belong to the Consortium of Uganda University Libraries (COUL) can access a range of scholarly and scientific publications.[47] Journal bundles can go up in price from year to year, however. In its article on "Big Deal Cancellation tracking, SPARC reports that:[48]

> *Publishers have often raised the price of the packages by 5-15%, far outpacing library budgets. This has been justified, in part, by the addition of a growing number of specialized journal titles, launched in quick succession. Libraries have found a growing chunk of their budgets allocated to servicing these big deals, as well as their ability to curate resources and build collections most appropriate for their communities severely hampered.*

The SPARC article lists negotiations and cancellations for the last several years in North America and in Europe. If publishers are raising package prices in these regions, it is reasonable to expect that costs will also go up in Africa when current contracts come to an end.

The open access model can benefit African universities, libraries, academics, and students just as much as it helps them elsewhere in the world. Open access is revolutionizing the traditional subscription-based publishing system. Moreover, if access to quality research information worldwide is important, so is the need to ensure that Africa's research output reaches the scientific community globally. Open access to Africa's research results can demonstrate that African scholars and students are significant producers of knowledge and not just consumers of it.

- Free *versus* openly licensed

Just because a resource is freely available for downloading on the Internet, it does not mean that it is open access. Openly licensed resources **must** have an appropriate license; otherwise, it is not legal to use the content. These licenses protect authors and publishers because they lay out the legal terms under which content may be used. Georgetown University in the United States wrote about the problem as follows:[49]

> *Pirate sites often refer to themselves as "open access." While in a literal sense, they are opening access to copyrighted works, they are not "Open Access" within the meaning of that term by scholarly publishers, researchers, scholars, and librarians. Scholarly OA is a well-established method of making scholarly works freely available to all readers worldwide without paywalls and operates completely within the scope of copyright law. There are some significant obstacles to widespread adoption of the OA model, such as article processing charges that authors (or their funders) must pay that are often thousands of dollars.*

There are also pirate sites that seek to get around paywalled copyright protected journal literature and make scientific articles freely available. Sci-Hub,[50] founded by Alexandra Elbakyan, might be the most notorious of these sites, but it is not the only one. Elbakyan founded Sci-Hub in 2017, with a focus on the biomedical sciences. There are now over 88 million documents in the database. Elbakyan has been sued numerous times by journal publishers and has moved her website frequently. Her database is now available through torrents.[51]

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[46] https://www.inasp.info/
[47] https://cuul.or.ug/index.php/menu-styles/electronic-databases/e-resources-a-z
[48] https://sparcopen.org/our-work/big-deal-cancellation-tracking/
[49] https://library.georgetown.edu/scholarly-communication/online-piracy-open-access
[50] https://sci-hub.se/alexandra
[51] https://sci-hub.se/database

Sci-hub's argument about the legality of its server is as follows:[52]

> *Sci-Hub has been hit by many lawsuits from academic publishing companies. They insist that Sci-Hub is not legal and accuse Sci-Hub of copyright violation or piracy. As the result of lawsuits access to Sci-Hub is being blocked in some countries. The position of Sci-Hub is: **the project is legal, while restricting access to information and knowledge is not**. The current operation of academic publishing industry is [a] massive violation of human rights.*

It will be interesting to see how the move to true open access publishing and Plan S (discussed below) will impact on Sci-Hub and other pirating services.

- ## Basic facts on open access journals and Africa

In 2015, UNESCO reported that the number of African journals employing open access models is growing.[53] African Journals Online (AJOL)[54] maintains a database of 523 African peer reviewed journals, 256 of them open access. But not all the AJOL journals are current or even still publishing. Another option is to look for African journals in the Directory of Open Access Journals (DOAJ).[55]

South African journals represent the bulk of those published in Africa (100 journals as opposed to 29 for the rest of Africa).[56] The figure below gives data on the number of journals included in DOAJ; the number of languages they are in; the countries represented; the number of journals that do not charge Author Processing Charges (APC), and the total number of journal articles overall.

Figure 6: DOAJ journal breakdown

80 LANGUAGES	131 COUNTRIES REPRESENTED	13,108 JOURNALS WITHOUT APCs	19,168 JOURNALS	8,738,207 ARTICLE RECORDS

DOAJ has high standards. Journals must publish five research articles per year; new journals must have already published ten research articles. Journals must have:
- Its own dedicated URL and homepage, which is accessible from any location.
- The website must be clear and easy to navigate.
- It should adhere to the guidelines described in the Principles of Transparency and Best Practice in Scholarly Publishing.
- Each article must be available as an individual, full-text article.
  - o   one unique URL per article
  - o   HTML or PDF, as a minimum
- Journals that include intrusive advertising will not be accepted.
- DOAJ does not approve of the use of impact factors but does permit those created by Clarivate.
- The website does not need to be in English. If the site is available in multiple languages the information provided must be the same in all languages.

The journal webpage must include the following information:
- Open access policy.

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[52] https://sci-hub.se/about
[53] https://unesdoc.unesco.org/ark:/48223/pf0000232207
[54] https://www.ajol.info
[55] https://doaj.org
[56] https://blog.doaj.org/2020/05/11/whats-in-a-name-a-study-of-african-and-arab-journals-in-the-doaj/

- Aims and scope of journal.
- Editorial board (including institutional affiliations of all members).
- Instructions for authors.
- Editorial process (peer review).
- Licensing terms.
- Copyright terms.
- Author charges:
  - If a journal doesn't have any charges, then this must be stated.
  - Must include all fees that may be charged to the author, from submission to publication, including:
    - submission fees
    - editorial processing charges
    - article processing charges (APCs)
    - page charges
    - colour charges
- Contact details
  - The contact details must include a contact name and the journal's dedicated email address.
  - The country in the application and on the journal website must be the country where the publisher is registered and carries out its business activities.

There are equally detailed instructions about the journal's ISSN, the peer review process, etc. Only journals that meet the DOAJ specifications are included in the database.[57]

Some African journals are established by groups of collaborating organizations. The *East African Journal of Science, Technology and Innovation* (EAJSTI),[58] for example, represents a cooperative effort by the six member states of the East African Community (Burundi, Kenya, Rwanda, South Sudan, Tanzania, and Uganda),[59] the Inter-University Council for East Africa,[60] and the Nelson Mandela African Institute of Science and Technology of Tanzania.[61] The journal is funded by the African Development Bank, while the East African Science and Technology Commission (EASTECO) is the publisher.[62] Volume four, issue two was released in March 2023.

Below is a small sampling of selected peer reviewed African journals in a range of disciplines, including information on where the journals are indexed and abstracted. All of them are covered by Google Scholar. It is thus possible to identify journals, articles, citations, and whether full text is available.

Table 1: Examples of African open access journals

Journal	Comments
African Crop Science Journal http://www.bioline.org.br/cs	*The African Crop Science Journal* is a quarterly publication, which publishes original research on all aspects of crop agronomy, production; genetics and breeding; germplasm; crop protection; post-harvest systems and utilization; agroforestry; crop-animal interactions; information science; environmental science; and

[57] https://doaj.org/apply/guide/
[58] http://www.eajsti.org/index.php/EAJSTI
[59] https://www.eac.int
[60] https://www.iucea.org/
[61] https://www.nm-aist.ac.tz/
[62] https://www.universityworldnews.com/post.php?story=20190409072943942

Journal	Comments
	soil science. The journal is bilingual, publishing in both English and French. The *African Crop Science Journal* is indexed in both CAB International and TROPAG & RURAL.
African Health Sciences https://africanhealthsciences.org	*African Health Sciences* is a quarterly journal published by Makerere University in Kampala, Uganda. It is an open access, free online, internationally refereed journal publishing original articles on research, clinical practice, public health, policy, planning, implementation, and evaluation in the health and related sciences relevant to Africa and the tropics. *African Health Sciences* is indexed in *Medline,* which is maintained by the US Library of Medicine, and the *Web of Science*.
African Journal of Food, Agriculture, Nutrition, and Development http://www.ajfand.net	The *African Journal of Food, Agriculture, Nutrition, and Development* is published in Kenya by the Africa Scholarly Science Communications Trust (ASSCAT). "AJFAND envisions a world where information on Food, Agriculture, Nutrition and Development is contributed and shared honestly, respectfully, equally and impartially, a world in which the AJFAND supports all those who would like to contribute to knowledge building in the South as well as in the North. A key guiding principle of AJFAND is that no culture has a monopoly of knowledge."[63] The journal is indexed in SCOPUS, Food, Science, and Technology Abstracts, CAB International, etc.[64]
Pan African Medical Journal http://www.panafrican-med-journal.com	The *Pan African Medical Journal* is a publication of the PAMJ-Center for Public Health Research and Information, which is in Nairobi, Kenya. There is a second office in Cameroon and additional contacts in Senegal, South Africa, and Uganda. The journal publishes original scientific studies, reviews and comments on current health initiatives, project and work reports, personal experiences, educational articles, and papers commenting on clinical, social, political, economic, and other factors affecting health. The *Pan African Medical Journal* is indexed in Medline, index Copernicus, Scopus, and Embase.
Scientific African https://www.journals.elsevier.com/scientific-african	*Scientific African* is published by the Next Einstein Forum, an affiliate of the African Mathematical Institute. It "is dedicated to expanding access to African research, increasing intra-African scientific collaboration, and building academic research capacity in Africa. The journal aims to provide a modern, highly visible

[63]https://www.ajfand.net/AJFAND/aboutAJFAND.html
[64] Go to http://www.ajfand.net/AJFAND/qualityassurance.html#Indexing for a full list.

Journal	Comments
	platform for publishing pan-African research and welcomes submissions from all scientific disciplines."[65]
	The journal is mounted on the Elsevier platform, where authors are also encouraged to share their data. *Scientific African* began publication in November 2018 and is not yet included in any of the major indexing and abstracting services.
South African Journal of Chemistry http://www.scielo.org.za/scielo.php?script=sci_serial&pid=0379-4350	The *South African Journal of Chemistry* is published by the South African Chemical Institute. The journal publishes original theoretical and applied research in molecular, organic, inorganic, and analytic chemistry. It covers general matters affecting the environment, industry, and research.
	The *South African Journal of Chemistry* is indexed in Chemical Abstracts Service (CAS), Current Web Contents, Chemistry Citation Index, Index to Scientific Reviews, and Speleological Abstracts.

- Subscription based *versus* open access licensing models

Subscription-based journals rely on individual or institutional subscriptions and advertising for income, including editorial and production costs. Many of these journals have a policy to embargo articles for six months to a year from the date of publication. Afterwards, the articles are freely available, but they do not fall within the open access classification.

Online open access journals, however, are free to access, with no subscription necessary. Even so, they have the same costs as do traditional subscription-based journals (apart from print and distribution costs). Open access journals, for the most part, rely on Article Processing Charges (APC) charges. The APC varies from journal to journal. At the high end of the spectrum, open access articles in *Nature* cost €9,750 / $11,690 / £8,490.[66] Many journals with high impact figures have equally high APS's. *Nature* and its family of journals now no longer charge African researchers an APC open access fee for accepted articles.[67]

Some open access journals do not require an APC fee. Some journals have very low APC's. Every DOAJ entry provides information on whether there is an APC charge and, if there is, what it costs.

In many instances, the donor who paid for the research or the institution where the researcher works will cover APC costs. In South Africa, for example, both the University of Pretoria and the University of Cape Town will pay a portion of the author's fee if the open access journal is on Department of Higher Education and Training's list of accredited journals.[68]

Some subscription-based journals permit authors to publish their articles in an open access format for a special fee. These are referred to as "hybrid" journals. The *Journal of African Economies*, which is published by Oxford University Press, is an example of a hybrid journal. Oxford University Press charges authors between £1000 and £2500, depending on the journal title to publish their

[65] https://www.journals.elsevier.com/scientific-african
[66] https://www.nature.com/nature/for-authors/publishing-options
[67] https://www.nature.com/articles/d44148-023-00006-5
[68] The DHET list of accredited journals will be found here: https://library.up.ac.za/journalsaccredited

article as open access, with a Creative Commons license. But African authors can receive a partial or full waiver.[69]

With the introduction of Plan S, discussed below, there are now four subscription models. They are subscription only, open access entirely, hybrid, and transformative journals. The aim of transformative journals is to switch publishers from subscription or hybrid models of publishing to fully open access.[70]

Table 2: Academic journal financial models and revenue source

Type of Journal	Explanation
Subscription-model journals	The reader or advertiser pays—Authors transfer copyright and rights to the publisher. This means that both authors and readers must abide by the publisher's typically restrictive terms and conditions.
Hybrid journals	Some subscription-based journal publishers allow authors to select an open access publishing option for a fee. The author retains copyright. The publisher derives additional income, through subscriptions and the author's APC
Open access journals	The author usually pays an APC and retains copyright. Some commercial publishers, such as Elsevier, now publish open access journals in addition to their regular subscription-based journals.
Transformative journals	Transformative journals are subscription or hybrid journals that have committed to switch to fully open access in conformance with the Plan S requirements.

Whatever model they choose, publishers must cover their editorial and administrative costs. Editorial costs can include peer review, design and layout, copy editing, and proofreading.[71]

Major ways in which subscription-model journals earn revenue include subscriptions (individual and institutional), advertising, and from sales of reprints to non-subscribers. Some publishers may also sponsor conferences, which earn revenue from both registration fees and sale of exhibit space.

As discussed above, open access publishers charge authors. In addition, some journals have received donor start-up support. For example, in 2002, the Public Library of Science (PLOS) received a $9 million grant for initial costs from the Gordon and Betty Moore Foundation. This grant was followed by a $1 million grant from the same foundation in 2006, "to help PLOS achieve financial sustainability and launch new free-access biomedical journals."[72]

Publishers of subscription-model journals own the rights to the articles they publish, including whether authors are allowed to place their work in an online repository. But some journals, such as *Crop Science*, will permit authors to place a pre-print or some other version of their article in a

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[69] Go to http://www.oxfordjournals.org/en/access-purchase/rights-and-permissions.html for information on OUP and open access. There are links on this page to information on charges and waivers.
[70] See the 2021 *Springer Nature* infographic on transformative journals at https://resource-cms.springernature.com/springer-cms/rest/v1/content/17978516/data/v9
[71] See *Open access scholarly journals: A new business model* for a table comparing conventional to open access models of publishing, https://guides-formadoct.u-bretagneloire.fr/c.php?g=654641&p=4598876.
[72] https://en.wikipedia.org/wiki/PLOS

personal or institutional repository. This would include university repositories or discipline-specific repositories, such as in the one maintained by the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM).[73] Author rights are discussed in more detail below.

- Open access and plagiarism

To be clear—anything on the Internet can be copied. Copyright does not protect against plagiarism or piracy. Think of the bootleg movies and music that are available online and on the street in almost every country of the world. Books and other written materials can be pirated in their entirety or partially copied in bits by students, teachers, researchers, and others who have no respect for the intellectual efforts of their colleagues. Open access resources are no more immune than those that are protected by copyright, meaning that they can be both plagiarized and pirated.

Online publication, however, makes it easier to detect plagiarism. In a 2016 article in the *African Journal of Library, Archives and Information Science*, Dennis N. Ocholla and Lyudmila Ochollawrote:[74]
> *The advantages of ease of access to and use of web-based information resources in the scholarly environment can be levelled by its disadvantages, in particular, the ease with which these same tools can be used to plagiarize, e.g. 'copy and paste' tool. However, while this scholarly challenge could be concealed in the 'print only' publishing environment for centuries, largely without noticing, the detection of plagiarism is becoming easier in the e-publishing environment. Yet even in the electronic publishing environment, such detection can be time consuming and costly if e-records are not placed in an Open Access (OA) environment where they rapidly appear in the public domain upon publication.*

The authors go on to discuss the benefits of plagiarism detection software, such as *Turnitin*.[75] Although Turnitin, which is widely used in educational systems, and *iThenticate*,[76] which is aimed at journal publishers, are sold, there are also free plagiarism checkers available. Google Scholar, for example, offers a free plagiarism checker.[77]

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[73]http://repository.ruforum.org
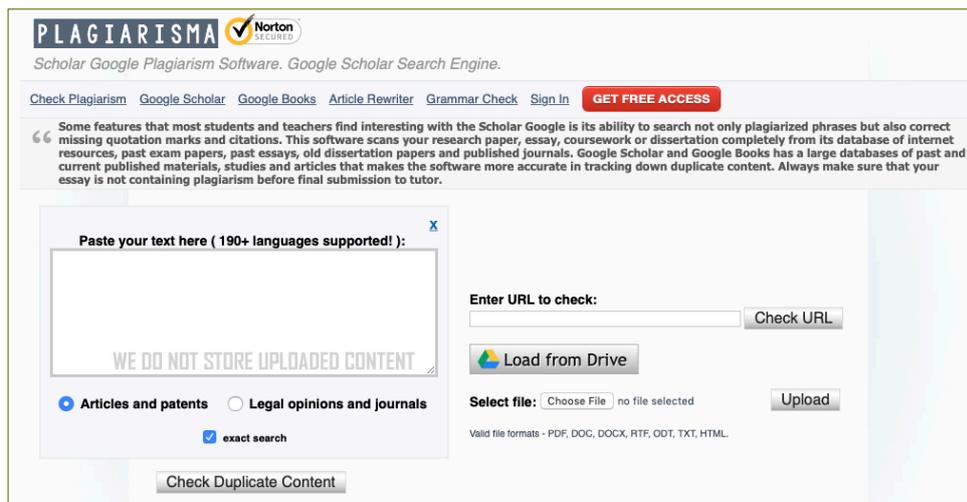[74]Dennis N. Ocholla and Lyudmila Ocholla, "Does Open Access Prevent Plagiarism in Higher Education?,"*African Journal of Library, Archives and Information Science*, https://www.researchgate.net/publication/311707987_Does_Open_Access_Prevent_Plagiarism_in_Higher_Education
[75]https://www.turnitin.com
[76]http://www.ithenticate.com
[77]http://plagiarisma.net/scholar.php

- ## Open access journals and peer review

Quality peer review is an essential component of all academic publishing.[78] Some critics of open access journals claim that they lack rigorous peer review, which they state is not the case for subscription-model top-tier journals. The truth is somewhere in between; sometimes even the most prestigious journals slip up on peer review. *Retraction Watch*, a website maintained by two US scientists, maintains a list of prestigious publishers that have been forced to retract articles because of plagiarism, faulty data, and other forms of scientific misconduct.[79] Peer review should have caught these errors but did not. Many open access journals employ an excellent peer review process; others do not. As is the case for all sources of information, authors must conduct due diligence in selecting an appropriate journal in which to publish. Additionally, readers must evaluate the source when reading any journal article, regardless of the licensing status.

- ## Publisher policies and author rights

The open access movement started when some scholars and scientists began to protest over signing away author rights to a journal publisher. Why should a commercial publisher own the fruits of their labor, they asked. They wanted to circulate their research as widely as possible, including the possibility to deposit copies of their research in a personal or institutional archive. Subscription-model journal publishers will make the articles they publish available on their websites, of course. But these journals charge a fee for non-subscriber access during the initial embargo period. Even so, as stated above, subscription-model publishers frequently permit authors to mount a version of their articles on personal or institutional websites. Open access permits authors to circulate their research results wherever and however they like (within the confines of the publisher's CC license).

Open access publishing is often categorized by color. At this date there are five:

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[78] See "The bane of publishing a research article in international journals by African researchers, the peer-review process and the contentious issue of predatory journals: a commentary" in the *Pan-African Medical Journal* for a discussion of how peer review impacts African medical researchers. Go to:
http://www.panafrican-med-journal.com/content/article/32/119/full/
[79] https://retractionwatch.com

Table 3: The colours of open access publishing[80]

Color	Archiving Policy
Green	Also known as self-archiving and repository-based open access. Authors who choose to publish under green open access have the ability to archive earlier versions (pre-print) and more final versions (post-print or the publisher's version) of their manuscript on a website or repository controlled by them and/or their funder, or on an independent repository.
Blue	Through blue open access, authors can archive the post-print or the publisher's final version/PDF.
Yellow	Authors who publish under yellow open access can archive a pre-print version of their work (ex: any version published before the widespread publication ofthe work).
White	Under white open access, authors are not able to archive their work (any versions), including pre-print, post-print, or the publisher's version.
Gold	Gold open access is the most common form of open access publishing and used by most, including IGI Global. Under gold open access, the author, institution, or research funder pays an open access fee (an Article Processing Charge (APC), Chapter Processing Charge (CPC), or a Book Processing Charge (BPC)) and the publisher makes the published version free to read. The Open Access Fees help to offset the costs of producing the work that would typically be supported by sales/subscriptions for the publication.

How is it possible to determine a journal's policies pertaining to archiving and licensing? SHERPA/RoMEO[81] in the UK maintains a website on publisher copyright policies and self-archiving. It uses four colors, as shown above, to categorize publisher policies, and this color sequence is now widely used when discussing different licensing arrangements. Green is the most permissive, while white is the most restrictive. Authors should aim for green or gold and never settle for white if they are interested in maximizing their visibility. SHERPA/RoMEO will also give users information on a journal's licensing status, when it is available. The screen capture below is an example of a SHERPA/RoMEO journal record.

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[80] Definitions by IGI Global Publishing at https://www.igi-global.com/newsroom/archive/guide-understanding-colors-open-access/4925/
[81]http://www.sherpa.ac.uk/romeo/index.php?la=en&fIDnum=|&mode=simple

Figure 8: SHERPA/RoMEO record for East African Journal of Swahili Studies[82]

🗎 OA Publishing	This pathway includes Open Access publishing
⧗ Embargo	No Embargo
🗝 Licence	CC BY 4.0
© Copyright Owner	Authors
🗁 Location	Any Website
	Named Repository (PubMed Central, ArXiv)
	Journal Website
☰ Conditions	Must link to publisher version with DOI
	Published source should be cited
	Must cite the authors of the original work

The East African Journal of Swahili Studies is published by the East African Nature and Science Organization and carries a CC BY license. Most articles are in Kiswahili.[83]

Authors should also check the publisher's website to ascertain open access and archiving information. When in doubt, authors can always write the publisher. Authors require answers to the following:

- What are the journal's copyright policies?
- If the journal is fully copyrighted, does the publisher offer an open access option?
- If so, how much does it cost and is there a discount for developing-country authors?
- Is the author permitted to deposit a version of his or her article in a repository?
- If so, which version and what are the conditions?
- Is there an embargo period before the journal article is free to all? (usually 12 months.)
- Is the journal archived in perpetuity?

In addition, check the DOAJ list of journal requirements discussed above.

Moreover, many publishers now publish both subscription-based/copyright protected journals and open access journals. This is true of the Nature Publishing Group, Elsevier, and the American Physical Society, to name just three. This has been done in part to make it easier to conform to new funder open access guidelines, although many funders are now switching to Plan S requirements. Authors will find these journals in SHERPA/RoMEO, as well.

- Not all open access publishers produce high-quality journals

Although many publishers of open access journals are legitimate, there are shoddy publishers everywhere. Some publishers of open access journals appear to be particularly unscrupulous and have come in for a good deal of criticism from librarians and scientists. These publishers are attempting to profit from the open access movement. The fees they charge authors are high; the

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[82]https://v2.sherpa.ac.uk/id/publication/38978?template=romeo
[83]https://journals.eanso.org/index.php/eajss

peer review and editing they provide are almost non-existent; and they do not check submissions for plagiarism. As an example, in April 2019, Omics International in India was fined $50 million by the US Federal Trade Commission for deceptive business practices.[84]

Jeffrey Beall, a US university librarian, called them "predatory journals," and the term stuck.[85]The journal *Nature* has also published on "the dark side of publishing."[86] As a further source of information on shoddy open access publishing, Monica Berger and Jill Cirasella, two academic librarians, analyzed the predatory publisher phenomenon, how to avoid falling into the clutches of one, and the importance of librarians in evaluating journals.[87] Many commentators now refer to these kinds of journals as deceptive journals.

There are several ways that authors can seek to mitigate the risk of selecting an unreliable open-access journal, with the goal of choosing the best one for the research in question. The bullets below provide a "due diligence" checklist.

- Use the Directory of Open Access Journals (DOAJ).[88] DOAJ has tough procedures for accepting journals.[89] You can use DOAJ to search by journal title or by subject.
- Many universities encourage academics to publish in open access journals. Ascertain whether your institution does so and whether it helps in covering author charges.
- Be wary of journal publishers who email you to solicit an article, particularly if you are not familiar with the journal title.
- Be wary of any journal title that does not give full contact information, including address.
- Ensure that the editorial board is composed of experts in the field. You may want to write one or two of them to ascertain whether they are really on the editorial board.
- The journal should prominently display on its web site author fees and its peer review process.
- Carefully read the author guidelines. If there are none, this might not be a journal in which you want to publish.
- Journals typically list the indexing and abstracting databases in which they are included. Check to ensure that this is the case. Some journals falsely claim to be included in legitimate indexing and abstracting services. Although full access to commercial indexing and abstracting services requires a subscription, it is possible to check whether the journal is covered in the service's list of included publications.
- Ascertain that the journal publishes regularly, and that the publication schedule meets your needs. Some journals have faster review and editorial processes than others. But beware of journals that promise too fast a turnaround time for peer review and acceptance. Unfortunately, there is no standard. You can check other journals in your discipline to ascertain how long the process takes.
- Read a few articles to ascertain their quality and check to see whether those articles are indexed in the most relevant citation and abstracting services. These include Scopus, CAB International, EconLit, ERIC, PubMed, and the Web of Science.
- Talk with your supervisor after you speak with colleagues. Ask whether they are familiar with the journal.

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[84]https://www.nytimes.com/2019/04/03/science/predatory-journals-ftc-omics.html

[85] Although Beall no longer writes on this issue, it is possible to find his criteria on how to determine predatory journals at https://beallslist.weebly.com/uploads/3/0/9/5/30958339/criteria-2015.pdf

[86]http://www.nature.com/news/investigating-journals-the-dark-side-of-publishing-1.12666

[87]https://academicworks.cuny.edu/cgi/viewcontent.cgi?article=1069&context=gc_pubs

[88]http://www.doaj.org/

[89] For more information on DOAJ new journal acceptance criteria, to Richard Van Noorden, "Open access website gets tough," *Nature*, 6 August 2014, https://www.nature.com/articles/512017a

Whether a journal publishes articles that plagiarize the work of others is an issue to be taken seriously. The *South African Journal of Chemistry* "scans each submission for plagiarism."[90] Not every publication does so, however. Ask the publisher whether and how the journal checks for plagiarism. In addition, many African universities subscribe to plagiarism checkers. Use the one to which your institution subscribes to check text from one or two articles to find out whether it has been copied in any way. You can also use one of the free plagiarism checkers available online.

- ● Additional open access considerations

- Be sure to include a line item for page charges in your research budget. Open-access APC fees can be high. This is in addition to the page charges that some subscription-based publications require. Thus, if you are thinking about publishing in a "hybrid" publication, you should reserve additional funds. You would be wise to select a few journals in which you want to publish to ascertain all fees and include those amounts in your research budget.
- Think carefully about where you want to publish and do your homework to ensure that you are selecting an appropriate journal. Remember the due diligence checklist above.
- If your university has a repository, use it to archive your work. In addition, you may want to join ResearchGate,[91] which will provide you with worldwide visibility. Other academic self-archiving services include EconPapers,[92] AgEcon Search,[93] the Social Science Research Network,[94] arXiv[95] for preprints in physics, mathematics, computer science, quantitative biology, and quantitative finance and statistics, and AfricXiv[96] for African preprints. Finally, be sure to create a profile in Google Scholar and make it public.[97] These services have also become major networking platforms to share and follow research. Authors can create research profiles, upload publications, and find and track other researchers. Registration is free at all of them. In addition, both ResearchGate and Google Scholar will tell you how often your work has been cited. Another possibility is to archive your work on your own personal webpage. And remember—none of these options is mutually exclusive.

- ● Open access, visibility, and impact factors

Impact factors measure the number of times an average paper in a particular journal has been referred to elsewhere in scientific literature. There are several ways to determine a journal's impact factor. Scopus has a free service to ascertain each Elsevier journal's impact factor.[98] The Scopus list, however, only includes journals published by Elsevier. The Web of Science publishes *Journal Citation Reports*, but access requires a subscription.[99] The SCImago journal and country rank is another important resource. Available free of charge from the the Consejo Superior de InvestigacionesCientíficas (CSIC), University of Granada, Extremadura, Carlos III (Madrid) and the Alcalá de Henares, SCImago allows users to ascertain country citation rankings and also journal impact factors, based on Scopus and Web of Science.[100] Finally, Google Scholar has a free impact

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[90] https://sajchem.co.za/instructions-to-authors/
[91] http://www.researchgate.net/
[92] http://econpapers.repec.org/
[93] http://ageconsearch.umn.edu/
[94] http://www.ssrn.com/en/
[95] http://arxiv.org/
[96] https://info.africarxiv.org/
[97] For instructions on how to create a profile, go to http://blog.impactstory.org/impact-challenge-day-3-google-scholar/.
[98] https://www.scopus.com/sources
[99] https://clarivate.com/products/journal-citation-reports/
[100] https://www.scimagojr.com

factor service, which can be broken down by discipline.[101] The University of Illinois at Chicago has a page on how to measure your impact factor, citations, and other metrics.[102] Cornell University maintains a page with instructions on how to measure an author's impact factor using Google Scholar.[103]

It's not unheard of to skew a journal's or article's impact factor. In a 2016 article in *PLOS One* titled "A Large-Scale Analysis of Impact Factor Biased Journal Self-Citations," Caspar Chorus and Ludo Waltman describe the different way impact factor data can be manipulated.[104]

Moreover, journals from the global South can be affected adversely by impact factor metrics. As Brujans and Lamanna point out in their 2018 article, "The case for a regional approach to publication impact:"[105]

> *Healthcare-related research is largely regional. Put simply, this is because disease burdens differ between world regions. Even global burdens, such as ischaemic heart disease and cancer, display distinctive characteristics in certain regions that are not seen in others. Regional differences in infrastructure, resources and human capital further compound the differences seen, as they affect the way in which the local scientific community can interact with the local disease burden. As such, it seems fair to assume that healthcare-related research ought to be regionally distributed.*

They go on to argue that journal publishers do not recognize the importance of regionality in clinical medicine:[106]

> *This regionality of clinical medicine is, however, not reflected in academic publishing; the impact of a journal is measured and understood by metrics that use the world as their denominator. Therefore, top medical journals are perceived to be relevant equally to all contexts and regions. However, there is a strong case to be made that this lack of granularity is deleterious, and that the creation of a regional impact metric would place clinicians, researchers, and libraries in a better position to understand which journals are relevant to their context and practice.*

A comparison of *The Lancet* and *The Lancet Global Health*, both published by Elsevier, is instructive. *The Lancet*, which is one of the top medical journals in the world, has a very high impact factor. *The Lancet Global Health*, which is open access and publishes research that is regional in nature with a focus on low- and middle-income countries, has respectable journal metrics. But they are lower than those of The Lancet.

Figure 9: The Lancet journal metrics

Journal	Journal Impact Factor (JIF) ⓘ	5 Year Impact Factor ⓘ	CiteScore
The Lancet	202·731	130·838	115·3↗

Figure 10: The Lancet Global Health journal metrics

The Lancet Global Health	38·927	35·214	41·8↗

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[101] https://scholar.google.com/citations?view_op=top_venues&hl=en
[102] https://researchguides.uic.edu/if/yourimpact
[103] https://guides.library.cornell.edu/impact/google-scholar-metrics
[104] https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0161021
[105] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5813912/
[106] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5813912/

The question becomes impact factor **for** whom? African journals, such as the ones listed in table two above, publish articles of national and regional significance far more often than subscription-model journals. But these journals may lack a high impact factor because of the specificity of the research described in the articles they publish. Many academics have begun to consider whether impact factor metrics are relevant overall. Brujans and Lamanna specifically ask about the utility of a "regional impact metric."

- ### Open access and donors

Some governments and foundations in North America and Europe require that all research they fund be made freely available to the public. Examples include the European Union and the Horizon 2020 project,[107] UK Aid,[108]Wellcome Trust,[109] the US National Institutes of Health (NIH),[110] and the Bill and Melinda Gates Foundation.[111] This has implications for universities and individual researchers because they must be sure that grants have sufficient funds to pay for any resulting author fees, if necessary, so that they can make the research resulting from grants accessible at no cost.

Some donors are more flexible than others in that they require that research be made freely available, but do not mandate publication in an open access journal. They also permit embargo periods of between six months and a year. This is true of NIH and Wellcome Trust, for example. Other funders, such as the Gates Foundation, require that all research it funds must be published immediately in an open access journal. Gates will not pay the APC otherwise. Increasingly, many donors also require that researchers open the underlying data on which the research is based. SHERPA/RoMEO maintains a searchable annotated list of donor policies, as shown in the figure below.[112] (Plan S, discussed below, has widened the list of donors that require open access publishing.)

Figure 11: Gates Foundation open access and data policies

Requirement	Bill & Melinda Gates Foundation **requires** Open Access Archiving
What to archive	Any publications
Publication version	Full text
When to archive	At the earliest possible opportunity
Where to archive	Named repository Any appropriate repository
Named Repositories	PubMed Central https://www.ncbi.nlm.nih.gov/pmc/
Metadata Record	Metadata must be deposited at the date of publication
OA Archiving Licence	CC BY v4 [applies to all]

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[107]https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/FactSheet_Open_Access.pdf
[108]https://www.gov.uk/government/publications/dfid-research-open-and-enhanced-access-policy
[109]http://www.wellcome.ac.uk/about-us/policy/spotlight-issues/Open-access/index.htm
[110]https://publicaccess.nih.gov/
[111]http://www.gatesfoundation.org/how-we-work/general-information/open-access-policy
[112]https://v2.sherpa.ac.uk/id/funder/961?template=juliet

The Gates Foundation also maintains a portal called Gates Open Research[113] for its grantees to mount their research after it is completed. Once on the website, the Foundation invites peer reviewers to review the document. The whole process is transparent, and reviewers are named.

Figure 12: Gates Open Research portal

RESEARCH ARTICLE metrics   ? ?

REVISED **Experiences of violence among female and male grade eight learners: baseline findings from the Girls Achieve Power (GAP Year) trial across three South African townships** [version 3; peer review: 2 approved with reservations]

Alison Kutywayo, Sasha Frade, Glory Chidumwa, Tshepo Mahuma, Nicolette P. Naidoo, Saiqa Mullick

PEER REVIEWERS *Andrew Gibbs; Pauline Gulliver*

FUNDER Bill and Melinda Gates Foundation

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 In addition, many multilateral agencies, such as the World Bank and the International centers affiliated to the CG agricultural system, now make their own research and data freely available, usually with a Creative Commons license.

It is always best to ask relevant program officers in addition to searching databases such as SHERPA because policies can change.

- • Plan S, article processing charges (APC), and impact on Africa

Most African academics, researchers, and students have never heard of Plan S, but many librarians have. Plan S, which was launched in 2018, is an initiative for Open Access publishing. The plan is supported by cOAlition S, an international consortium of research funding and performing organizations. Plan S requires that, from 2021, scientific publications that result from research funded by public grants must be published in compliant Open Access journals or platforms.[114] All publicly funded and some donor-funded research, must now be published in open access format.

Plan S is hastening the pace of substituting **pay for access to pay to publish** because subscriptions, are no longer the only economic model journal publishers employ.

After Springer Nature announced in January 2023 that scientists from 70 countries that the World Bank classifies as low- or lower-middle income countries, whose articles are accepted by the *Nature* family of journals would not have to pay an APC, Munyaradzi Makoni and Wagdy Sawhel wrote in University *World News* that:[115]

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[113]https://gatesopenresearch.org/
[114]https://www.coalition-s.org/
[115]https://www.universityworldnews.com/post.php?story=20230118190925833

> *…specialist journals like Nature, whose stringent and low acceptance rates make it difficult for authors to get published.*

Many university library consortia have negotiated reduced subscription rates for bundles of scholarly journals. They are now adding APC fees to these negotiated rates. In 2018, the Association of Universities in the Netherlands (VSNU) rowed with Elsevier over contract issues and threatened to ask Dutch editors-in-chief and researchers to stop publishing in Elsevier journals.[116] In 2020 the Dutch universities' consortium came to a four-year agreement with Elsevier as follows:[117]

> *All accepted articles by corresponding authors of Dutch universities (including University Medical Centres), NWO and the KNAW in the selected journals by Elsevier are eligible for open access publication without extra cost.*

In the United States, the University of California system first cancelled its Elsevier subscriptions, and then was able to negotiate a contract that would essentially eliminate paid subscriptions in return for paying APCs for the university system's faculty. In the words Jeffrey MacKie-Mason, the university librarian:[118]

> *Elsevier's prices are still too high, and it makes outrageous profits. But we did get an expenditure reduction, and that will save money for the system and for the authors. Overall, the UC (libraries plus authors) will pay 7 percent less in total than if we had continued with the previous model. Another way of saying that is the UC will be paying about the same $13 million in 2021 as we paid in total in 2018, saving us over 7 percent by avoiding annual price escalation (inflation). Part of the way we got expenditure savings is by negotiating a 15 percent discount on the publishing price for articles in most journals (10 percent for a limited number of prestige titles)*
>
> *We refer to these agreements as transformative open access agreements because they convert subscription payments into payments for open access publishing (with reading provided for free). It is a new approach we helped develop with other leading institutions a few years ago, in large part through the OA2020 initiative.*

In Africa, however, these APC arrangements may be too expensive for universities or individuals to bear. *University World News* pointed to the issues from a South African perspective:[119]

> *For research-intensive universities, these new agreements are not going to be beneficial. We are going to pay more for the current subscriptions," said Ellen Tise, senior director of library and information services at Stellenbosch University.*
>
> *In addition, Tise argued, although institutions with low research outputs may benefit from the kinds of open access deals being promoted by Plan S, "it will not address the deep knowledge gap between developed and developing nations; and, at the end of the day, the big commercial publishers will continue to benefit".*

- ### The Intersection between OER and open access

OER and OA are similar, but they are not the same. OERs are used for teaching and learning. They can be full courses, lesson plans, and modules. OA resources are used to make the research output

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[116] https://www.timeshighereducation.com/cn/dutch-universities-urge-elsevier-editors-resign-open-access-row

[117] https://www.openaccess.nl/en/publisherdeal/elsevier-2020-2024

[118] https://www.universityofcalifornia.edu/news/ucs-deal-elsevier-what-it-took-what-it-means-why-it-matters

[119] https://www.universityworldnews.com/post.php?story=2019112805442788

of a scholar or student freely available. An OA resource can be a journal article, case study, book, policy document, etc. The "O" for open unites the two; both typically use CC licenses.

There are three major ways in which OER creation and utilization can intersect with open access. Good research made available under open licenses can help educators prepare up-to-date and relevant learning materials. Additionally, these documents can be used as recommended or supplemental reading. Third, assigning students to search online for relevant documents is an excellent way to bolster both information-retrieval skills and learner centred studies.

It is possible to find open access/freely available research literature various ways. One is to conduct a search using Google's advanced mode. OER Africa has tutorials on finding open content, including using Google.

Figure 13: OER Africa finding open content tutorial[120]
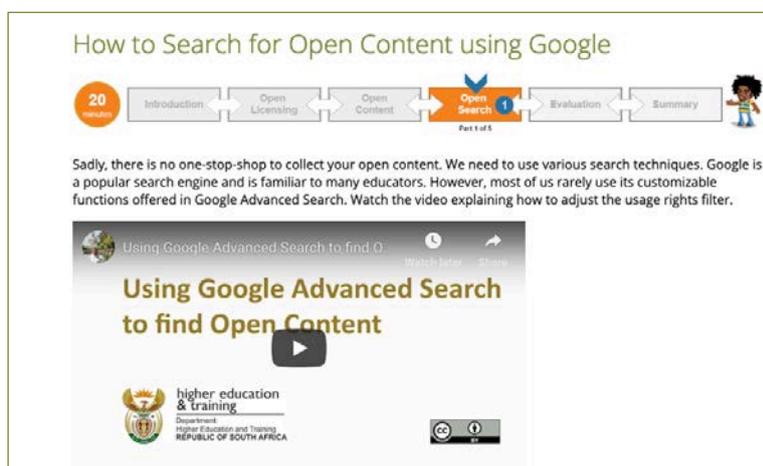
OER Africa has several additional tutorials on open education, including adapting OER, publishing in open access journals, and "design for learning".[121]

Google Scholar can restrict searches to scholarly resources. It makes every effort to include the URL where it possible to read the full text of a journal article, report, or case study. A search for "West African medicinal plants" pulled up 10 pages of citations, including this one (figure 12).

Figure 14: West African medicinal plants

You can see that the citation links you to a version of the article that the author placed on ResearchGate. It may not be open access, but it is free to read. You can also see how many times

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[120] Go to https://www.oerafrica.org/book/finding-open-content-tutorial for the complete set of tutorials.
[121] https://www.oerafrica.org/book/learning-pathways-open-education-online-tutorials

the article has been cited—375 times. Lecturers can use resources such as this in preparing their teaching materials; they can also recommend freely available documents to their students by providing the URL. Finally, Google Scholar is a good place for students to identify relevant materials as part of their assignments and research.

- Creating enabling policies for open access publishing

Some African universities understand the importance of open access publishing to enhancing their image and knowledge of research conducted at their institutions. Moreover, as discussed above, a growing number of donors now requires grantees to make their research publicly available. These are powerful incentives. In October 2018, in honour of Open Access Week, the Secretary General of the Association of African Universities expressed AAU support for open access and identified policies that African universities should adopt:[122]

- *In hiring, promotion, and tenure, the university will give due weight to all peer-reviewed publications, regardless of price or medium.*
- *Faculty who publish articles must either (1) retain copyright and transfer only the right of first print and electronic publication, or (2) transfer copyright but retain the right of postprint archiving.*
- *Adopt policies encouraging or requiring faculty to fill the institutional archive with their research articles and preprints.*
- *All theses and dissertations, upon acceptance, must be made openly accessible, for example, through the institutional repository or one of the multi-institutional OA archives for theses and dissertations.*
- *All conferences hosted at your university will provide open access to their presentations or proceedings, even if the conference also chooses to publish them in a priced journal or book. This is compatible with charging a registration fee for the conference.*
- *All journals hosted or published by your university will either be OA or take steps to be friendlier to OA. For example, see the list of what journals can do.*

For those interested in why universities choose to adopt open access policies, *SciDevNet* wrote about the University of Nairobi's reasons for promulgating an open access policy and the importance of open access to African research and the global knowledge pool.[123]

Figure 15: Reasons University of Nairobi selected open access publishing.

- University wants its research to reach many and have an impact on policy
- Articles, data and images will be added to online digital repository
- Resource could make it easier to share data and reduce research duplication

[122] Go to https://www.aau.org/2018/10/12/short-statement-from-the-sg-of-aau-on-open-access-to-all-heis-on-the-continent/. The Secretary General's statement also includes links to open access policy resources for administrators, faculty, and librarians.
[123] http://www.scidev.net/global/r-d/news/kenya-s-top-university-opens-up-its-research.html

The three African research and education networks—UbuntuNet for Eastern and Southern Africa, WACREN for West Africa, and TANDEM for North Africa—are also collaborating with academic libraries in these regions on open access, repositories, and policies in an initiative called LIBSENSE.[124] LIBSENSE has drafted model national[125] and institutional[126] open access policies, which are under review.

African university repositories and policies

- ### Definitions

An institutional repository is an online library that collects, preserves, and disseminates digital copies of the intellectual output of an institution, particularly a research institution.[127] Books, research articles, theses and dissertations, and other scholarly resources are typically included in these repositories, many of which practice open access principles. Universities in Africa and elsewhere have established repositories to promote wide and freely accessible distribution of the research carried out at their institutions. From a global perspective, however, the number of African university repositories is small. But the numbers are growing, with a concomitant increase in quality.

- ### University repositories in Africa

The Directory of Open Access Repositories (OpenDOAR) maintains a list of institutional repositories in Africa.[128] But, because OpenDOAR is primarily a self-reporting effort, it is not always current. Some repositories appear to have gone offline; others have launched and are not yet included in the database. The International African Institution (IAI) in the UK maintains another annotated list of repositories, which is updated regularly.[129] It is currently a more reliable source of information. Working with the African preprint service AfricarXiv, IAI created digital maps and information in March 2020. The figure below shows the countries in which repositories are found. South Africa has the most repositories; almost all repositories are in English-speaking Africa.
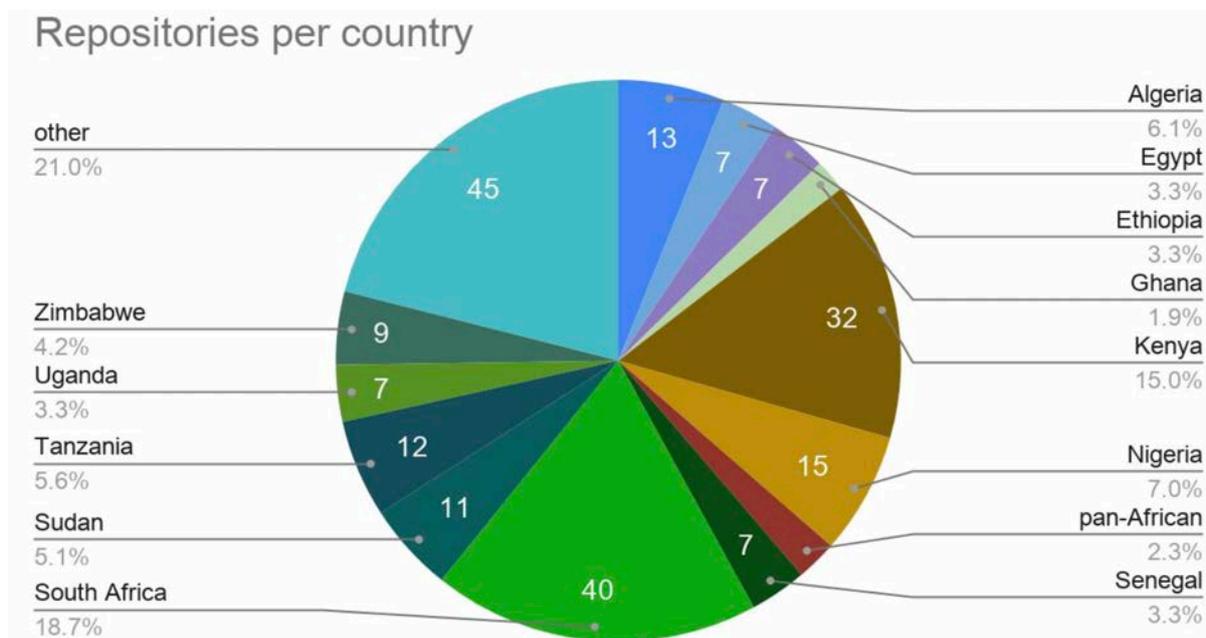
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[124] https://spaces.wacren.net/display/LIBSENSE
[125] https://spaces.wacren.net/pages/viewpage.action?pageId=7929890
[126] https://spaces.wacren.net/pages/viewpage.action?pageId=7929892
[127] Wikipedia has an excellent article on repositories. Go to:
http://en.wikipedia.org/wiki/Institutional_repository.
[128] https://v2.sherpa.ac.uk/opendoar/
[129] https://www.internationalafricaninstitute.org/repositories

Figure 16: African countries where repositories are located.

Repositories per country

- Algeria 6.1%
- Egypt 3.3%
- Ethiopia 3.3%
- Ghana 1.9%
- Kenya 15.0%
- Nigeria 7.0%
- pan-African 2.3%
- Senegal 3.3%
- South Africa 18.7%
- Sudan 5.1%
- Tanzania 5.6%
- Uganda 3.3%
- Zimbabwe 4.2%
- other 21.0%

Appendix one contains annotated tables of Sub-Saharan Africa repositories that are current as of May 2023. These tables are not meant to be comprehensive; the goal is to provide examples to demonstrate the breadth of the repository movement in Africa and the disparities among regions and countries.

Repositories are important from an African perspective because universities on the Continent and the research they produce are not as well-known as they should be. Repositories can increase the international visibility and prestige of a university, its research, and its scholars. They thus ensure that African research information can reach the global knowledge pool and be recognized for its quality. On pages 6-7 of the University of Namibia's scholarly communications policy, the university lists 18 principles that underpin its repository and open access policies.[130]

Some African universities have specific policies for their repositories; others have created policies for open access and Creative Commons licensing more broadly. Some encourage, but do not require, authors to submit their resources to the institution's repository; some mandate that all scholarly outputs should be made freely available. But populating university repositories will require more than policies. There are too many African repositories with a URL, but little else. The university needs to be brought on board, and all authors actively encouraged to deposit their papers into the university repository. Funding is required to pay for necessary infrastructure, equipment, staff time, and maintenance, as discussed below.

- ### Repository Management

Repository management requires strategic planning and a work plan, appropriate technology and a platform, an adequate budget, sufficient human resources for all functions, and appropriate web analytics. Workshops and other sensitization activities will be necessary. For information on repository management, the following resources may be helpful: SPARC has published an institutional repository checklist and resource guide.[131] Stellenbosch University also maintains a

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[130]https://www.unam.edu.na/wp-content/uploads/2022/03/unam-scholarly-communication-policy.pdf
[131]https://sparcopen.org/wp-content/uploads/2016/01/IR_Guide__Checklist_v1_0.pdf

Wiki with practical guidelines for starting an institutional repository.[132] As a final source of assistance, the Confederation of Open Access Repositories has training materials in a number of areas, including setting up and running repositories, advocacy to different stakeholders, and research data management, amongst others.[133]

Most African university repositories use D-Space, a not-for profit, open-source software, to house their repositories.[134] But repositories are not always as user friendly as they might be. Some allow keyword searching by year of publication; others do not. Some do not provide licensing information. Even though the download is free, the terms under which the resource may be used might not be defined, which – at least in principle – means that they remain bound by All-Rights Reserved Copyright. In addition, visitors to some repositories will sometimes find that not all content is accessible at all. Some repositories contain bibliographic references or abstracts without full text. Sometimes, this is because the resource is in hard copy only, having been written before digital deposit was required. Figure 11 below shows a record from the University of Nairobi institutional repository, with all necessary metadata included. Note that license terms are included, and full metadata are also available.

Figure 17: University of Nairobi repository record

In 2018, EIFL published a detailed checklist on repository management to help librarians ensure that their repository meets user expectations and enhances their university's visibility. The guide also provides information on how to enhance discoverability and measure utilization statistics, including how to determine the impact of individual resources contained in the repository.[135]

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[132]http://wiki.lib.sun.ac.za/index.php/SUNScholar/Practical_guidelines_for_starting_an_institutional_repository_(IR)
[133]https://www.coar-repositories.org/topic/training-and-capacity-building/
[134]https://duraspace.org/dspace/
[135]https://www.eifl.net/news/eifl-checklist-dspace-repositories-updated-0

- Theses and dissertations

Making theses and dissertations freely accessible can be complicated. Some postgraduate students plan to publish their research results, and journals have different policies about accepting papers based on a thesis or dissertation that has been made available online. Some consider making a thesis or dissertation publicly available as prior publication.

In the United States, many universities allow an embargo period of between six months and two years to allow graduates time to publish. The thesis or dissertation is deposited with the library, but only the citation and abstract are available online for the embargo period. At Columbia University, for example, embargoes are usually requested when a patent is pending, an experiment is not finished, or a manuscript has been submitted for publication in a scholarly journal or as a book. Students may request an embargo for up to five years.[136] The Columbia University electronic deposit Frequently Asked Questions (FAQs) explain why open access deposit can enhance the student's visibility and prevent plagiarism:[137]

> *Works appearing in the Academic Commons are available to anyone with an Internet connection. Making dissertations available openly will benefit you by broadening your audience, increasing citations, and allowing potential employers and publishers to moreeasily find your work. By making your work widely available online, you can better protect your intellectual property, by firmly and publicly establishing your ideas. All works deposited into the Academic Commons have a permanent URL that will never change and can be used as a citation in your CV or in bibliographies.*

Apart from Addis Ababa University in Ethiopia,[138] South African universities are the only ones of the sub-Saharan African repositories surveyed to have specific policies for online access to theses and dissertations. To give two South African examples:

- At the University of the Witwatersrand, all students must submit their thesis or dissertation in electronic format. In the form that the student must complete, s/he acknowledges that it will be made publicly available within four months of submission "unless permission for further embargo has been approved by the relevant Supervisor."[139]
- At the University of Pretoria, all students are required to deposit their theses or dissertations in the university electronic theses repository. With the permission of the supervisor, students may request an embargo period or refuse permission altogether to provide public access to their thesis or dissertation.[140]

Open access is important, but so is the right of graduates to publish. African universities may want to amend their open access policies to allow students embargo periods. Those universities without policies should be sure to include publishing guidelines for students. The key is to implement a policy that is fair both to students and the university's interest in opening research conducted under its auspices to scholars worldwide.

Open knowledge and librarians

Librarians can play a role in an institution's open access trajectory. Librarians know all too well about the high cost of journals and how subscriptions can consume their meagre budgets. They are,

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[136] https://gsas.columbia.edu/student-guide/dissertation/electronic-deposit-faqs
[137] https://gsas.columbia.edu/student-guide/dissertation/electronic-deposit-faqs
[138] See table in Appendix one.
[139] https://www.wits.ac.za/media/wits-university/faculties-and-schools/health-sciences/student-documents/postgraduate/Revised approved ETD form 09052017.docx
[140] https://www.up.ac.za/media/shared/160/ZP_Files/upspace-final-submission-form.zp158248.pdf

thus, well-placed to advocate for use of high-quality openly licensed content. In addition, they have traditionally helped users find resources. A librarian who is well versed in finding open access materials is experienced enough to continue this role and to prepare appropriate training materials on how to find, evaluate, and use open access materials. Finally, they are at the forefront of establishing and maintaining institutional repositories. Thus, librarians can play a catalytic role in elucidating open access, explaining its relevance to the global knowledge pool, training library users, and lobbying for appropriate policies.

AfLIA plays a major role in promoting open knowledge on the Continent. It collaborates with OER Africa on tutorials for librarians on finding and adapting OERs and publishing in open access journals. AfLIA also collaborates with Wikimedia on the training of at least 200 information professionals in the African library and information science sector from 20 or more African countries on how to effectively open and link knowledge by making their library collections more visible through Wikidata.[141] It has also signed a Memorandum of Understanding with the data platform Figshare to promote to promote open data awareness and participation in Africa.[142] AfLIA also has an MoU with WikiData. Finally, AfLIA and Neil Butcher and Associates (NBA) are working together on a toolkit on the UNESCO OER Recommendation and will co-host a workshop at the upcoming May 2023 Seventh African Library Summit.[143]

Many African universities maintain institutional repositories, which are managed by a librarian. In South Africa most university repositories also provided guidance on OER resources. The University of the Witwatersrand (Wits) in South Africa[144] and Kwame Nkrumah University of Science and Technology (KNUST) in Ghana[145] are two examples at the institutional level. Wits also offers training in OER and open access.

African university libraries could do more to foster open knowledge at their institutions. Below are some examples:
- Just as WITS and KNUST have done, more African libraries could post pages on their library home page or repository platform to educate and show users where there are relevant resources.

- What about training? AfLIA and OER Africa have collaborated on tutorials, webinars, and short trainings for university librarians on finding and adapting open content and open access journals. The training resources already exist. African librarians could offer this training to their users. African libraries frequently run orientation programs for incoming students. Do these orientation syllabi discuss open licensing? If not, what would be required to add a section to the orientations?

- Policy is an important issue. Some African universities have open access policies, which are discussed above. There should be policies at all institutions and librarians could play an important advocacy role in promoting them with university leadership. Some African universities are also working on instituting OER policies. OER and OA policies address the same concerns. Should they be merged? UCT has an open access policy that includes all openly licensed content and a guide to open licensing for academics:

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[141] https://web.aflia.net/aflia-receives-a-grant-for-promoting-open-knowledge-practices-in-african-libraries-through-wikidata/
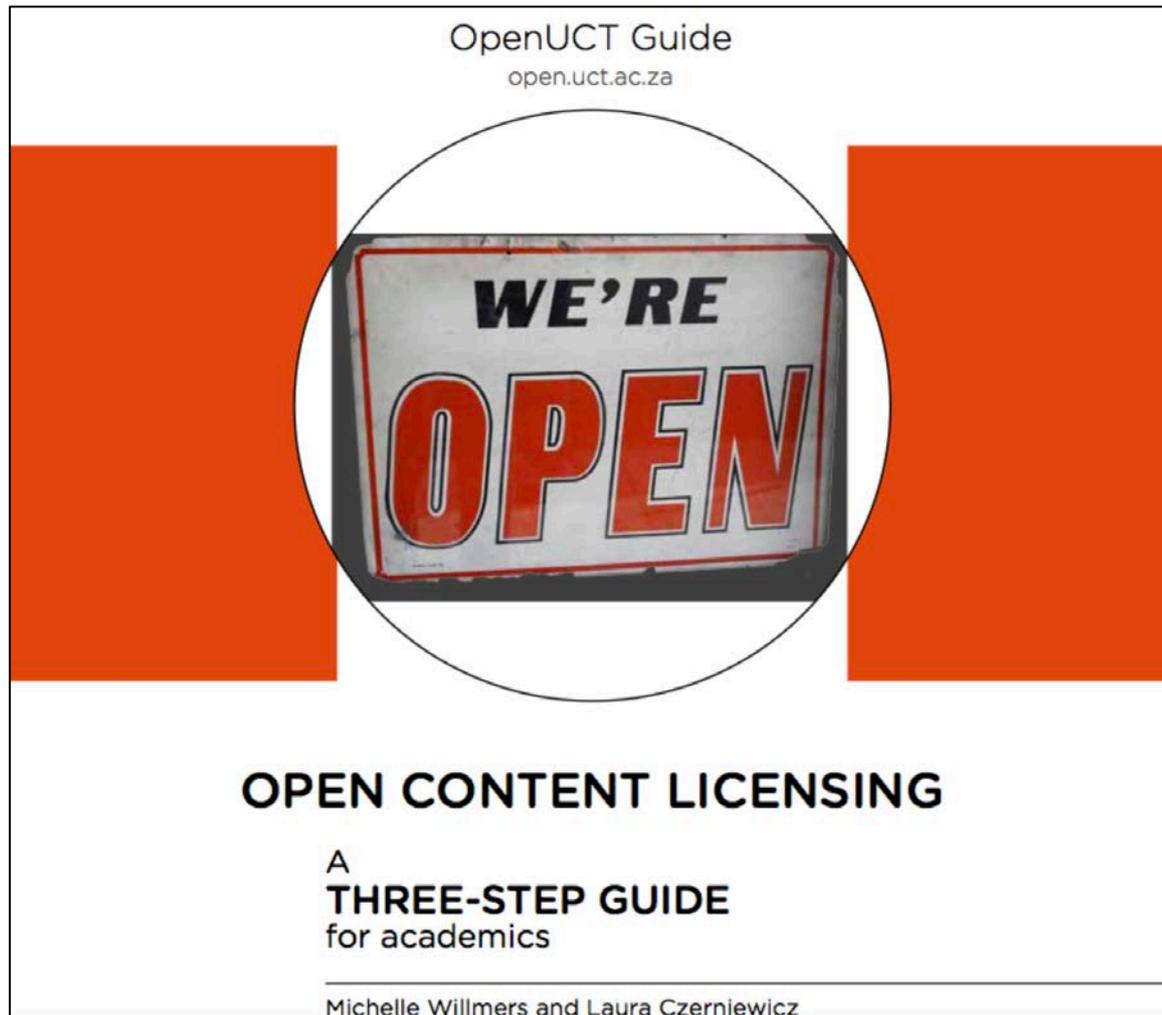[142] https://web.aflia.net/aflia-partners-with-figshare-to-promote-open-data-awareness-and-participation-in-africa/
[143] https://web.aflia.net/aflia-partners-with-nba-to-implement-unesco-oer-recommendations/
[144] There is an OER library guide at https://libguides.wits.ac.za/Open_Educational_Resources and for open access at https://libguides.wits.ac.za/openaccess_a2k_scholarly_communication
[145] https://websys.knust.edu.gh/oer/pages/sections.php?mid=25&sid=144

Figure 18: three-step open licensing guide[146]

[146]http://www.cilt.uct.ac.za/news/open-content-licensing-three-step-guide-academics

Appendix 1: African open access repositories and policies

The tables below, which are organized by region or country, provide information on major sub-Saharan African open access repositories, together with details on relevant institutional open access policies, where they exist.[147]Most, but not all, are university repositories. Many repositories are in countries in which English is the language of instruction at the tertiary level. Information on OER repositories and policies will be found elsewhere.

As noted above, these tables are not comprehensive, and the situation changes constantly because new institutions establish repositories on a regular basis. When in doubt, do a Google search by entering the name of the institution in which you are interested and the word "repository" or the term "open access."

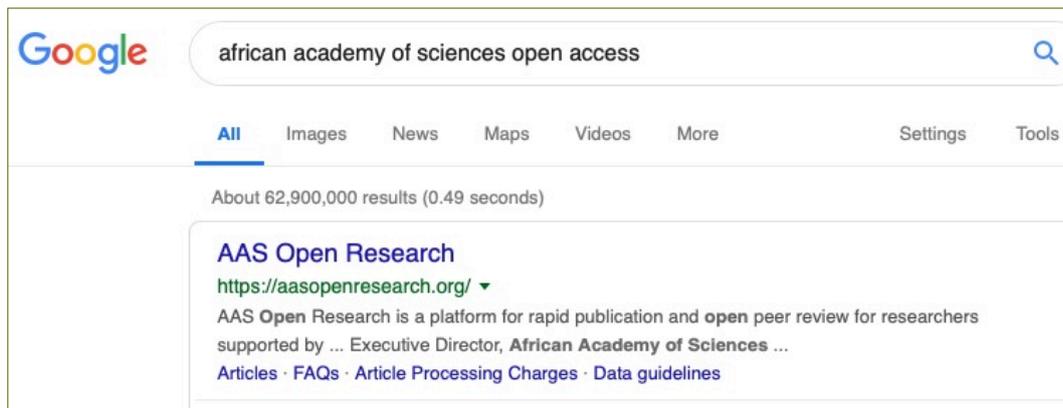*Figure 19: Example of Google search*

Table 4: Africa-wide repositories

Institution	Comments
African Capacity Building Foundation https://elibrary.acbfpact.org	The African Capacity Building Foundation, which is in Harare, Zimbabwe, maintains a digital library of its publications on development. ACBF is a specialized agency of the African Union. Although all publications are freely accessible, they are fully copyrighted and bear the following notice: "No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying recording or otherwise, without prior written permission."
Africa Portal https://www.africaportal.org/publications/	The Africa Portal "was a research repository and an expert analysis hub on African affairs," which closed in 2022. The platform, however, is still active and there are over 10,000 resources on it. All are open access, a freely available collection of resources managed jointly by the South African Institute of

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[147] An increasing number of African universities have established institutional repositories, but a smaller number have promulgated university-wide open access policies. In addition to consulting the existing policies and asking assistance from the AAU, university administrators interested in open access policies, may want to read the European Universities Association's *Open Access checklist for universities: A practical guide on implementation*, which can be found at https://eua.eu/resources/publications/365:eua%E2%80%99s-open-access-checklist-for-universities-a-practical-guide-on-implementation.html.

Institution	Comments
	International Affairs in Johannesburg, South Africa,[148] and the Centre for International Governance Innovation in Ottawa, Canada.[149] Collaborating content providers include major African and overseas research centers.
AfricArXiv African Preprint Service https://osf.io/preprints/africarxiv/	AfricArXiv is an initiative of the Project for Open Science. This service allows African scientists to mount preprints of their research for review and discussion by peers in the international scholarly community before publication in a scholarly journal. AfricArXiv, which does not peer review submissions, sees itself as a way for African scientists to circulate their research quickly and freely to communicate with others in their field. It does not replace publication in a peer reviewed journal. See the AfricArXiv submission guidelines at https://docs.google.com/document/d/1pZ2kxbTSpjrMWHfhI851 rBjsUimArE_UD8aMy5KiUqk/edit#heading=h.7j4b06jfbue8 for more information.
Association of African Universities (AAU) Database of African Theses, Dissertations, and Research http://datad.aau.org	DATAD-R contains theses and dissertations, as well as peer-reviewed research articles from African universities. Starting in 1998 with a feasibility study and pilot project at 11 universities, DATAD now incorporates theses, dissertations, and research. As of March 2019, there were over 29,000 theses or dissertations and almost 5,000 research reports in the database. DATAD-R is hosted by the Academy of Science of South Africa and maintained by AAU.

The AAU has also worked with its member universities on training workshops and meetings dealing with policy, repository implementation (including technology, practices, and standards), and other issues. |
OER Africa https://www.oerafrica.org	OER Africa, which is an initiative of Saide and located in Johannesburg, South Africa, is a one-stop shop for information for and from African universities on OER. The OER Africa repository is broken down by topic: understanding OER; courseware, research and policies; and OER in higher education.
Open Research Africa https://openresearchafrica.org/	Open Research Africa publishes scholarly articles and other research outputs (posters, slides and documents), reporting basic scientific, scholarly, translational and clinical research across the physical and life sciences, engineering, medicine, social sciences and humanities. All submissions must be funded by researchers funded by three partner organizations. Go to: https://openresearchafrica.org/about for more information.
The Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) Knowledge Repository https://repository.ruforum.org	RUFORUM, which is based at Makerere University in Kampala, Uganda, maintains an institutional repository in the broad-based agricultural sciences of theses and dissertations of students receiving RUFORUM scholarships; journal articles; case studies; policy documents; and reports.

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[148] https://saiia.org.za/
[149] https://www.cigionline.org/

Institution	Comments
UN Economic Commission for Africa (UNECA) Institutional Repository http://repository.uneca.org	The UNECA maintains a knowledge repository that includes published materials such as flagship publications, journal articles, conference proceedings, technical reports, mission reports, annual reports, working papers, speeches and other grey literature on African social and economic development. UNECA resources are copyrighted, but include the following note: "Material in this publication may be freely quoted or reprinted. Acknowledgement is requested, together with a copy of the publication."

Table 5: Repositories in Botswana

Institution	*Comments*
Botswana International university of Science and Technology http://repository.biust.ac.bw/	BIUST maintains a small repository. Its collection of theses and dissertations starts with the class of 2017.

Table 6: Repositories in Cape Verde

Institution	Comments
Portal do Conhecimento de Cabo Verde http://www.portaldoconhecimento.gov.cv	The Portal do Conhecimento de Cabo Verde, which is maintained by the Cape Verde government, is a collection of theses, dissertations, articles, and other resources. Full text is available for some, but not all, documents. Available resources are freely available, but do not carry a Creative Commons license. The site is in Portuguese.

Table 7: Repositories in Ethiopia

Institution	Comments
Addis Ababa University http://etd.aau.edu.et	Addis Ababa University does not have a full-fledged institutional repository, but there is an open access repository for theses and dissertations completed at the university. All postgraduate students are required to submit an electronic copy of their thesis to the library, which is then mounted in the repository.
Online Resources Platform https://orp.ethernet.edu.et/	The Online Resources Platform is maintained by the Ministry of Science and Higher Education (MoSHE). The platform provides an interface to the Ethiopian National Digital Library, peer reviewed open access Ethiopian journals, and the research of Ethiopian universities and research institutions.

Table 8: Repositories in Ghana

Institution	Comments
Ashesi University https://air.ashesi.edu.gh	Ashesi University maintains a small, but current, institutional repository for students and staff to mount their research. "Students who produce strong research work have the privilege of getting their work published on AIR," but their theses and dissertations must be submitted to the library for approval.[150]

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[150]https://air.ashesi.edu.gh

Institution	Comments
Kwame Nkrumah University of Science and Technology, Ghana http://dspace.knust.edu.gh/	The Kwame Nkrumah University of Science and Technology (KUNIST) collects full text of research, conference proceedings, theses and dissertations, and university documents. Theses and dissertations constitute the largest component of the repository collection. KNUST does not have an open access policy, but Postgraduate students are "are strongly urged to ensures soft copies of their research findings are submitted to the School of Graduate Studies for uploading to the repository." They are not required to do so, however. There is a draft (undated) publications policy for theses and dissertations, which lays out student requirements on copyright and on electronic access. It can be found at https://kccr-ghana.org/wp-content/uploads/2018/08/POLICY-ON-PUBLICATION.pdf. KNUST does have an OER policy, which mandates Creative Commons licensing for resources produced at the university. It was implemented in 2011 and was one of the first such policies in sub-Saharan Africa. The repository will be found here: http://ir.knust.edu.gh/. The university's OER policy and the background leading to its implementation are located on the OER Africa website: http://www.oerafrica.org/resource/policy-development-and-use-open-educational-resources-oer-knust.
University of Development Studies http://www.udsspace.uds.edu.gh/	Established in 1992, UDS is Ghana's first public university in the Northern region of the country. Its mandate is:[151] *The University by its mandate and constituency has a pro-poor focus and this is reflected in its methodology of teaching, research and outreach services. The specific emphasis on practically-oriented, research and field-based training is aimed at contributing towards poverty reduction in order to accelerate national development.* Many of the resources in the UDS repository focus on the North.
University of Ghana http://ugspace.ug.edu.gh	UGSpace is the institutional repository of the University of Ghana. It is an open access electronic archive for the collection, preservation and distribution of University of Ghana digital materials, which was established to facilitate the deposit of digital content of a scholarly or heritage nature in order to share, preserve and promote the intellectual output of the University in a managed environment.

Table 9: Repositories in Kenya

Institution	Comments
Egerton University http://ir-library.egerton.ac.ke/jspui/	Egerton University maintains a small repository. There are 726 theses and dissertations in the repository, by far the large component of the repository's collection. Although full text is freely available, some of them are copyright protected with the following statement: "This copy of the thesis is protected and may not be reproduced, stored or transmitted in any form or any

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[151] https://www.uds.edu.gh/about/

Institution	Comments
	means such as electronic, mechanical, photocopying and recording without prior sanction in writing from the author or Egerton University on that behalf."
Jomo Kenyatta University of Agriculture and Technology http://ir.jkuat.ac.ke	The university's repository is relatively small, with theses and dissertations constituting the largest collection. The university's digital repository policy, which includes a section on open access will be found at http://jkuat.ac.ke/departments/library/wp-content/uploads/2015/04/POLICY-JKUAT-Digital-Repository-Policy31.pdf.
Kenyatta University https://ir-library.ku.ac.ke	The repository's home page includes this text: "Full text access is provided under Creative Commons License." The university's open access policy will be found at open access policy will be found at: http://library.ku.ac.ke/wp-content/uploads/2013/01/Library-IR-Policy.pdf.
Moi University http://ir.mu.ac.ke:8080/jspui/	The Moi University repository is small. Five hundred and eighty-eight resources are citations only. The remainder contain full text.
Rift Valley Institute (Sudan Open Archive) https://www.sudanarchive.net	"The Sudan Open Archive offers free digital access to knowledge about all regions of Sudan. It is an expanding, word-searchable, full-text database of historical and contemporary books and documents. The current version, SOA 3.0, includes two new special collections: the first thirty-two volumes of Sudan Notes and Records, Sudan's flagship scholarly journal, and the collected papers of the late Sudan scholar, Richard Gray."[152]
Strathmore University https://su-plus.strathmore.edu	Although all entries contain a full citation including an abstract, full text is not available for every one of them.
United States International University http://erepo.usiu.ac.ke	Although full text is freely available, some resources such as theses, are fully copyrighted with all rights reserved.
University of Nairobi http://erepository.uonbi.ac.ke	The University of Nairobi institutional repository is quite large, with over 38,000 theses and dissertations and other research resources. Most theses and dissertations are full text, with a CC BY license, although some have a citation and an abstract, nothing more. The university's open access policy will be found at http://uonlibrary.uonbi.ac.ke/node/1482.

Table 10: Repositories in Mozambique

Institution	Comments
Eduardo Mondlane University http://www.repositorio.uem.mz/	This repository did not exist in 2019, which is a sign of how the number of repositories grows and the countries in which they can be found.

Table 11: Repositories in Namibia

Institution	Comments
University of Namibia http://repository.unam.na	The thesis/dissertations collection contains full text, abstracts, and citations. The same is true for other collections in the

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[152]https://www.sudanarchive.net

repository. According to the University of Namibia Scholarly Communication Policy, members of the university community are required to provide the library with copies of their scholarly output in instances where they maintain copyright control. In addition, the university encourages authors to publish in open access formats.   UNAM's open access policy will be found on page eight of its scholarly communications policy.[153] Although theses and dissertations are included in the repository, the policy does not provide any guidelines for their inclusion.

Table 12: Repositories in Nigeria

Institution	Comments
Ahmadu Bello University https://kubanni.abu.edu.ng/home	The repository contains more than 9,000 records. Although no licensing information is given for individual resources, it is an open access repository.
University of Ibadan http://ir.library.ui.edu.ng	The repository contains about 4,000 records, many of them theses and dissertations. A few of the older ones have citations and abstracts only, no full text.
University of Jos http://irepos.unijos.edu.ng/jspui/	According to a paper presented by Stephen A. Akintunde, PhD and Daniel Igoche of the University of Jos library, the university, which established its repository in 2009, was the first in Nigeria to do so. The repository deposit policy mandates that all publications for promotion assessment must be provided to the library for uploading into the repository. Digital copies of theses and dissertations submitted to the School of Postgraduate Studies must also be given to the library for the repository.[154]
University of Lagos https://ir.unilag.edu.ng	The repository was created to provide "open and permanent access to University of Lagos scholarship thereby ensuring its wide dissemination and increased visibility online." Full text of some theses and dissertations are only available after requesting assistance from the librarian.

Table 13: Repositories in Rwanda

Institution	Comments
Genocide Archive of Rwanda http://genocidearchiverwanda.org.rw/index.php/Welcome_to_Genocide_Archive_Rwanda	The Genocide Archive of Rwanda is not a repository, but it is an important Rwandan resource for anyone interested in mapping and documenting the genocide. The archive has the following access policy: "The Genocide Archive of Rwanda encourages you to use the content on this website for personal, educational, and other noncommercial purposes."
University of Rwanda http://dr.ur.ac.rw	The University of Rwanda repository is very small. Full text is available, but no licensing information given.

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[153] https://www.unam.edu.na/wp-content/uploads/2022/03/unam-scholarly-communication-policy.pdf
[154]Stephen A. Akintunde, PhD and Daniel Igoche, Time Check: Ten Years of IR at the University of Jos, paper presented at West and Central African Research and Education Network (WACREN) fifth annual conference, March 14-19, 2019, https://indico.wacren.net/event/71/contributions/498/attachments/424/521/1_stephenpresentation.pdf

Table 14: Repositories in Senegal

Institution	Comments
Cheikh Anta Diop University http://196.1.97.20/greenstone/cgi-bin/library.cgi?site=localhost&a=p&p=about&c=theses&l=fr&w=utf-8	The university has a French-language repository, which is not easy to navigate.

Repositories in South Africa

Almost every South African university has established an institutional repository. The University of the Witwatersrand maintains a page with links to South Africa's university and research repositories: http://libguides.wits.ac.za/c.php?g=145383&p=956647. In addition, the National Research Foundation coordinates a national system for mounting South African university theses and dissertations., which can be found at http://www.netd.ac.za/. The portal helps coordinate, manage, monitor, and support the development of electronic theses and dissertations programs at South African universities. Twenty-three South African universities have provided metadata to the portal. Finally, ten universities and research organizations have adopted open access policies, among them the University of Cape Town, the University of the Western Cape, and the University of Witwatersrand. The full list will be found at http://roarmap.eprints.org/view/country/710.html.

Table 15:Repositories in Sudan

Institution	Comments
Sudan University of Science and Technology http://repository.sustech.edu	The following notice appears on the repository home page: "It should be understood that all materials published by Sudan University of Science and Technology SUST on its website or Institutional Digital Repository are intended for scientific research and to support researchers. Therefore, it is strictly prohibited to reprint any material from master's, doctoral theses or books published on its website without first obtaining written permission from SUST. Any unauthorized reprinting of material or any portion of it gives SUST the authority to prosecute any person found in violation of this provision." Abstracts are available and some full-text—in Arabic and in English.
University of Khartoum http://khartoumspace.uofk.edu	Many of the resources are in Arabic, although some have an English translation of the abstract. There is some full-text in English that can be freely accessed. Some resources are not available without permission.

Table 16: Repositories in Tanzania

Institution	Comments
Muhimbili University of Health and Allied Sciences http://dspace.muhas.ac.tz:8080/xmlui/	The university repository policy will be found at https://campus.fahce.unlp.edu.ar/pluginfile.php?file=%2F58763%2Fmod_folder%2Fcontent%2F0%2FRepoMUHAS.pdf&forcedownload=1. Students are required to deposit their theses and dissertations in the institutional repository. Concerning peer-reviewed scientific articles, the university includes the following instructions: "The

Institution	Comments
	University shall oblige faculty and students to immediately deposit the peer reviewed scholarly literature with immediate or deferred access depending on the copyright conditions of the published literature."
Open University of Tanzania http://repository.out.ac.tz	The repository is very small. Although the university does not have an open access or repository policy, there is an OER policy. It can be found at: https://www.oerafrica.org/system/files/12584/out-open-education-resources-policy-final.pdf?file=1&type=node&id=12584.
Sokoine University of Agriculture http://www.suaire.sua.ac.tz/	Sokoine University has a small repository. Citations, abstracts, and some full text is available. Some resources are restricted and require permission to access them. Theses and dissertations carry the following copyright notice: "No part of this dissertation may be produced, stored in any retrieval system or transmitted in any form or by any means without prior written permission of the author or Sokoine University of Agriculture on behalf," although full text is freely available.
	The university also maintains a separate climate change collection at http://www.taccire.sua.ac.tz/. It is a collaborative program of five institutions: Ardhi University, Sokoine University of Agriculture, Tanzania Meteorological Agency, University of Dar es Salaam (UDSM), andthe Norwegian University of Life Sciences.
University of Dar es Salaam https://libraryrepository.udsm.ac.tz/home and http://repository.costech.or.tz/handle/123456789/2128	Unlike other repositories in this appendix, the University of Dar es Salaam repository contains citations and abstracts to theses and dissertations, but not always full text. Online research conducted by university staff is housed by the Tanzania Commission for Science and Technology (COSTECH). The COSTECH repository platform makes available research completed at many Tanzanian institutions. Go to http://repository.costech.or.tz/ for a full list.

Table 17: Repositories in Uganda

Institution	Comments
Makerere University http://dspace.mak.ac.ug	Makerere University does not have a repository policy, but on the repository website, there is full copyright information, including open access possibilities for the university community.
	Students must submit paper and electronic copies of their theses and dissertations to the Directorate of Research and Graduate Training. The hard copies are then sent to the Makerere University library, where abstracts are uploaded to the Makerere University institutional repository. Authors are encouraged to upload full text.

Table 18: Repositories in Zambia

Institution	Comments
University of Zambia http://dspace.unza.zm:8080/xmlui/	The University of Zambia repository contains over 5,000 resources, more than half of them theses and dissertations. Full text is available. Licensing information is unclear. Some theses and dissertations are fully copyright protected, but full text can be downloaded.

Table 19: Repositories in Zimbabwe

Institution	Comments
University of Zimbabwe https://ir.uz.ac.zw/	The University of Zimbabwe institutional repository contains over 8,200 full-text resources.

Appendix two: Useful Resources

The footnotes, with accompanying URLs, will be relevant for anyone who wants to read further and in more depth.

Below are a few resources that we have picked out as generally useful for readers who want to learn more about open knowledge. They may be amongst those in the citations, but we did not want them to get lost.

All URLs were accurate as of 8 May 2023, but they have a way of changing or the site disappears entirely. If that happens, you can try searching on the name of the site to ascertain whether there is a new URL.

For African Librarians and Library Educators. The African Library and Information Associations and Institutions (AfLIA) engages in capacity-building in the broad area of open knowledge, including open data, open access, OER, and open science. It organizes webinars, short courses, manages a WhatsApp group, and more. Go to https://web.aflia.net/

Open Access

EIFL Checklist for DSpace Repositories https://www.eifl.net/news/eifl-checklist-dspace-repositories-updated-0

SPARC institutional repository and resource guide https://sparcopen.org/wp-content/uploads/2016/01/IR_Guide__Checklist_v1_0.pdf

How Open Is It? https://sparcopen.org/wp-content/uploads/2015/12/hoii-guide_V2_FINAL-1.pdf

Setting the Default to Open (SPARC Europe) https://sparceurope.org/what-we-do/open-access/

A Quick Guide to Open Access https://www.openaire.eu/a-quick-guide-to-open-access

Open Data

Open Data Handbook https://opendatahandbook.org/

Open Data Online Learning (World Bank) http://opendatatoolkit.worldbank.org/en/essentials.html -elearning

Open Educational Resources

OER Africa is a one-stop shop for information about OER developments on the Continent and tutorials on how to use OERs in teaching and learning. Go to https://www.oerafrica.org/

For African librarians in creating an OER page for their users, the University of the Witwatersrand has an excellent page that you can use as a model. Go to: https://libguides.wits.ac.za/Open_Educational_Resources

A Basic Guide to Open Educational Resources (Neil Butcher) https://oasis.col.org/items/7a0576ac-de05-442a-a134-2498da2a0a62

Open Science

Open Science Training Handbook (Foster Open Science)
https://www.fosteropenscience.eu/content/open-science-training-handbook

Open Science Toolkit (UNESCO) https://www.unesco.org/en/open-science/toolkit?TSPD_101_R0=080713870fab20009970a06a1b98006092e479e4cb5c89e0497b2c8cf cff22061a9620744bd4ae6d084d1b5dbe143000f09176aa6f4bfbcc1bb19a13617e90040ff7307667f1a a2222ce4154accd28709a0195b7e083d45e4fa3e6373562f9ff