The Open Scholarship Primer

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A Guide to Open Access, Open Research & Open Education

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Licensing

Cover Image

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About the Book

The Open Scholarship Primer was developed from the Program for Open Scholarship and Education (POSE), a hybrid blended program offered in 2019-2025 at the University of British Columbia. The primer explores how open copyright licenses, collaborative practices, and networked technologies have the potential to lower barriers to knowledge by making the processes and products of scholarship more distributed, transparent, and accessible. The text offers a content on the full spectrum of open scholarly activities including, open access, open research, and open education. The text contains multimedia components and self-assessments to allow participants to asynchronously practice what they learn.

Structure

Each chapter is broken down into themes. For example, Open Access contains The Publication Ecosystem, Author Rights, and Pathways to Open. Each theme contains an introduction, sub-parts of that theme (e.g. The Publication Ecosystem – Academic Publishing Today), a conclusion.

In the sub-parts, you will find interactive components, including:

- **Scenarios/Case Studies** – The case studies/scenarios provide a detailed overview of a particular idea within a real-world context
- **Dig Deeper** – Includes additional resources for going into more depth on a topic.
- **Test Your Knowledge** – Interactive questions that help you think through what you have learned and apply it.

Each chapter also includes an activity page that culminates what you have learned in Open Access, Open Research, and Open Education. The activities include:

This **Developing a Plan Activity** section of the end of chapter activities is meant to provide with a place to reflect and organize some of the different ways open scholarship could be applied to your work. At the end of this activity, you can download your reflection to action it!

The **Open Scholarship Primer Activity Bank** are activities that you will complete as part of each chapter. The concept behind the activity bank is to learn by doing. Some activities will be more critical thinking and reflection prompts, while others will ask you to interact with specific open scholarship tools.

Additional Resources

This book contains a glossary of terms to assist with learning the language of open scholarship. The terms are linked throughout the text and can be found at the back of the book.

INTRODUCTION TO OPEN SCHOLARSHIP

Open Scholarship is a broad and somewhat loose term that has emerged in response to a need to identify and speak to a growing number of open practices within academia. Open Access, Open Science, Open Data, and Open Education make up a sprawling landscape of interconnected approaches to and focuses on “openness”.

With roots in democracy, equality, and social justice, open scholarship operates under the assumption that knowledge creation and dissemination should be understood as social practices. In this sense, as Tom Woodward has stated, “Open is a purposeful path towards connection and community,” and the values of inclusion, social impact, and participation are integral to the practice of open”.[1] In recent years, there has also been increased emphasis on open methods to advance the speed, sharing, and integrity of scientific discovery.

Open scholarship is the application of open practices throughout the teaching, learning, research and scholarly environment. Examples of open practices include:

- The use of open copyright licenses that grant permission for others to freely access, reuse, redistribute, or build upon your scholarly work.
- Using networks, web-based tools, and the Internet to facilitate collaboration.
- Making research processes, data, and code transparent in order to increase the reproducibility and accessibility of research.
- Creating and using educational resources that are free of costs and copyright restrictions in order to lower student costs and access barriers for learning materials such as textbooks.
- Integrating principles of social justice into academic processes in order to make scholarship more equitable and inclusive.
- Engaging in pedagogical practices where learners are creators of knowledge and have agency in their own education.
- Connecting and engaging with communities, networks, and the broader public.

Notes

1. Grush, M. (2014, November 12). Open pedagogy: Connection, community, and transparency — A Q&A with Tom Woodward. Campus Technology. Retrieved from https://campustechnology.com/articles/2014/11/12/open-pedagogy-connection-community-and-transparency.aspx

What is Open Scholarship?

Open scholarship is an umbrella term which encompasses open access, open research, open science, open data, open education, open pedagogy and all other forms of openness in the scholarly and research environment. In this text, we've broken open scholarship into three main units: Open Access, Open Research, and Open Education, which we'll briefly introduce

Open Access

The term open access was first clearly articulated in 2002 in the Budapest Open Access Initiative and in its simplest expression refers to academic research that is freely accessible "on the public internet" and available for the public to "read, download, copy, distribute, print, search, or link to".[1] Importantly, open Access is a public good, based on the belief that the public, who largely funds education and research, should have broad and unfettered access to the knowledge being produced by the academy. Since the Budapest Open Access Initiative, approaches to achieving open access have proliferated.

Today, multiple forms of open access – Green, Gold, Platinum etc. – provide researchers with a variety of paths and approaches that allow them to achieve varying degrees of openness. While the multiplicity of paths provides necessary flexibility, it has also allowed various stakeholder groups – funders, publishers, governments, universities – to present and promote "lesser, degraded forms of open access"[2] and frustrate attempts to truly transform scholarly publishing. In 2017, reflecting on the 15 year anniversary of the original declaration, the BOAI reiterated its foundational principles and acknowledged that further work would need to be done to "align incentives for scholars to share their work openly and …lower costs related to open access publishing"[3] if Open Access was to supplant traditional publishing methods. Today, this is where much of the workaround open access is concentrated, not in articulating the public good of open access, but in developing strategies to make it the default method of academic knowledge dissemination. Finally, the values inherent in the open access movement continue to be influential and have come to form a set of foundational principles visible in all areas of open scholarship.

In the Open Access chapters, we will explore the history and basic economics of scholarly publishing as well as the value of intellectual property to academics and publishers. We will also define different types of open access and dive into the benefits and challenges that open access brings to scholarship.

Open Research

The sharing of research results, methods, and data is central to scientific practice, and stimulates new forms of communication and collaboration. Today many funding agencies are mandating open access to the outputs and processes of research, accelerating research and learning, and increasing the impact universities can have beyond their walls. Open science and open data work together to further the reach of scientific research outputs. Open science is a "movement which aims to make scientific research, data and dissemination accessible to all levels of an inquiring society" (LERU, 2018). It supports the scientific community and the advancement of scientific discovery by promoting transparency and in turn supporting reproducibility and credibility. Open data focuses on making machine-readable datasets from a primary source accessible within the confines of privacy and cultural protocols.

Transparency is a core value in both open science and open data and refers to open sharing of data, research design, and materials, making it easier to reproduce the evidence derived from research.[4] Openness in the sciences also seeks to make research outputs comprehensible to a broader public providing the opportunity for scientific research to have applications in non-academic environments.[5] The "citizen science movement" creates the opportunity for public participation in research and practical applications supporting the greater reach of scientific outputs.

In the Open Research chapter, we will examine the relationship between open workflows and open software and reproducible research. We'll also look at the value and importance of open data for enabling research transparency, reproducibility, and innovation.

Open Education

Open education can trace its roots to the the Universal Declaration of Human Rights, adopted by the United Nations 1948, which states "everyone has a right to education."[6] The seminal 2007 Cape Town Open Education Declaration stated that open education and the use of open educational resources (OER) contribute "to making education more accessible, especially where money for learning materials is scarce. They also nourish the kind of participatory culture of learning, creating, sharing and cooperation that rapidly changing knowledge societies need."[7] In 2012, the UNESCO Paris OER Declaration recommended that governments "promote and use OER to widen access to education at all levels, both formal and non-formal, in a perspective of lifelong learning, thus contributing to social inclusion, gender equity and special needs education."[8]

Open education thus encompasses a set of practices directed at making the process and products of education more transparent, understandable and available to all people. Open educational resources (OER) are "teaching, learning, and research resources that are free of cost and access barriers, and which also carry legal permission for open use. Generally, this reuse permission is granted by use of an open license (for example, a Creative Commons license) which allows anyone to freely use, adapt and share the resource—anytime, anywhere".[9] OER creates accessible learning opportunities on a large scale by eliminating cost barriers to educational resources and providing opportunities to adopt, reuse, and adapt resources for sustainable use in classrooms.

In the Open Education chapters, we'll explore the basic concept of Creative Commons licenses and how they can be applied to educational resources, we'll discuss strategies for adapting and contextualizing learning materials that have open licenses, and examine the pedagogical benefits and impacts to integrating an open approaches into teaching and learning.

Notes

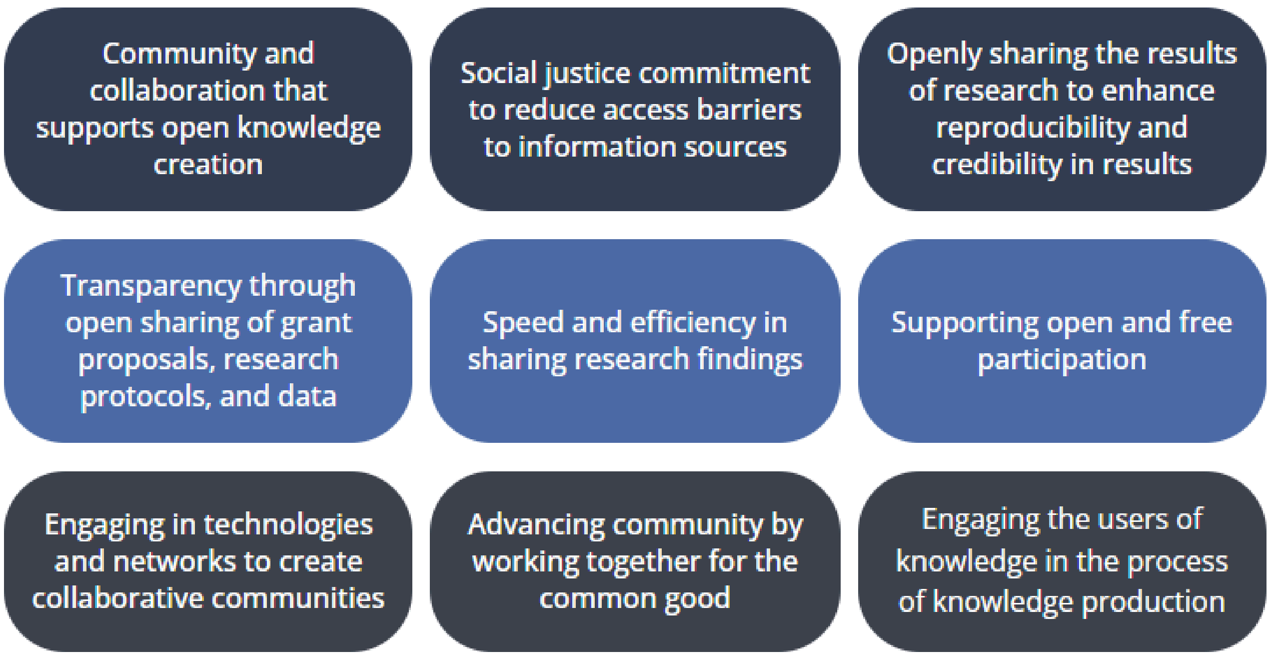
1. Budapest Open Access Initiative. (2002). Make research publicly available. Retrieved November 12, 2025, from https://www.budapestopenaccessinitiative.org/
2. Budapest Open Access Initiative. (2017, February 14). BOAI15: 15th anniversary. https://www.budapestopenaccessinitiative.org/boai15-1
3. Ibid
4. McKiernan, E. C., Bourne, P. E., Brown, C. T., Buck, S., Kenall, A., Lin, J., McDougall, D., Nosek, B. A., Ram, K., Soderberg, C. K., Spies, J.

R., Thaney, K., Updegrove, A., Woo, K. H., & Yarkoni, T. (2016, July 7). *Point of view: How open science helps researchers succeed*. *eLife*, 5, e16800. https://doi.org/10.7554/eLife.16800

5. Bartling, S., & Friesike, S. (2014). Opening science: The evolving guide on how the internet is changing research, collaboration and scholarly publishing. Springer.
6. United Nations General Assembly. (1948, December 10). Universal Declaration of Human Rights (English translation). Office of the United Nations High Commissioner for Human Rights. https://www.ohchr.org/sites/default/files/UDHR/Documents/UDHR_Translations/eng.pdf
7. Cape Town Open Education Declaration. (2007). Read the Declaration. Retrieved November 12, 2025, from http://www.capetowndeclaration.org/read-the-declaration
8. UNESCO. (2012, June 20–22). Paris OER Declaration [Declaration]. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000246687
9. SPARC. (n.d.). Open education. https://sparcopen.org/open-education/

Why Open Scholarship

While there are a variety of objectives associated with the different aspects of open scholarship, there are also commonly held values that operate across different areas. Some of these values are more prevalent in specific open scholarship areas (e.g. transparency and reproducibility in open science); however, the core values of participation, community building, and free and unrestricted access to research outputs are fundamental to all facets of open scholarship. The following is a list of values held by open scholarship found within the literature:



The Values of Open Scholarship

Martin Weller, in his open access book the Battle for Open, describes some of the motivations that scholars may have for adopting open approaches. These include:

- **Increased audience** through the removal barriers to people accessing a resource, be it an article, book, course, service, video or presentation. This means it has to be free, easily shareable, online, and with easy rights.
- **Increased reuse** by allowing others to take what you have created and combine it with other elements, adapt it and republish. The same considerations are required as above, but with an extra emphasis on minimal rights and also creating the resource in convenient chunks that can be adapted. Whereas increasing audiences mean releasing an article online, increasing reuse might lead someone to share the data that underlies it.
- **Increased access** with the intention is to support particular groups who may be disadvantaged. This may mean incorporating a social justice approach to scholarship or developing strategies such open access admission or courses such that no formal entry qualifications are required to study.
- **Increased experimentation** through the use of different media or approaches that wouldn't fit within the normal constraints of standard practice.

- **Increased reputation** by being networked and online can help improve an individual's or an institution's profile. As an academic, operating in the open, publishing openly, creating online resources, being active in social media and establishing an online identity can be a good way to achieve peer recognition, which can lead to tangible outputs such as invites to keynotes or research collaborations
- **Increased participation** and input through open practices. This could be crowdsourcing in research or getting feedback on a book or research proposal. Being open allows others to access it and then provide the input required.

Additionally, open scholarship can make research and other academic processes more efficient: greater access to scientific inputs and outputs can improve the effectiveness and productivity of the research system, by reducing duplication and the costs of creating, transferring and reusing data; allowing more research from the same data; multiplying opportunities for domestic and global participation in the research process. Open approaches can also improve the quality and integrity of scholarship: open access to scientific outputs, data and other assets that support the research process offer the opportunity of a wider evaluation and scrutiny by the scientific community, thus allowing a greater and more accurate replication and validation of research results.

Finally, by making the processes and outputs of scholarship open, researchers and educators promote awareness, knowledge, and learning among the public. Openness evidence of the outcomes of public funded research and learning can help to build trust and support for public policies and investments. Moreover, it promotes citizen's engagement and even active participation in scientific experiments and data collection. This engagement can promote collaborative efforts and faster knowledge transfer. This allows better understanding of challenges that require coordinated international actions such as climate change or the ageing population and also could help identify solutions more effectively.

In Their Own Words

Jon Beasley-Murray, Associate Professor, UBC Latin American Studies: "I have always been a strong believer in open access. The university is no ivory tower, and especially at a public university, it is our ethical and political duty to share what we are doing with as broad a public as possible. Otherwise, we are simply pandering to the notion that learning is something that individuals purchase for their own personal self-improvement or betterment. As far as possible, instead of inhabiting educational walled gardens, we should be trying to dismantle the barriers (largely imaginary, in any case) that separate academia from the rest of the world. But we should do so without losing sight of the fact that the university has a logic different from the rest of the world—not least, for instance, in that it refuses the commodification of knowledge, the idea that anything and everything can be bought and sold. Teaching "in the open" drives this point home."

Surita Jhangiani, Assistant Professor of Teaching, UBC Faculty of Education: "There are many reasons [it is important for instructors to consider using open educational resources], but one factor that particular resonates with me is diversity. Creating OER resources and collaborating with others allows for a diversity of voices and perspectives to be presented. Often textbooks are written from a hegemonic Eurocentric bias, and different ways of knowing and difference experiences are disregarded. OER creates the space to disrupt this landscape and challenge longstanding ways of thinking, which are proving to be harmful. The diversity that can be embedded into OER creates spaces for growth and transformation, which to me is compelling on its own."

Arthur Gill Green, Affiliate Assistant Professor, UBC Geography: "If we believe education leads to human flourishing and that education is a right, then the use and creation of OER in tandem with effective teaching and learning strategies (that is, open pedagogy) is required to establish and protect that right. Open pedagogy fulfills one of the core commitments to a democratic system by cultivating an informed, educated, and engaged electorate."

Adaptation Statement

Generative AI and Open Scholarship

> Generative AI (GenAI) is a type of artificial intelligence (AI) that is able to create new content, such as text, images, music, or entire datasets, based on patterns and information it has learned from existing data. While traditional AI systems are mainly used to analyze existing data and make predictions, GenAI takes this one step further by creating new data similar to the data it accesses. When an AI technology is creating something by itself, this is called "generative AI" or "GenAI".[1]

GenAI is rapidly transforming how we conduct research, scholarship, and teaching and learning. While we engage in this work we will need to grapple with what it means to include GenAI as organizations and institutions develop policies, best practices, and limitations to GenAI use. Each part of this text will address the emergence of GenAI and it's impacts on the area of open access, open research, and open scholarship. As this is an emerging area, much of what will be contained in the parts will be debates, discussions, and the potential benefits and risks of of GenAI in these areas. POSE will not offer training in GenAI use or application in scholarship and education but will provide specific information related to open scholarly practices. The following outlines how GenAI is covered in each unit:

Open Access

The Open Access chapters will cover issues related to GenAI and publishing, with a particular focus on its impact on open access. The following is covered in the unit:

- Academic publishing and GenAI – Including the opportunities and challenges of GenAI and publishing practices
- Authorship and GenAI – Including discussion on ethics of authorship, originality and GenAI, and the complexities of copyright

Open Research

The Open Research chapters will cover issues related to GenAI and research, with a particular focus on its impact on open scholarship. The following is covered in the unit:

- GenAI Tools to Create Readable Code – opportunities and challenges in using an LLM as a coding assistant.
- GenAI for data analysis – Including ways to improve the long-term reproducibility of your analysis.

Open Education

The Open Education chapters will cover issues related to GenAI and teaching and learning, with a particular focus on its impact on education. The following is covered in the unit:

- GenAI as a Tool for OER – Including the potential for creation, adaption, and remixing using GenAI tools, the tensions and ethical considerations of using GenAI, and recommendations on using the tools for generative OER
- GenAI and Open Licenses for OER – Including ways to mitigate the GenAI use if openly licensed content for training
- Ethics and Tensions in using GenAI in Open Education

Dig Deeper

If you are interested in learning about GenAI and the current landscape for teaching, learning, and scholarship, the following resources will give you a good introduction and may support your learning when completing the POSE Units:

- UBC Suggested Tools and Training for GenAI
- AI, Machine Learning, Deep Learning and Generative AI Explained by IBM Technology
- Glossary of GenAI Terminology
- Commonly Used GenAI Tools
- GenAI and Teaching and Learning

Notes

1. The University of British Columbia. (n.d.). *Generative AI*. https://genai.ubc.ca

OPEN ACCESS - THE PUBLICATION ECOSYSTEM

The modern publishing ecosystem is a complex multi-stakeholder environment. As an individual operating within this system it is valuable to understand the motivations driving this industry and to consider how your decisions contribute to larger systemic issues. Ownership of intellectual property is fundamental to the research enterprise, yet few scholars fully understand their rights or feel comfortable negotiating with publishers to retain them. As granting agencies begin to require open access (OA) and institutions become more focused on knowledge mobilization and impact, researchers need to develop strategies to make their work openly accessible.

In the following chapters you will:

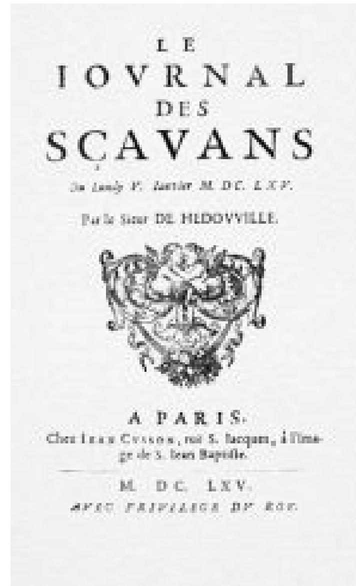
- Understand the history of academic publishing and the impact of the transition from print to digital publishing
- Understand the basic economics of publishing
- Identify the role of the academic library within the publishing ecosystem
- Identify predatory publishing practices and their relationship to OA
- Evaluate the degree to which publishers confer value and prestige within the academy
- Consider the future of academic publishing and the impacts of artificial intelligence
- Understand the types of intellectual property in Canada and how they are legally protected
- Identify the gaps in Canadian copyright as it relates to traditional knowledge
- Explain the value of intellectual property to academics and publishers
- Identify common terminology found in journal publisher contracts
- Understand how to negotiate journal publishing contracts
- Explain the benefits and barriers to openly sharing your intellectual property
- Understanding of the basic rationale for OA
- Understanding of the benefits and challenges that OA presents
- Explain the various types of OA

Academic Publishing Today

The contemporary academic publishing ecosystem is the product of centuries of tradition and convention. It is relied upon by academics, institutions, funders and communities to vet and confer quality upon research and scientific discovery. In the academy, publishing plays a particularly important role, serving as the mechanism through which scholarly research is circulated and judged.

For those who have decided to pursue a career in academia, they are likely already aware of the importance that their publishing decisions can have on their ability to secure research funding, obtain promotion and elevate their profile within their discipline.

Although research assessment and scholarly communication are not the same thing, they are often conflated. One potential result of this is an over-reliance on quantitative metrics that prioritizes measures and rankings over science and can lead to the "gaming" of the publishing system.[1]



The Journal des sçavans is thought to be the oldest academic journal (1665). 1665 journal des scavans, *Unknown,*

Publish or Perish?

As the quantification of research impact and a **publish or perish** mentality become more prevalent it becomes increasingly important for scholars to understand the complexities of the current academic publishing landscape and, in particular, to recognize the forces at play that make it difficult to affect changes that would serve to create a more equitable publishing environment and academic rewards system.

Tradition vs. Innovation

If we begin by looking at the history of the academic publishing system as a way to understand the power it wields, it is interesting to note that relatively little has changed in the centuries since the first academic journals were established. Aside from a shift to digital publishing and the formalization of peer review, the systems and formats established by early journals persist to this day.

There are of course many benefits to this system. It has proven to be a reliable model of disseminating science and established peer review practices, backed by well-know publishers, continue to be the benchmark of credible science.

However, this system has also proven inflexible and resistant to change, even in the face of new technology and dissemination methods that make greater and faster communication possible. Established publisher "brands" have come to dominate science and growing consolidation has granted the publishers left standing with increased influence and control over science. As this influence has grown over time particular journals and publishers have become increasingly synonymous with quality and prestige. At the same time, other stakeholders operating within academia including universities and funders have begun to look to these publishers to confer quality and value. Due to an increased focus on the importance of metrics including the **Journal Impact Factor (JIF)** and author **h-Indexes** in tenure and review processes, for example, many scholars are strongly encouraged, if not required, to publish in specific high quality or prestigious journals in their field. This makes it increasingly difficult for individuals to make independent decisions about where and how they publish and may discourage many from choosing to publish in non-traditional venues.

Scenario – Publish or Perish

Peter Higgs, the British physicist who gave his name to the Higgs boson, wrote a total of 10 papers over the course of his academic career. He is quoted in the Guardian as stating that he believes no university would employ him in today's academic system because he would not be considered "productive" enough.

- How is productivity measured in your discipline?
- What pressure do you feel to quantify your research output in order to advance your career?
- How do you understand the relationship between quantity and quality when it comes to assessment of your academic career?

Dig Deeper

To learn more about the modern academic publishing ecosystem, review:

Fyfe, A., et al. (2017), Untangling Academic Publishing: a history of the relationship between commercial interests, academic prestige and the circulation of research. Licensed under CC-BY 4.0.

Notes

1. Chapman, C. A., Bicca-Marques, J. C., Calvignac-Spencer, S., Fan, P., Fashing, P. J., Gogarten, J., Guo, S., Hemingway, C. A., Leendertz, F., Li, B., Matsuda, I., Hou, R., Serio-Silva, J. C., & Stenseth, N. C. (2019). Games academics play and their consequences: How authorship, h-index and journal impact factors are shaping the future of academia. Proceedings of the Royal Society B: Biological Sciences, 286, Article ID 20192047. https://doi.org/10.1098/rspb.2019.2047

The Digital Shift an Open Access

The development and proliferation of the internet has been the most powerful force to disrupt the academic publishing ecosystem since its inception over four hundred years ago. Among other things, the internet promised to provide a cheaper and faster way to disseminate knowledge. As a result of this potential, **open access** (OA) emerged as an alternative to traditional subscription-based publishing. As a movement, OA is best understood as a response to one of the fundamental weaknesses of scholarly publishing – research is largely supported through public funds, yet the vast majority of funded research is published in paywalled journals that only those affiliated with academic institutions have access to. Limiting access to this knowledge not only prevents those who have funded the research from accessing it, it also severely undercuts its potential to positively impact the world and contribute to innovation and the betterment of society.

Promise vs. Reality

Unlike traditional academic publishing, OA publishing operates without passing along any costs to readers. OA research is published freely online and is available to any reader with access to the internet. This scale of public dissemination would be difficult to conceptualize without the internet, as it relies largely on online platforms as a means of public dissemination. While there is no denying that the internet has had a profound effect on the publishing industry, both for traditional publishers and in the development of OA, for many it has not lived up to its more radical and transformative potential. Interestingly, the **Budapest Open Access Initiative**, 2002, which is often considered the first formalized articulation of OA, imagines OA to be possible not so much because the internet will make all things discoverable, but because the costs of publication will decrease dramatically and publishing will be much easier over the internet, making it possible for the academy to take back control of the publishing enterprise from commercial publishers.

Reflecting on the 15th anniversary of the original BOAI, Jean-Claude Guédon wrote:

> “Much has happened, and much of it is positive, but taking stock of what has been achieved has also become an urgent task, if only to get a clear sense of our bearings: while Open Access is now here to stay, it also displays a variety of forms that do not all conform with the project of distributed human intelligence with which it is associated. Lesser, degraded, forms of Open Access have also and gradually emerged, sometimes as the result of power plays by powerful actors, sometimes out of compromises proposed by people of good will. At the same time, the very multiplicity of social actors now involved in Open Access has made the field much more complex than it was fifteen years ago. ” If we compare the early articulation of the promise of open access to its contemporary reality, it is easy to see that the promise of the internet with respect to transforming academic publishing, has largely been unfulfilled. While open access continues to be an important and growing force withing publishing, the more radical elements of open access – based on the assumption that the academy would regain control over knowledge dissemination – have not come to fruition. Today commercial publishers are key players in the open access publishing ecosystem, having learned how to monetize open access publishing by charging back the cost of publication to authors.”[1]

The Impact of COVID-19

Events surrounding the COVID-19 pandemic provide another opportunity to reflect on the current state of academic publishing and highlight the need to quickly and freely disseminate scientific research. In a recent statement on the importance of sharing COVID-19 data **United Nations Educational, Scientific and Cultural Organization (UNESCO)** stated, "the value and necessity of Open Solutions is crucial. Open Access to scientific information and open data facilitate better and faster research towards a vaccine and inform public health measures essential to contain the spread of the virus."[2] The fact that so many publishers, funders, governments and researchers have promised to release their COVID-19 related work openly both demonstrates the real value of OA and begs the question, why hasn't open sharing become the norm for all scientific publishing?

Dig Deeper

To read the rest of Jean-Claude Guédon's reflection, review:

Guédon, Jean-Claude (2017) Open Access:Toward the Internet of the Mind. Licensed under CC-BY 4.0.

Notes

1. Guédon, J.-C. (2017, February 23). Open access: Toward the Internet of the mind. Budapest Open Access Initiative. https://www.budapestopenaccessinitiative.org/boai15/open-access-toward-the-internet-of-the-mind/
2. UNESCO. (n.d.). Communication and information: Response to COVID-19. https://en.unesco.org/covid19/communicationinformationresponse/opensolutions

The Economics of Publishing

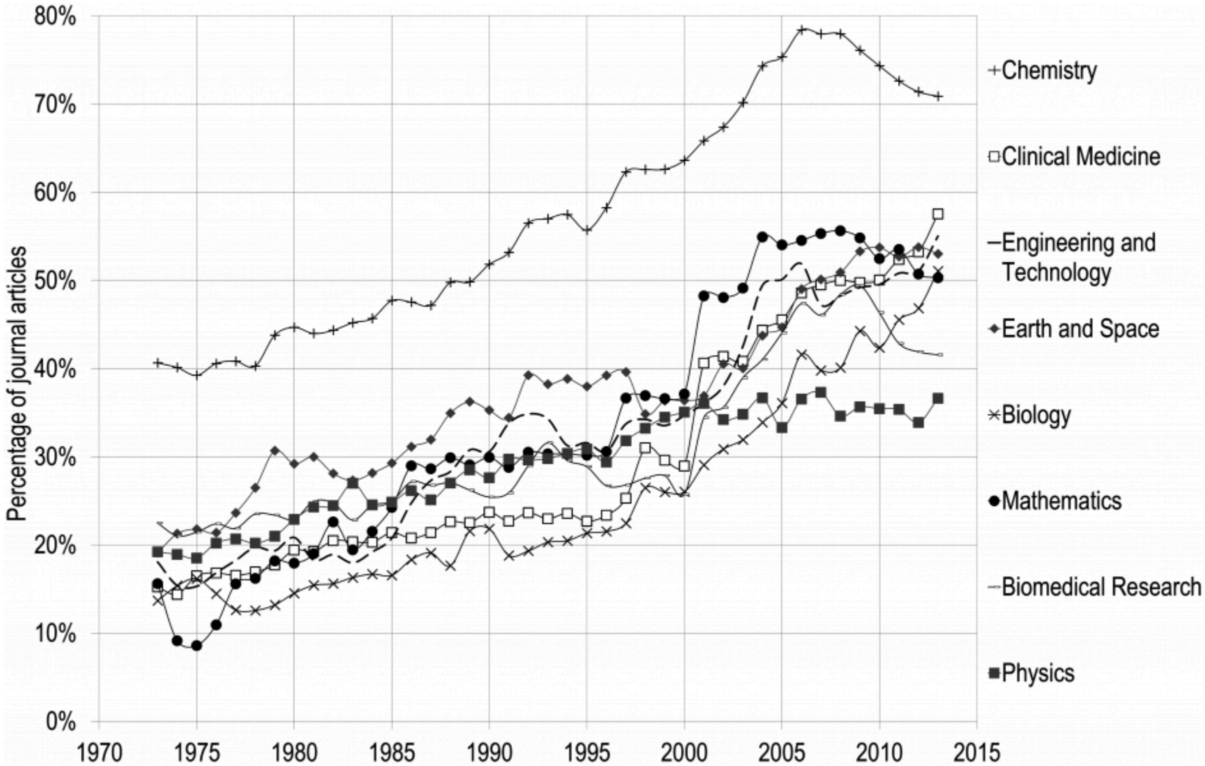
As of 2015, the academic publishing ecosystem is a 25 billion dollar a year industry.[1] In addition to being a large industry it is a consolidated one, with only 5 for-profit publishers responsible for approximately 50 percent of all output.[2]

Test Your Knowledge

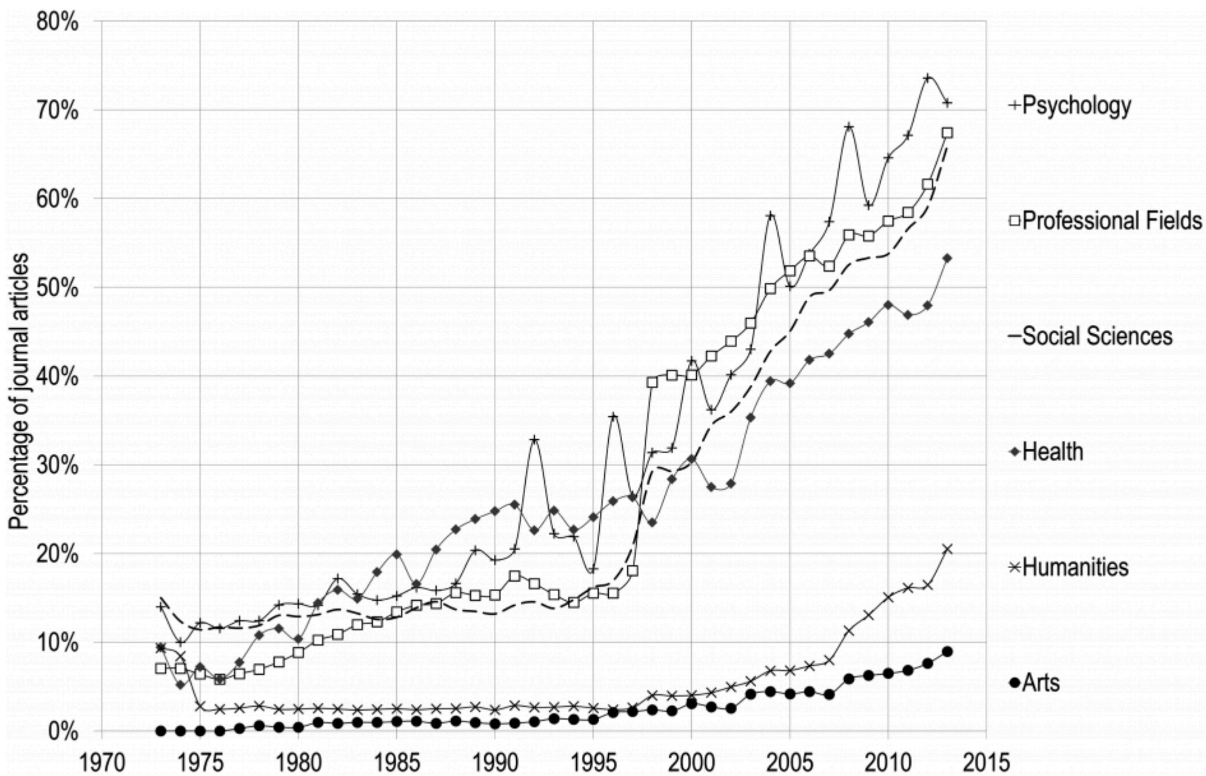
An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.bccampus.ca/openscholarship/?p=46#h5p-1

Unsurprisingly, a lack of competition between publishers has had a significant impact on the price of scholarship. Decades of subscription cost increases and talk of 40 percent profit margins for the biggest names in academic publishing have been concerns for academic libraries for years. Unfortunately, unsustainable pricing is an issue that has not garnered much attention within the larger academy. This is perhaps due to the peculiarity of the economics of scholarly publishing whereby the main consumers of academic research (academics and students) are largely shielded from the cost.

Aside from purely financial considerations, consolidation and commercialization have the potential to cause harm to the integrity of science itself. Increasingly, publishers favor positive results and novel studies. Researchers, realizing what is likely to get published, may then direct their research in order to meet these demands. In recent years scientists have begun to reckon with the consequences of publication bias, including bringing awareness to the replication crisis and advocating for high impact journals to highlight negative results studies.



Percentage of papers published by the five major publishers, by discipline in the Natural and Medical Sciences, 1973–2013. Retrieved from Larivière, V., Haustein, S., & Mongeon, P. (2015). The oligopoly of academic publishers in the digital era. PLOS ONE, 10(6), e0127502. https://doi.org/10.1371/journal.pone.0127502.



Percentage of papers published by the five major publishers, by discipline in the Social Sciences and Humanities, 1973–2013. Retrieved from Larivière, V., Haustein, S., & Mongeon, P. (2015). The oligopoly of academic publishers in the digital era. PLOS ONE, 10(6), e0127502. https://doi.org/10.1371/journal.pone.0127502.

Dig Deeper

To learn more about consolidation in academic publishing, review:

Larivière, V., Haustein, S., & Mongeon, P. (2015). The oligopoly of academic publishers in the digital era. *PLOS ONE*, *10*(6), e0127502. https://doi.org/10.1371/journal.pone.0127502

Publishers as Research Analytics Providers

At the same time that big publishers have been creating new journals and purchasing smaller publishers and independent journals, they have also expanded their portfolios to include products and services relevant to other parts of the research life cycle. For example, along with its scholarly publications **Elsevier** is also the owner of Scopus, SciVal, Pure, Clinicalkey, Mendeley, SSRN, and several other tools that researchers, librarians, and institutions rely on to support the research endeavor.

As these publisher brands continue to expand and integrate other pieces of academic infrastructure into their portfolios, there is growing concern about the implications this will have on the academy. While it may be feasible for scholars and institutions to publish their own journals and make their research available, it is much harder to imagine them recreating tools like SciVal, which pulls data from other Elsevier products to visualize research performance and benchmark scholars relative to their peers. It is perhaps telling then that in recent years Elsevier has rebranded itself as a "global information analytics business", choosing to highlight its value not in publishing but in analytics tools, which are supported using data generated via its publishing arm.

Case Study – Bepress

In late 2017 Elsevier announced its acquisition of Bepress, a scholar-led company responsible for Digital Commons – a cloud-based institutional repository software that allows universities to share research outputs such as preprints, student theses, data sets and special collections with the public for free. The sale to Elsevier, long considered an adversary to many in academic libraries, prompted sharp rebukes from Bepress customers, spurring some to call for a "beprexit".

- Should libraries and academic communities be concerned with consolidation within the researcher infrastructure marketplace? What are the advantages and disadvantages to consolidation?
- Should there be an expectation that scholar-led or community supported endeavours remain non-profit?

Dig Deeper

To learn more about the consolidation of academic infrastructure, review:

Posada, Alejandro and George Chen (2018). Inequality in Knowledge Production: The Integration of Academic Infrastructure by Big Publishers. Licensed under CC-BY.

Notes

1. Ware, M., & Mabe, M. (2015). The STM report: An overview of scientific and scholarly journal publishing (4th ed.). International Association of Scientific, Technical and Medical Publishers. https://s3.eu-west-2.amazonaws.com/stm.offloadmedia/wp-content/uploads/2024/08/10040615/2015_02_20_STM_Report_2015-1.pdf
2. Larivière, V., Haustein, S., & Mongeon, P. (2015). The oligopoly of academic publishers in the digital era. *PLOS ONE*, *10*(6), e0127502. https://doi.org/10.1371/journal.pone.0127502

The Role of the Academic Library

In many ways, academic libraries are well-positioned to see the effects of publisher consolidation firsthand, as they remain the primary purchasers of scholarly content. Since the 1990's academic libraries have largely transitioned their purchasing of academic content to "**big deals**", under which publishers bundle together hundreds or even thousands of journal titles into packages. When this model emerged it offered substantial value for libraries as the per-title cost of journals went down. "Following this new model, size of serial collections in academic libraries increased almost fivefold from 1986 to 2011".[1] While this new purchasing model allowed libraries to rapidly increase their collections, it also resulted in increases in collection expenditures and decreases in the value of these investments, as researchers and students still largely read and cited only a fraction of the titles held in library collections.

Transitioning Away from the Big Deal

In more recent years, the thinking around the value of the big deal has slowly changed as libraries have come to terms with the fact that it is no longer possible, nor necessary, to keep up with the ever increasing level of scholarly output. For decades now, publishers have been increasing the costs of journal subscription deals at rates that outpace inflation. As a result, subscriptions become more expensive every year. This has resulted in what is often referred to as the "**serials crisis**", whereby academic libraries are increasingly unable to keep up with the rising cost of subscriptions.

In the last few years frustration over the rising cost of subscriptions, paired with the growing availability of open access (OA) research, has led many libraries to either cancel their big deal subscriptions or work with publishers to draft new types of licenses that incorporate OA principles and offset costs for OA publishing. In a 2020 survey of academic library directors, half indicated that they will likely cancel a journal package in the next five years.[2]

While big deal cancellations are still news-worthy occurrences, there is good evidence to suggest that they will become more commonplace in the future. Schools that have yet to make the difficult decision to cancel are looking to trailblazers like the University of California, which recently cancelled its subscription with Elsevier after a long and ultimately unsuccessful renegotiation.[3] The UC system was able to marshal faculty support for their cause, but many schools are still unsure if their faculty and students will support a decision to cancel a large subscription package.

Although UC eventually came to an agreement with Elsevier in 2021, other universities and purchasing consortia watched their negotiation process carefully and have begun to fight for more progressive terms in their licenses.[4] For example, in 2021 the Canadian Research Knowledge Network negotiated a new Elsevier license on behalf of its member institutions in Canada that includes reduced costs for OA publishing and other progressive elements.[5]

Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.bccampus.ca/openscholarship/?p=48#h5p-2

Scenario – Breaking up with the 'big deal'

Let's consider this scenario: The library has just informed your department that due to budget constraints they plan on cancelling a large subscription package that includes many of the journals you regularly read and cite. The library will be purchasing individual subscriptions to a much smaller number of journals and while a few of the key journals you rely on are on the list, others are not.

- What would be your initial response to the library's decision?
- What should the library do and who should they consult before finalizing their new approach?

The Next Big Deal – AI Training Collections

While libraries are still contending with the legacy of subscription packages and publisher "big deals", a new frontier for licensing is beginning to emerge around use of collections for **GenAI** training and **text and data mining**. Many standard licensing agreements between libraries and content providers explicitly forbid using these collections for textual analysis or AI training. Consequently, researchers are often unable to access library resources in the ways they require. In the long term, libraries are hopeful that AI regulation and policy will help clarify that using copyright-protected works for machine learning is a protected right, but in the meantime, libraries are trying to renegotiate their licensing agreements to permit AI training, or are purchasing special collections that are built for such uses. This inevitably puts new financial burdens on libraries and creates additional hurdles for students and faculty. Additionally, it raises the issue of bias, as researchers may be limited to using inferior data and or tools because of licensing restrictions.[6]

Libraries are just beginning to see the commodification of collections for AI purposes and many of even the largest publishers have yet to settle on a model for AI licensing. **ITHAKA S&R** has begun to track generative AI licensing agreements, and have noted that "Thus far a standard set of terms or overall model from which to build these deals has yet to emerge."[7]

Dig Deeper

To learn more about the cancellation of big deals, review:

SPARC's Big Deal Cancellation Tracker

Anderson, Rick. (2017). When the Wolf Finally Arrives: Big Deal Cancellations in North American Libraries (comments on this post highlight the ongoing debate).

Notes

1. Shu, F., Mongeon, P., Haustein, S., Siler, K., Alperin, J. P., & Larivière, V. (2018). Is it such a big deal? On the cost of journal use in the digital era. College & Research Libraries, 79(6), 785-804. https://doi.org/10.5860/crl.79.6.785
2. Frederick, J. K., & Wolff-Eisenberg, C. (2020, April 2). Ithaka S+R US Library Survey 2019. Ithaka S+R. https://doi.org/10.18665/sr.312977
3. University of California, Office of Scholarly Communication. (2019, March 1). UC and Elsevier: FAQs. https://osc.universityofcalifornia.edu/uc-publisher-relationships/uc-and-elsevier/
4. Kell, G. (2021, March 18). UC's deal with Elsevier: What it took, what it means, why it matters. University of California. https://www.universityofcalifornia.edu/news/ucs-deal-elsevier-what-it-took-what-it-means-why-it-matters
5. Canadian Research Knowledge Network. (n.d.). CRKN-Elsevier license renewal. https://www.crkn-rcdr.ca/en/crkn-elsevier-license-renewal
6. IBM Technology. (2023, October 16). Shedding light on AI bias with real-world examples. https://www.ibm.com/think/topics/shedding-light-on-ai-bias-with-real-world-examples
7. Ithaka S+R. (n.d.). Generative AI licensing agreement tracker. https://sr.ithaka.org/our-work/generative-ai-licensing-agreement-tracker/

Predatory Publishing

Predatory publishing is the name given to a parasitic form of open access (OA) publishing that asks authors to pay the costs of publication often associated with OA, but doesn't adhere to the rigorous ethical standards expected by authors and readers. As a result of this strategy, predatory publishers are often accused of having high acceptance rates and not conducting thorough peer review. Predatory publishers typically have greater profit margins, as they accept a higher number of articles and collect more fees yet do not spend these fees on the publication process (peer review, copy editing, etc.).[1]

Who are the Prey?

For many active scholars, predatory publishing is nothing more than a nuisance, as easily ignored as the unsolicited emails they receive inviting them to submit a manuscript in a discipline far outside their area of expertise. Unfortunately not all scholars are able to distinguish between legitimate and illegitimate publishers with graduate students and early-career scholars being particularly vulnerable to predatory publishers.

There is also evidence beginning to emerge which suggests that some scholars are knowingly publishing in predatory journals in response to mounting pressure to publish their research as quickly as possible. While traditional publication timelines can stretch into months or years, predatory publishers often advertise turnaround times of only a few weeks.[2]

Nuisance or Threat?

There is growing concern that predatory publishing is having a cumulative negative effect on the value of and trust in academic research by the public, especially given that this potentially low-quality research is easily available to a public audience that still cannot access much of the "gold standard" research made available in the prestigious paywalled journals.

While it is beneficial to make research available to a public audience, many in the general population are not able to easily distinguish between high-quality and low-quality research. They expect that the research they find online in scholarly journals can be trusted because it has been vetted by other experts in the field. This implicit trust in scientific research has built up over hundreds of years, but ultimately rests on assurances from publishers (the peer review process is rarely made available to readers). As a result, academic publishing is particularly vulnerable to bad faith actors.

Scenario – Quality control

Let's consider this scenario: A graduate student you are supervising has recently completed an interdisciplinary research project and is looking to publish her research in an OA journal. Due to the nature of the project she is looking for publication venues outside those you typically recommend.

- What guidance would you give this student to help them find a legitimate place to publish?

Signs of a Predatory Journal

Identifying predatory journals is an important skill set for authors and readers to hone. Think. Check. Submit., a cross-industry initiative to educate authors on how to identify potentially predatory journals provides useful resources to help guide decision-making.

Watch the below video for a brief overview. Refer to the Gold OA section of the Pathways to Open chapter to find information on selecting an appropriate OA journal.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=50#oembed-1

Think. Check. Submit. (2016). Licensed under CC-BY.

Tarnishing the Reputation of Open Access

Predatory publishing also does a disservice to the larger OA movement, as some scholars do not distinguish between high-quality OA journals and predatory ones. Additionally, there is concern among OA advocates that emerging and global south publishers are unfairly accused of being predatory and that this conflation stems from Global North bias in using things like English proficiency as a shortcut for assessing journal quality.

The distinction between predatory and not becomes even more muddied when we consider that some previously labeled predatory publishers respond to criticism and institute policies and workflows more consistent with other reputable publishers. At what point should these publishers be deemed legitimate, and who has the authority to decide? If we take alone the academic community's willingness to publish somewhere, then all publication channels are valid.[3]

Dig Deeper

To learn more about the challenges of the term 'predatory' publishing, review:

Anderson, R. (2015, May 11). *Should we retire the term "predatory publishing"?* The Scholarly Kitchen. https://scholarlykitchen.sspnet.org/2015/05/11/should-we-retire-the-term-predatory-publishing/

Notes

1. Grudniewicz, A., Moher, D., Cobey, K. D., Bryson, G. L., Cukier, S., Allen, K., Ardern, C., Balcom, L., Barros, T., et.al. (2019, December 11). Predatory journals: No definition, no defence. Nature, 576, 210-212. https://doi.org/10.1038/d41586-019-03759-y
2. Kolata, G. (2017, October 30). Many academics are eager to publish in worthless journals. The New York Times. https://www.nytimes.com/2017/10/30/science/predatory-journals-academics.html
3. Petrou, C. (2020, August 10). Guest Post – MDPI's Remarkable Growth. The Scholarly Kitchen. https://scholarlykitchen.sspnet.org/2020/08/10/guest-post-mdpis-remarkable-growth/

Publishing and the Academy

Academic publishing holds an important place within the larger academy. Alongside the professionalization of research and the development of the tenure and review system, publishing has come to play an increasingly significant role in the assessment of an individual scholar's career. Schimanski and Alperin state,

> "While "most agree RPT [Review, Promotion and Tenure] requirements should encourage peer-reviewed works of high quality, in practice, the value of publications is often assessed using shortcuts such as the prestige of the publication venue, rather than on the quality and rigor of peer review of each individual item."[1]

A growing focus on the publication venue over the research itself as a marker of quality is highlighted by the increased interest in bibliometrics as a means to evaluate scholarship. Measures including the h-Index, **citation counts**, the Journal Impact Factor and others are used to produce seemingly impartial evaluations. Funders have also taken to looking at publication venue and Journal Impact Factor as a marker of quality in grant application processes, further reinforcing the need for researchers to publish in prestige journals with high impact factors.

Because the integration of bibliometric measures in research assessment operates at several levels within the academy – disciplinary, institutional, funder – it systematically reinforces these measures as markers of quality. As a result, scholars have little ability to make publication decisions outside of this framework without worrying about the potential impact on their careers.

In recent years, open access (OA) advocates and scholars from across the academy have begun to push back on this narrow and prescriptive approach to research assessment. DORA – the San Francisco Declaration on Research Assessment – is one such scholar-led initiative that is asking institutions and funders to "not use journal-based metrics, such as Journal Impact Factors, as a surrogate measure of the quality of individual research articles, to assess an individual scientist's contributions, or in hiring, promotion, or funding decisions."[2]

Advocacy and the Academy

In recent years there has been a growing grassroots backlash against for-profit publishers from within the academy. Increasingly researchers are beginning to question the free labor they contribute to academic publishing and reconsidering their contributions in light of the commercial interests that publishers represent.

Perhaps the most well known of such efforts, The Cost of Knowledge project started as a post on mathematician Timothy Gower's blog urging his colleagues to consider a boycott of Elsevier by refusing to publish, serve on editorial boards, or conduct peer review for their fleet of journals. After garnering significant support, the blog post has grown into what it is today, a list of over 20,000 academics who have made a public declaration that they will not support Elsevier journals.[3]

Case Study – Journal of Informetrics

In early 2019 the entire editorial board of the Journal of Informetrics resigned in an open letter to Elsevier, the journal's publisher. According to the letter, the board resigned after discovering that their "position on ownership, open access, and open citations is fundamentally irreconcilable with the position of Elsevier". In the days following their resignation, the same team launching a new fully OA journal called Quantitative Science Studies.

- What responsibility does a publisher have to the community of scholars that supports their publications?
- Where does a journal derive its value? – is it in the journal name or in the editorial and peer review practices behind it?
- If a journal editorial board in your field left to create a new OA journal, what factors would you consider before choosing which journal to publish in?

Dig Deeper

Shimanski, Leslie and Juan Pablo Alperin. (2018). The evaluation of scholarship in academic promotion and tenure processes: Past, present, and future. Licensed under CC-BY.

Notes

1. Schimanski, L. A., & Alperin, J. P. (2018). The evaluation of scholarship in academic promotion and tenure processes: Past, present, and future [version 1; peer review: 2 approved]. *F1000Research, 7*, Article 1605. https://doi.org/10.12688/f1000research.16493.1.

2. Declaration on Research Assessment. (n.d.). Read the declaration. San Francisco Declaration on Research Assessment. https://sfdora.org/read/
3. The Cost of Knowledge. (n.d.). The Cost of Knowledge. http://thecostofknowledge.com/

The Next Transformation: Generative AI and Academic Publishing

In January 2024, the library research and consulting organization **Ithaka S+R** released a report on what they referred to as the "second digital transformation" of scholarly publishing. Touching on many of the themes and topics discussed in this chalter, the second digital transformation is framed as a revamping of the structures, workflows, incentives and outputs that characterized the print era. Noting that the first digital transformation occurred with the advent of the internet, the authors point out that the initial shift from print to digital did not immediately result in new modes of publishing, with scholars and publishers alike clinging to limiting conceptual models that privilege the peer reviewed article as the preeminent scholarly output and resist the democratization of knowledge discovery and dissemination.[1]

In October 2024, Ithaka S+R released another report, entitled "A Third Transformation? Generative AI and Scholarly Publishing." Among other things, this report notes that while at the time they were conducting interviews (in early 2023) for their earlier publication there was talk of generative AI (GenAI), among participants: "it was just beginning to make its presence felt in academia and society" but since then, it has become "inescapable".[2] In other words, while the initial transformative effects of the shift to digital took twenty plus years to emerge, developments in GenAI have taken only a year to have a significant impact on academic publishing. Because of the rapid pace of change, academic publishing stakeholders are still struggling to make sense of the potential that GenAI has to transform publishing. First movers have begun to incorporate GenAI into their products and service offerings, while publishers and academic institutions are attempting to address the ethical considerations of GenAI through policy and procedure revisions.

At the time of writing this chatper (early 2025), it is not yet apparent how disruptive artificial intelligence (AI), and in particular GenAI, will be to the scholarly publishing ecosystem or the advancement of open access (OA). However, we have begun to see the ways that publishers and authors are starting to navigate both the opportunities and challenges posed by AI.

Opportunities

- Streamlining of editorial processes and the deployment of AI for things like peer review and copy-editing
- AI-enhanced search and discovery tools like Elsevier's Scopus AI and Consensus can help researchers find and synthesize information
- New revenue streams, as publishers can license their intellectual property for AI training

Challenges

- The use of AI to manipulate the publishing process, including generating fake data and manuscripts or manipulated images
- Increases in the scope and scale of predatory practices such as "paper mills"
- "Enshittification" of the scholarly record and threats to scientific integrity

Dig Deeper

To learn more about the impacts of AI on academic publishing, review:

Bergstrom, T., & Ruediger, D. (2024, October 30). A Third Transformation?: Generative AI and Scholarly Publishing. Ithaka S+R. https://doi.org/10.18665/sr.321519

Notes

1. Bergstrom, T., & Ruediger, D. (2024, October 30). A Third Transformation?: Generative AI and Scholarly Publishing. Ithaka S+R. https://doi.org/10.18665/sr.321519
2. Ibid

The Publication Ecosystem - Conclusion

In the Open Access – The Publication Ecosystem chapters, we have explored the publication ecosystem, including publishing practices, the financial drivers, and how publishing has transformed through the digital shift.

Publishing plays a particularly important role in academics, serving as the mechanism through which scholarly research is circulated and judged. Many publishing decisions impact the ability of researchers to secure research funding, obtain promotion and elevate their profile within their discipline, creating the "publish or perish" mentality in academia. With the introduction of the internet, a "digital shift" provided an opportunity and alternative to traditional subscription-based publishing in the form of open access (OA), a model where research is published freely online and is available to any reader with access to the internet. While the introduction of the internet introduced what many consider a more equitable publishing system, publishers have found ways to monetize the OA movement through a variety of publishing models (e.g. green OA, hybrid, etc.), including seeking to monetize their catalogue for training GenAI tools. Additionally, predatory publishing , a parasitic form of OA publishing that asks authors to pay the costs of publication without adhering to the rigorous ethical standards expected by authors and readers, has impacted trust of OA. While world events, like the COVID-19 pandemic, highlighted the benefit of free and quick access to research outputs, the goals of the OA movement remain elusive.

OPEN ACCESS - AUTHOR RIGHTS

Ownership of intellectual property is fundamental to the research enterprise, yet few scholars fully understand their rights or feel comfortable negotiating with publishers to retain them. This part of the book will introduce you to intellectual property ownership in the academy and better prepare you to enter into publishing agreements.

Through this section you will:

- Understand the types of intellectual property in Canada and how they are legally protected
- Identify the gaps in Canadian copyright as it relates to traditional knowledge
- Explain the value of intellectual property to academics and publishers
- Identify common terminology found in journal publisher contracts
- Understand how to negotiate journal publishing contracts
- Explain the benefits and barriers to openly sharing your intellectual property

Defining Intellectual Property

In Canada there are four main types of **intellectual property (IP)** rights, and more than one can apply to your creation. Watch the video to learn about the types of IP in Canada.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=60#oembed-1

What is Intellectual property? by Canadian Intellectual Property Office.

What is Intellectual Property?

IP is what you create, invent or develop as a result of your intellectual activity. Intellectual property is valuable, and just like other types of property you own, it comes with legal rights. Examples of IP include:

IP is defined as knowledge or expression that is created by an individual and can be legally protected. IP refers to the product of the creative process and can include:

Trademark

A trademark covers contractual obligations over the identified goods or services of a company. This can include business methods, inventions, recipes, and manufacturing processes. Example: The name and logo of Apple, Microsoft, etc.

Patent

A patent provides rights over an original and useful idea that is not considered an invention. This can include physical products or processes. The rights exclude others from using, making, or selling the patented item and is valid in Canada up to 20 years from the date of filing. Example: Apparatus for production of three-dimensional objects by stereolithography (3D Printer)

Industrial Design

Industrial design details the rights over the visual design of an object. This can include features, shape, pattern, and configurations of the object which protects the appearance of use. The rights exclude others from using, making, or selling and is valid in Canada up to a maximum of 10 years. Example: 22 Hybrid Tube Amplifier

Copyright

Copyright details the rights to produce or reproduce a creative work – or part of a work – in any form. Creative works can take many forms of expression and extend beyond literary works to include all original dramatic, musical and artistic works. While copyright is often referred to in the singular, it is important to note that the rights of a copyright holder extend beyond mere reproduction and, depending on the type of work being considered, include the right of performance, translation, presentation, mechanical reproduction, etc. Because copyright protection affords a monopoly to owners, limitations on copyright, through exceptions and exhaustion, are central to maintaining a well-balanced copyright system that benefits both users and creators. Currently, the copyright term in Canada is life of the creator plus an additional 70 years.

For additional details on the types of intellectual property rights, review the Intellectual Property in Canada table by Innovation, Science and Economic Development Canada.

For the purpose of the following chapters, we will focus on the intellectual property rights associated with copyright. For additional resources on the other three types of intellectual property rights, go to Dig Deeper.

How is Intellectual Property Determined in Canadian Copyright?

Copyright in Canada is:

- Automatic upon creation of a work in a tangible form (e.g. written down, recording, etc.)
- Protects the rights of the creator to use their work
- Protects the rights of performers (e.g. dancers, musicians, etc.)

For intellectual property rights to be determined for literary, artistic, musical or dramatic works, the "works" must meet three criteria.

Originality

Originality relates to how the work is expressed and the effort of the expression itself. For Canadian copyright, originality does not reflect the creativity or uniqueness of the work but the intellectual effort expressed in the work.

Fixation

Fixation is not defined in the Copyright Act but is formed through court cases dealing with copyright. Generally speaking, fixation refers to the expression in a tangible form of the work itself. This can be a book, article, a performance, and an audio recording.

Nationality of the Creator and Place of Publication

Copyright applies if the creator is a Canadian citizen, resident of Canada, or another treaty country.

Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.bccampus.ca/openscholarship/?p=60#h5p-3

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.bccampus.ca/openscholarship/?p=60#h5p-4

Dig Deeper

To learn more about intellectual property from a Canadian and international context, watch: Intellectual Property Rights by Centre for International Governance Innovation.

Adaption

Adapted from Discover Intellectual Property – Module from Canadian Intellectual Property Office licensed under a Non-commercial reproduction.

The Value of Intellectual Property

IP is important and matters to creators for a variety of reasons. As you create and express new ideas in tangible ways, protecting your intellectual property is a means by which you can gain benefits from your work, whether they be financial or social. For many creators, the economic benefit they derive from their works is a key motivating force, as their intellectual labour directly funds their ability to continue to work and maintain their lifestyle; however, the value of intellectual property extends beyond purely economic considerations, particularly in an academic context where creators are often incentivized to create and produce knowledge as part of their job responsibilities as the university.

In this familiar scenario, the idea of value for intellectual property takes on a more nuanced meaning and the impacts of maintaining rights becomes more complex.

As an academic author, one's goal is often to get their work published in the "best" journals or publications in your field. Publishing in these journals ensures your content has the greatest reach and the highest impact, as identified through impact factors and metrics (See the UBC Library Citation Metrics Guide).

Scenario – Publishing a Journal Article

Dr. Ada Olowe is a tenure-track Assistant Professor. She has just completed an article on a research study with colleagues from another university. She is publishing the article in a prestigious journal and will use it as a basis for a course she is developing for the coming year. As part of the publishing agreement, she has been asked to sign a form by the publisher of the journal that will transfer the copyright of the article to them.

For academics like Dr. Olowe the tenure and promotion process requires a portfolio of work to be presented to secure rank and job security in the academy. This added pressure can often convince authors to sign a publisher copyright agreement that transfers their copyright completely to the publisher. This transfer of intellectual property, in the case of Dr. Olowe, restricts her ability to:

- Use the research in future publications
- Use the research for teaching and learning, including providing students access to the article
- Share the whole or part of the research either electronically or in print
- Modify or provide errata to the published research

Publishers & Intellectual Property

When you decide to publish an article or monograph, you own the full copyrights. As the copyright owner, under Section 3 of the Copyright Act (website), you are allowed:

- Reproduce your work
- Create new works based on your original work
- Share your work with whomever you choose
- Perform, display, or broadcast your work in public
- Transfer all or some of your rights to third party

If you choose to publish within the traditional publishing system, you will be required to sign an agreement transferring some – or all – of your rights to the publisher. A **publishing agreement** is a legal contract that outlines the terms under which a publisher will make your work available. Often, these agreements require that the author provide the publisher with exclusive publishing and distribution rights to the accepted manuscript. Publisher agreements vary in scope and complexity, but ultimately they serve as the basis for the publishing relationship between author and publisher.

Scenario – Journal Publishing Agreement

Dr. Ada Olowe's article has been accepted to the Journal of International Political Theory (SAGE). She must sign the Journal Contributor Publishing Agreement before her article is sent for editorial review and copy editing. Dr. Olowe is not concerned about royalties for her work but would like to be able to use the article for her courses, posting a version in her departmental profile, and developing new research and publications.

Review the Journal Contributor Publishing Agreement and answer the following questions:

1. Is Dr. Olowe able to use her journal article in all the ways she has outlined?
2. What rights does Dr. Olowe maintain if she signs the agreement?
3. What rights is Dr. Olowe assigning the publisher if she signs the agreement?

These may seem like tricky questions.

Understanding publisher agreements can be difficult. The legal terminology used in the contracts will indicate the rights of the publishers and your rights to your original work but as the phrases are not in everyday language you may not know what you are agreeing to.

Publisher Agreements

As stated earlier, a publisher agreement is a legal contract that transfers the rights of your work to the publisher provisioning them with **exclusive** publishing and distribution rights to the material submitted to them in the accepted manuscript. The terms of publisher agreements vary widely and the kind of controls on how an author's work can be used later will vary based on the contract signed. Before signing a publishing agreement, it is important to recognize that the agreement is an exchange between author and publisher. For example, authors will transfer or license their copyright to a journal publisher, often without compensation, in return for the work being published in a credible journal, making the article visible with the potential for yielding readership and citations that increase the article's impact. The publisher in return will gain the ability to control how the work is published and made accessible to others, setting the type of access (e.g. online, print) and the cost to access (e.g. subscription fees).

There is some common terminology that you should be aware of to better u**exclusive** nderstand an author's rights as outlined in a publisher agreement. Before we look at the terminology, it is important to understand the different phases an article may go through in preparation for publishing.

Publishing Phases

Pre-print

Also called an author's draft or pre-refereed version, pre-print refers to the article as it was when it was initially submitted to the publisher for peer review or any other earlier version.

Post-print

Also called an author's final or accepted manuscript, post-print refers to the post-peer-review and accepted version of the article, before the publisher has created the final layout for the work. This is generally the version that the publishers allow researchers to parallel publish in a repository (i.e. self-archiving).

Publishers Version

Also called the version of record, the published version is the article as it is in the final publication, including the final layout. The publishers rarely allow researchers to parallel publish the publisher's version. Publishers are protective over the final published version articles they choose to publish and often negotiations to openly share finalized versions are restricted.

Common Publisher Agreement Terminology

Assignment

Assignment refers to the transfer of copyright ownership either in part or in whole. Example of the terminology in use: The Author hereby assigns to the Publisher the copyright and all the exclusive rights comprised in the copyright in the Work and all revisions thereof….

Grant of Rights

A Grant of Rights sets out the rights you are maintaining for your work and what you are giving to your publisher.

Exclusive License

A license that sets out agreements not to grant other licenses that have the same rights within the scope of the exclusive license. Example of the terminology in use: The Author hereby assigns to the Publisher the copyright and all the exclusive rights comprised in the copyright in the Work and all revisions thereof….

Embargo

A period of time during which the publisher has the exclusive right to make the research available. Typically, for self-archiving, the publisher will require an embargo (ranging from 6 to 24 months) before the item is released openly. There is some debate over why a publisher might request this, but the simplest answer is that publishers are concerned with the exclusivity and novelty of the research they choose to publish.

Non-Exclusive License

A license that allows the same **rights to granted** to several licensees, either consecutively or simultaneously.

Declaration of Conflicting Interests

A policy that may be required by a publisher indicating a conflict of interest when submitting a manuscript that could be perceived as impacting the judgement of the author. Some conflicts of interest could include receiving fees for consulting, receiving funding for the research, and employment with a company impacted by the research.

Reversion Rights

A provision in a publisher contract that permits the author to regain some or all the rights over the work under conditions set out by the publishing agreement. Example of the terminology in use: If the Work has been declared out of print by the Publisher in the Canada, the Publisher may, but shall not be obligated to, offer to revert rights to the Work to the Author.

Reviewing the Publisher Agreement

Thoroughly reviewing the publication agreement is the first step in understanding what the consequences and benefits are when signing an agreement. Publishers' agreements are written by publishers and may capture more of your rights than are necessary to publish the work. Ensuring the agreement is balanced and has a clear statement of your rights is up to you.

Publishing agreements are negotiable. Publishers require only your permission to publish an article, not a wholesale transfer of copyright. Hold onto rights to make use of the work in ways that serve your needs and that promote education and research activities. Value the copyright in your intellectual property. A journal article is often the culmination of years of study, research, and hard work. The more the article is read and cited, the greater its value. But if you give away control in the copyright agreement, you may limit its use.

Review the Journal Contributor Publishing Agreement from Journal of International Political Theory (SAGE) and test your knowledge below:

Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.bccampus.ca/openscholarship/?p=64#h5p-5

Before transferring ownership of your intellectual output, understand the consequences and options. Answer the following questions when reviewing a publisher agreement:

- Is your grant of rights an assignment, an exclusive license, or a non-exclusive license?
- Does your contract limit the scope of the rights granted?
- Does your contract limit the duration of the grant?
- Do you have a license-back for your own future uses?
- Does your contract contain a revert-back clause in case your publisher doesn't exploit certain rights?
- Does your grant of rights section reserve all rights not granted to your publisher?

The next section on publisher negotiations outlines approaches and strategies authors can take to negotiate the rights they retain when publishing their work.

Book Publishing

Book publishing is a much more intensive process although many of the considerations mentioned do apply. However, from first receiving a publication contract to understanding the common clauses and terms of rights that may impact your interests both locally, nationally, and internationally, book publishing agreements can be overwhelming. We encourage you to use the dig deeper section to begin investigating book publishing and intellectual property.

Dig Deeper

To learn more about monograph publishing negotiations and contracts, review Understanding and Negotiating Book Publication Contracts (PDF) from the Authors Alliance, by Brianna L. Schofield & Robert Kirk Walker, licensed under CC BY 4.0.

Adaption

Adapted from Understanding and Negotiating Book Publication Contracts (PDF) from the Authors Alliance, by Brianna L. Schofield & Robert Kirk Walker, licensed under CC BY 4.0.

Publisher Negotiations

Why does negotiating a publisher contract matter?

Often authors think of publishers as neutral entities when it comes to questions of ownership and intellectual property. The process of signing contracts that assign publishers ownership of intellectual work is seen as just a part of the process of publishing. However, in reality, considerable control over academic knowledge is exercised by publishers that are not necessarily visible to authors. Instead of directly addressing copyright violations by authors openly sharing their work, publishers are approaching the open sharing of content at a higher level.

The Coalition of Responsible Sharing is a group of publishers who have signed a statement on the formal steps they are taking to stop platforms like Academia.edu and ResearchGate from allowing authors to share their publications. Additionally, the coalition released an open letter to the Trump administration actively discouraging the consideration of putting a zero **embargo** which would allow for the open publication of federally funded research immediately upon completion. These kinds of actions by publishers make it extremely important for authors to consider how to maintain their rights over their work so decisions on where they can share and to who is not impeded by the contract they have signed.

Preparing to Negotiate

The key to any successful negotiation is preparation. Before you begin to negotiate, consider what you hope to gain. While authors, in general, share a common goal of wanting their work to be widely read, what they hope to get out of a publishing deal may vary significantly. For example, consider the following rights you may want to retain:

- Make reproductions for use in teaching, scholarship, and research;
- Borrow portions of the work for use in other works;
- Create **derivative works**;
- Alter the work, add to the work, or update the content of the work;
- Maintain identity as the author of the work;
- Be informed of any uses, reproductions, or distributions of the work;
- Perform or display the work;
- Include all or part of the work in a future thesis, dissertation, or other scholarly publication;
- Develop an oral presentation of the material in any forum;
- Make materials available to underdeveloped nations for humanitarian purposes;
- Archive and preserve the work as part of either a personal or institutional initiative, for example, on your own web site or in an institutional repository; and
- Claim ownership in every draft and pre-print version of the work.

Whether it is retaining certain rights to your work or making your work openly accessible, your publishing goals are personal and not necessarily reflected in a template contract.

Negotiation

Author Addendums

An **author addendum** is a legal instrument that you can use to modify your copyright transfer agreements with non-open access (OA) journal publishers. It allows you to select which individual rights out of the bundle of copyrights you want to keep, such as distributing copies in the course of teaching and research, posting the article on a personal or institutional Web site, or creating derivative works.

SPARC (Scholarly Publishing and Academic Resources Coalition) has created template author addendums to use during your negotiations.

- Download the Canadian SPARC Author Addendum in English (PDF)
- Download the Canadian SPARC Author Addendum in French (PDF)

Rights Reversion

For book authors, re-evaluating your author agreements when the book has fallen out of print or isn't selling well is an opportunity to consider opening your work up to the public. To learn more about rights reversion in book publishing, review Understanding Rights Reversion: When, Why, & How to Regain Copyright and Make Your Book More Available by the Authors Alliance.

Dig Deeper

To learn more about researcher understanding of copyright and transfer agreements, read the following:

- Lange, J. (2018). Confused about copyright? Assessing Researchers' Comprehension of Copyright Transfer Agreements. *Journal of Librarianship and Scholarly Communication*, *6*(1), eP2253. DOI: http://doi.org/10.7710/2162-3309.2253

Intellectual Property and Open

***Open access (OA)** is a set of principles and a range of practices through which research outputs are distributed online, free of cost or other access barriers. The main focus of the OA movement is peer reviewed research literature. OA can be applied to all forms of published research output, including peer-reviewed and non peer-reviewed academic journal articles, conference papers, theses, book chapters, and monographs. Importantly, "true" OA requires that the content be both freely available online and that barriers to copying or reuse are also reduced or minimized by employing a Creative Commons or other open license to the work.*

There are a number of challenges and benefits associated to OA publishing. The Pathways to Open chapter will cover many of these in detail.

For this part of the Open Access section, we will focus briefly on open sharing and the spectrum of openness, outside of the final publication, as it relates to your intellectual property.

Spectrum of Open Sharing

Publishing openly can be considered a part of a spectrum of openness. The spectrum of openness involves all the ways researchers can share their work through the entire research cycle. With the introduction of social networked technologies, network research tools, and open processes, the research cycle has the potential to be more open and participatory. Each form of social network engagement provides different opportunities to communicate but also different levels of engagement with social media technologies and networks that disperse the information.

For example, in **Table 1: Degree of Openness at Different Research Cycle Stages**, examples of open research sharing by audiences is described from the Social Media for Citizens and Public Sector Collaboration (Somus) and the NMR Lipids Project (NMRLP).

Table 1: Degree of openness at different research cycle stages.

Research cycle stage	Somus	NMRLP
	Outputs	
Conceptualizing, networking	*Public sharing* on Jaiku service.	*Community sharing* on ArXiv and direct e-mail.
Proposal writing and design	*Public sharing* on Jaiku and wiki.	Initial setup *private management* or *collaborative sharing*, after that *public sharing* on the blog and GitHub.
Collecting and analyzing	*Community sharing*: research data shared among research group.	*Public sharing* on the blog and GitHub.
Documenting and sharing	*Public sharing* on Etherpad and wiki.	*Public sharing* on the blog.
Publishing and reporting	*Community sharing* through standard toll-access articles, *public sharing* of the final report.	*Community sharing*: drafts of articles on GitHub, preprints on ArXiv, finished product in traditional journals. Subject matter unintelligible to most laypersons.
Engaging and translating	*Public sharing* through the social media applications created for case studies.	*Public sharing* through blog posts and public appearances to promote open science.
Infrastructuring	*Private management*: social media applications co-produced with citizen participants, but all rights remain with consortia institutions, also one proprietary application funded.	*Public sharing*: data and code shared and licensed openly (GitHub), although not understandable for laypersons.

Table 1: Degree of Openness at Different Research Cycle Stages from the article Afraid of Scooping – Case Study on Researcher Strategies against Fear of Scooping in the Context of Open Science

The table identifies a variety of outputs for sharing during the research cycle and the tools used to share (e.g. Jaiku, wikis, Etherpad, ArXiv, GitHub, etc.). Table 1 also identifies the audience when deciding on a research output as the choices made on where and how to share may differ depending on the audience the researchers were interested in engaging.

Decision Making for Open Sharing

Before engaging in open sharing during the research life cycle, researchers need to think through the workflows of openly sharing their material. Openly sharing is complementary to traditional publishing processes and will add another layer of decision making, process, and activity to releasing research.

Scenario – Sharing Openly

Dr. Iwamoto is working with a research team that is interested in sharing their grant applications and research design, updates of lab findings during the research process, sharing their data and first report drafts, and engaging in knowledge translation to share the findings with the broader public.

What should he and his team consider when deciding to share openly?

These questions will help guide you in making choices about how you engage and with what tools:

What type of engagement am I interested in developing?

One of the challenges when deciding to share openly is deciding what you will share, when you will share during the research cycle, and the tool(s) to use. When making this decision, you should consider what is the purpose of your engagement. This could include: connecting to other scholars; sharing with the public; and gaining feedback or insight into your work.

What do I want to communicate?

Thinking carefully about what you want to say and not say about your research is important when making a decision about the open sharing workflows. Perhaps you want to share information about your research design but would like to keep private the findings of your research until the final publication. Thinking through these elements of open sharing will help you develop a plan of action.

How much time/effort do I want to put into updating/maintaining my content?

When openly sharing about your research the last thing you want to do is leave a partially developed or unfinished public space with your content. Making decisions around how much time you have for developing and maintaining your open sharing practices will help you decide what to engage in and what tools you will use.

Tools for Sharing

For more information about the kinds of tools to use for openly sharing, review the Open Software chapters.

Research Scooping

While there are several benefits to engaging in open sharing, a major concern specifically related to intellectual property rights is the fear of **research scooping**. Research scooping is a term used to describe when another person publishes an idea or results of research prior to you. This is concerning to researchers who fear that the lack of novelty of their research will negatively impact the publishing prospects, particularly in high-impact journals. With open sharing, the fear of research scooping is even more pronounced for researchers as there is a sense that their intellectual property is potentially in more danger of being plagiarized or taken when it is posted online without the "protections" of a publisher.

Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.bccampus.ca/openscholarship/?p=70#h5p-6

While the fear of research scooping is a real concern for researchers, a recent paper by Hill and Stein (2019) indicates that the price for those who are scooped is not as large as perceived. Hill and Stein tracked and analyzed 150,000 structures from the Protein Data Bank, a repository that houses identified protein structures under embargo. Between 1999 and 2017, 1,630 scientists worked on the PDB structures to publish in journals once the embargoes were lifted. The research findings showed protein structures that were published second were 2.5% less likely to be published, published in journals with a lower measured impact factor that the first publication, and out of an estimated 100 citations the first paper would receive 58 and the second paper 42.[1]

While there are many factors that may play into the fear of research scooping, including the priorities of promotion and tenure processes, academic conventions in your field and considerations related to the potential financial benefits to your findings (e.g. patents), ownership of your intellectual property should not be one of them. If you engage in open sharing practices, the principles of scholarly integrity apply. Acknowledgement through attribution is an agreed-upon moral commitment in academia. It is the cornerstone of building upon the knowledge and contributions of others. While research misconduct, including misappropriation and plagiarism, can occur, it can occur regardless of open or traditional publishing practices. Engaging in knowledge sharing is a combination of knowing your rights as it relates to your intellectual property and entering into the practice with trust in your colleagues' scholarly integrity.

Notes

1. Hill, R., & Stein, C. (2025). Scooped! Estimating rewards for priority in science. Journal of Political Economy, 133(3), 793–845. https://doi.org/10.1086/733398

Traditional Knowledge

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=74#oembed-1

Traditional Knowledge and Intellectual Property by the Centre for International Governance Innovation

Traditional knowledge (TK) is knowledge, know-how, skills and practices that are developed, sustained and passed on from generation to generation within a community, often forming part of its cultural or spiritual identity.

While there is not yet an accepted definition of TK at the international level, it can be said that:

- **TK in a general sense** embraces the content of knowledge itself as well as traditional cultural expressions, including distinctive signs and symbols associated with TK.
- **TK in the narrow sense** refers to knowledge as such, in particular the knowledge resulting from intellectual activity in a traditional context, and includes know-how, practices, skills, and innovations.

Traditional knowledge can be found in a wide variety of contexts, including: agricultural, scientific, technical, ecological and medicinal knowledge as well as biodiversity-related knowledge.[1]

Reflection – Australian Dreaming Stories

In 1994, a carpet factory reproduced a well-known painting by Banduk Marika entitled Djanda and the Sacred Waterhole on a carpet. The underlying image of this work belongs to the Rirratjingu clan and is part of the mythology of the Djangkawu creation story.

In the case study of the **Australian Dreaming Stories**, reflect on the following question:

- What impact does the use of the painting have on the intellectual property rights of Banduk Marika, as outlined above?
- Is the painting Djanda and the Sacred Waterhole considered traditional knowledge?
- What impact does the use of the painting have on the cultural and spiritual health of the Rirratinjgu clan?

Traditional Knowledge and Canadian Indigenous Peoples

While copyright serves the purpose to protect the rights of creators of literary and artistic works, there are several ways in which copyright fails Indigenous peoples and TK.

Indigenous cultural heritage and identity is expressed through creative works like storytelling, song, dance, rituals, and practices and is connected to land and community across time. The Canadian Copyright Act, as it is currently structured, cannot protect Indigenous knowledge due to the complex and community-based notions of ownership.

In recognizing the difference in ideas of ownership, copyright is increasingly harmful to Indigenous peoples in the following ways:

- Copyright focuses on economic benefits of knowledge and fails to recognize the cultural, spiritual and communal importance of Indigenous creative works.
- Copyright focuses on individual creators and fails to recognize the communal nature of producing and caring for the creative works.
- Copyright provides limits to the length of time in which an object can be protected which fails to recognize the intangible spiritual nature of the object that is situated in Indigenous identity across time.

Further issues around copyright for Indigenous creative works relate to the idea of ownership of heritage materials in the traditional publishing process. From the Canadian Federation of Library Associations (website) Position Statement on Indigenous Knowledge in Canada's Copyright Act (PDF):

> Who holds "legal" copyright to that knowledge or cultural expression under Canada's current Copyright Act is often contrary to Indigenous notions of copyright ownership. Indigenous knowledge may be found in published works as a result of research or appropriation, and in these cases, the author of the published work holds the "legal" copyright to that knowledge or cultural expression, while Indigenous peoples would see the owners as the people from where the knowledge originated.[2]

Dig Deeper

To learn more about traditional knowledge in the Canadian context, review: Protecting Traditional Knowledge and Traditional Cultural Expressions, Conference Report — Toronto, Canada, March 2019.

Traditional Knowledge Licenses & Labels

As illustrated through this chapter, IP rights related to traditional knowledge fail to consider the full expression of cultural heritage, traditions, and notions of ownership. From this understanding came the development of Traditional Knowledge Licenses and Labels that address the protocols and concerns of Indigenous peoples around traditional knowledge objects.

Traditional Knowledge (TK) Licenses are developed in conversation with Indigenous communities to provide a set of licenses, similar to the Creative Commons license structure, that identifies the needs of Indigenous peoples when addressing intellectual property.

The TK Labels are a tool for Indigenous communities to add existing local protocols for access and use to recorded cultural heritage that is digitally circulating outside community contexts. The TK Labels help non-community users of this cultural heritage understand its importance and significance to the communities from where it derives and continues to have meaning.[3]

Example of TK Labels in Use – SQ'ÉWLETS – Research and Resource Management Centre

Dig Deeper

To learn more about Traditional Knowledge Licenses and Labels, review: Anderson, Jane and Kimberly Christen. (2013). 'Chuck a Copyright on it': Dilemmas of Digital Return and the Possibilities for Traditional Knowledge Licenses and Labels. *Museum Anthropology Review* 7, (1-2) Spring-Fall 2013; 105-126. CC BY 3.0.

Adaption

Adapted from "Protect and Promote Your Culture: A Practical Guide to Intellectual Property for Indigenous Peoples and

Local Communities" by World Intellectual Property Organization (WIPO) Traditional Knowledge Division under a CC BY 3.0 IGO

Notes

1. World Intellectual Property Organization. (n.d.). Traditional knowledge. https://www.wipo.int/tk/en/tk/
2. Canadian Federation of Library Associations/Fédération canadienne des associations de bibliothèques (CFLA-FCAB). (2018). Indigenous knowledge in Canada's Copyright Act: Position statement (PDF). http://cfla-fcab.ca/wp-content/uploads/2018/05/CFLA-FCAB_Indigenous_knowledge_statement.pdf
3. Local Contexts. (n.d.). Traditional Knowledge Labels. https://localcontexts.org/labels/traditional-knowledge-labels/

Can a Machine be an Author?

While discussions of Artificial Intelligence (AI) in academia have largely centered on its ethical use in teaching, learning, and research, deeper questions about the fundamental nature of AI remain unresolved. Generative AI (GenAI), in particular, creates seemingly novel content, raising critical questions about the copyright status of these outputs.

Broadly speaking, GenAI outputs raise two important questions related to “copyrightability”. Firstly, they upset traditional notions of authorship. While the *Copyright Act* does not explicitly define the term “author”, basic assumptions about the status of an author are infused throughout the *Act*. For example, copyright term lengths are explicitly tied to the life of the author. This conception of authorship is predicated on a human author, as there would be no way to make a copyright term determination based on the lifespan of an AI tool.

Case Study – The Monkey Selfie

While Canada has little jurisprudence on the question of human authorship directly, the US has several instructive examples we can look to.

One such dispute involves the copyright status of a photograph of a macaque that was claimed to have been taken by the monkey itself. Originally published alongside a Daily Mail article, wildlife photographer David Slater licensed images of a monkey alongside quotes indicating that the photographs were self-portraits because the monkey had tripped the remote shutter-button. A user later uploaded the photograph to Wikimedia Commons, claiming that because it was created by a non-human author, it was not protected by copyright. Although not decided in a formal lawsuit, the dispute ended up at the United States Copyright Office, where its claim for registration was refused, confirming Wikimedia's claims that the work was not eligible for copyright protection.

A second lawsuit, filed by People for the Ethical Treatment of Animals (PETA) asked that the monkey be assigned copyright. This suit was ultimately unsuccessful, with the court finding that only a human-authored work was eligible for copyright protection.

If we assume that only humans can be authors, it leads us to look for elements of human authorship within GenAI processes. For example, can someone claim authorship over the set of prompts that they input into an AI generator, and if so, would this then give them rights over the resulting outputs? Questions such as these have yet to be resolved, either through legislation, policy, or jurisprudence. Currently, those with an interest in AI are looking to lawsuits, many of them coming out of the US, to provide guidance. George Washington University maintains an [AI litigation database,](#) which highlights the ongoing debate over the legality of AI-related outputs and processes.

AI Outputs and Originality

The second question raised by GenAI outputs has to do with originality, a requirement of any work that seeks to be eligible for copyright protection. This may be an even more complicated question than the one surrounding authorship, as it rests on a sophisticated understanding of how generative AI models work. Here, an example that highlights the potential issue may suffice:

This image, created by stable diffusion, appears to reproduce a version of the Getty Images watermark, suggesting that photographs from the visual media company's repertoire may have ended up as part of Stable Fusion's training data. To what degree one can consider this generated image "original" is difficult to parse, especially when end users usually have little knowledge of the corpus of material that the AI was trained on.

Questions of originality almost always lead to questions of infringement, and certainly copyright holders have been vocal about their concerns over the use of their works as inputs for AI training purposes. As this example illustrates, the relationship between AI inputs (training data, prompts) and outputs is still difficult for the average user of GenAI to understand.

Complexities Abound

This chapter does not aim to provide a comprehensive analysis of all copyright considerations related to AI. However, it is worth noting that legal scholars and governments continue to grapple with the challenges of originality and authorship in AI-generated content. Recently, the Canadian government launched a consultation on copyright in the age of generative artificial intelligence, asking stakeholders to weigh in on a variety of AI-related issues. In early 2025, the government issued a "What we Heard Report", summarizing the feedback they received from interested parties. A review of the stakeholder feedback and government report makes clear that there is no general consensus on how the government should address issues arising from the advancements of AI technology. Over the course of the next several years, we should expect to see governments and courts grapple with policy and legislative reforms in response to AI.[1]

Dig Deeper

To learn more about AI governance in Canada, review:

What We Heard Report: Consultation on Copyright in the Age of Generative Artificial Intelligence

Notes

1. Innovation, Science and Economic Development Canada. (2025, February 11). Consultation on copyright in the age of generative artificial intelligence. Government of Canada. https://ised-isde.canada.ca/site/strategic-policy-sector/en/marketplace-framework-policy/consultation-copyright-age-generative-artificial-intelligence

Author Rights - Conclusion

In the Open Access – Author Rights chapters, you have explored author rights, focusing on how authors are protected, or in the case of traditional knowledge, are not protected under copyright; the ways in which authors sign over their rights; and strategies to negotiate with authors when dealing with publisher agreements.

Canadian copyright for literary, artistic, and musical works must meet the criteria of originality, fixation, and the creator is a Canadian citizen, resident of Canada, or another treaty country. As the copyright owner of your work, you are allowed to reproduce your work, create new works based on the original, share however you would like, perform or display your work in public, and transfer your rights to a third party. As an author, when transferring your rights to a third party, you sign a publisher agreement, a legal contracts that transfers some or all of the rights in your work to the publisher. These agreements can have consequences for your copyright and how you can use your work in the future. Negotiating with publishers using such tools as author addendums provides you with an opportunity to maintain rights over your work that are of importance to you.

While sharing your work in the open allows you to set the rules around how your work can be used by others, priorities set forward in promotion and tenure processes, academic conventions in your field, and considerations related to the potential financial benefits to your findings (e.g. patents), are considerations that need to be evaluated before engaging in open.

Indigenous cultural heritage and identity is expressed through creative works like storytelling, song, dance, rituals, and practices and is connected to land and community across time. Canadian *Copyright Act*, as it is currently structured, does not adequately account for traditional knowledge due to the focus of copyright on economic benefits, individual creators, and the time-based nature of protections.

Finally, with the introduction of GenerativeAI the *Copyright Act* will need to address complex issues related to authorship and originality While legal scholars and the Canadian government grapple with these questions, publishing practices and workflows will continue to develop as policy and legislative reforms lag.

OPEN ACCESS - PATHWAYS TO OPEN

As granting agencies begin to require open access (OA) and institutions become more focused on knowledge mobilization and impact, researchers need to develop strategies to make their work openly accessible. The follow chapters will explore ways to make your work openly available and investigate the benefits and impact of OA on your academic engagement.

Through this section you will:

- Understand the basic rationale for OA
- Understand the benefits and challenges that OA presents
- Learn of the various types of OA
- Identify ways to make your work OA

The Basics of Open Access

Open access (OA) is a set of principles and a range of practices through which research outputs are distributed online, free of cost or other access barriers.

Watch the below video to get a brief primer on the basic mechanics of OA:

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=83#oembed-1

Open Access by the Canadian Association of Research Libraries

While OA can be applied to all forms of published research outputs, including peer-reviewed and non peer-reviewed academic journal articles, conference papers, theses, book chapters, and monographs, the primary focus of the OA movement has traditionally been academic journals. Whereas conventional (non-OA) journals cover publishing costs through access tolls such as subscriptions, site licenses or pay-per-view charges, OA journals are characterized by funding models which do not require the reader to pay to access the journal's contents.

Free to Read and Share

Importantly, "true" OA(often referred to as *libre* OA) requires that the content be both freely available online and that barriers to copying or reuse are minimized through the application of a Creative Commons or other open license to the work (learn more about Creative Commons in the Creative Commons chapter). This is usually facilitated by allowing the original authors to retain copyright over their work and assigning an open license at the time of publication. As we will see later, alternative models of OA exist under which publishers makes academic works available online for free but retain copyright and prohibit further redistribution (often referred to as *gratis* OA). While this method of OA meets the baseline requirements of open distribution, it does not guarantee that the works can be reused and as a result is a limit on the utility of the research. The desire of publishers to retain ownership over academic knowledge, while also promoting OA to research, is just one example of the complex ways in which different stakeholders have interpreted OAand shaped it to meet their needs and preferences.

Facilitating Access Through New Economic Models

Providing free and unfettered access to academic literature begs an obvious question, how is OA financially sustainable? OA advocates acknowledge that knowledge production is not free and there are both financial and other costs associated with high-quality academic publishing. Instead of relying on libraries, governments, industry and citizens to pay for access to scientific literature, OA publishing operates under the premise that there are viable funding models available that can ensure traditional peer review standards of quality while also making the following changes:

- Rather than making journal articles accessible through a subscription business model, all academic publications could be made free to read and published with some other cost-recovery model, such as publication charges, subsidies, or charging subscriptions only for the print edition, with the online edition gratis or "free to read".
- Rather than relying on traditional notions of "all rights reserved" copyright models, authors and publishers could instead offer up academic content under a "some rights reserved" model, which would make it free to be built upon by others.

In the contemporary publishing landscape the cost of publishing is hotly debated and if anything, OA has only intensified the conversation. For perhaps the first time, publishers have publicly attempted to quantify the cost of publishing an article through the adoption of article processing charges, fees passed along to authors to cover the cost of OA publishing. These fees have made it difficult to ignore that the cost of publishing is often far more than just the labor that goes into the production of the journal. Prestigious journals with fees in the thousands make it clear that publishing with them will cost a premium.

Reflection: OA publishing with Nature

In late 2020 the prestigious journal *Nature* announced that it would be offering an OA publishing option for its authors at a cost of €9,500 per article. As part of its justification for the unprecedented cost, *Nature* argued that their high rejection rates required that accepted articles bear the cost of their highly selective process, as they make no money from the effort that goes into reviewing unsuccessful manuscripts. Put another way, *Nature* is arguing that exclusivity results in higher costs for its authors.

How persuasive do you find *Nature*'s argument? Should very selective journals be able to charge considerably more than others? What are the possible negative impacts of such high publication fees?

The Prevalence of Open Access

Despite the complexities around the implementation of and transition to OA, the share of published research that is being made openly available continues to grow over time. While firm data on the prevalence of OA is difficult to obtain, a 2018 article by Piwowar et al. suggests that at least 28% of all published research is currently available under some form of OA. Additionally, their research shows that this percentage is much higher for recently published works. Of the academic papers published in 2015 (the most recent year analyzed in the study) 45% is OA.[1]

Aside from looking at the total volume of OA publications, the success of OA can also be measured by support that open approaches have garnered from publishers, funders and institutions. The tenor of the conversation around OA has largely shifted from one about the *if* and *why* of OA to the *how*.

What Motivates the Open Access Movement?

The OA movement means different things to different groups. For the individual researcher it may be about ensuring that their research impact is optimized, for the funder it may be about their desire to facilitate innovation and international collaboration, for others it may be about transforming the publishing landscape and upsetting the prestige publishing economy. Each of these stakeholder groups will bring a different perspective and approach, attempting to mold OA in their image. Perhaps more than anything else, this chapter reflects the complex interplay of all of these motivations as they have come shape the OA movement.

Dig Deeper

To learn more about the prevalence of open access publishing, review:

Piwowar et al. (2018). The state of OA: a large-scale analysis of the prevalence and impact of Open Access articles. Licensed under CC BY 4.0.

To learn more about the history of open access, review:

Chan et al. (2002). Budapest Open Access Initiative Declaration. Licensed under CC BY 4.0.

Adaption

Notes

1. Piwowar, H., Priem, J., Larivière, V., Alperin, J. P., Matthias, L., Norlander, B., Farley, A., West, J., & Haustein, S. (2018). The state of OA: A large-scale analysis of the prevalence and impact of open access articles. PeerJ, 6, e4375. https://doi.org/10.7717/peerj.4375

Opportunities and Challenges

While most actors who have a stake in the research enterprise support open access (OA) and embrace its principles, it is still true that publishers as well as the funders and institutions that support scholarship have yet to institute policies and reward structures that encourage and support researchers who would like to publish OA. As a result the social good of OA often has to be weighed against the practicalities of efficiency, career incentives, and research funding.

Open Access Opportunities

The greatest benefit of OA is that it enables the results of scholarly research to be disseminated more rapidly and widely:

1. More people can read the results of scholarly research, including those who would otherwise not be able to access that information because they cannot afford the subscription to an expensive journal.
2. New ideas can be dispersed more rapidly and widely, which in turn triggers new research studies; it serves as an impetus for knowledge.
3. Scientific research shows that publishing in OA, because of the worldwide visibility without barriers, demonstrably leads to more citations and more impact.
4. Businesses also have broad access to the most recent scientific ideas, which they can then build upon. OA contributes to the knowledge economy and provides an economic boost.
5. Since OA also implies wider reuse, recent knowledge can be put to immediate use in teaching as open educational resources.

Open Access Challenges

Researchers experience a number of disadvantages, most of which relate to the transition to the OA publication model. It is only in the longer term that the extra effort required brings concrete benefits to researchers themselves. This may affect the priority they attach to switching to this new publication model.

The disadvantages they experience:

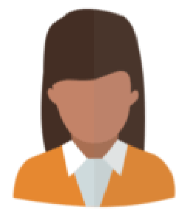
1. In many disciplines, researchers are rated by their ability to publish in journals with a high impact factor. However, it takes some time before new journals, both traditional and OA, can acquire an impact factor. Related to this, the value of the impact factor as a valid and accurate measure of a journal's quality has become a topic of debate. Increasingly, researchers are asking research evaluators (institutions and funders) to judge research on its individual merits, and not where it has been published.
2. The number of high-quality, fully OA journals varies enormously across the different disciplines. Some disciplines, including law and the humanities do not have a large pool of suitable venues in which to publish.
3. Publishing in OA journals sometimes involves additional administration, whereas delivering articles to traditional journals can usually be done easily online.
4. In this transition period most research institutes have not yet made provisions for the payment of Author

Processing Charges (APCs). This therefore entails additional, often substantial, costs for researchers. However, many universities are beginning to respond by setting up funds to cover OA publication fees and it is good to inquire about this.

5. Researchers can be spammed by OA publishers of often dubious quality ("predatory journals"), which colours their perception of the OA publication model.
6. Supplying publication data and the full text of publications to repositories (to satisfy "green OA") means extra work for researchers.

Scenario – Setting Priorities

Let's consider this scenario: Siobhan is a PhD student under your supervision and is preparing a manuscript for submission to journals. Her research has a strong public health aspect and she would like to publish OA. All of the prestigious journals in her discipline allow authors to submit articles for consideration as either OA, with an accompanying $2,500 fee, or not. Siobhan does have some research funding available to her (~ $10,000) and is struggling with whether or not she should submit her article as an OA article and pay the fee. What advice would you give to Siobhan?



Dig Deeper

To learn more about the benefits and challenges of OA, review:

Adema, Janneke and Eelco Ferwerda. (2014). Publication Practices in Motion: The Benefits of Open Access Publishing for the Humanities. In *New Publication Cultures in the Humanities: Exploring the Paradigm Shift*. (pg 131-147). Licensed under CC BY-NC-ND.

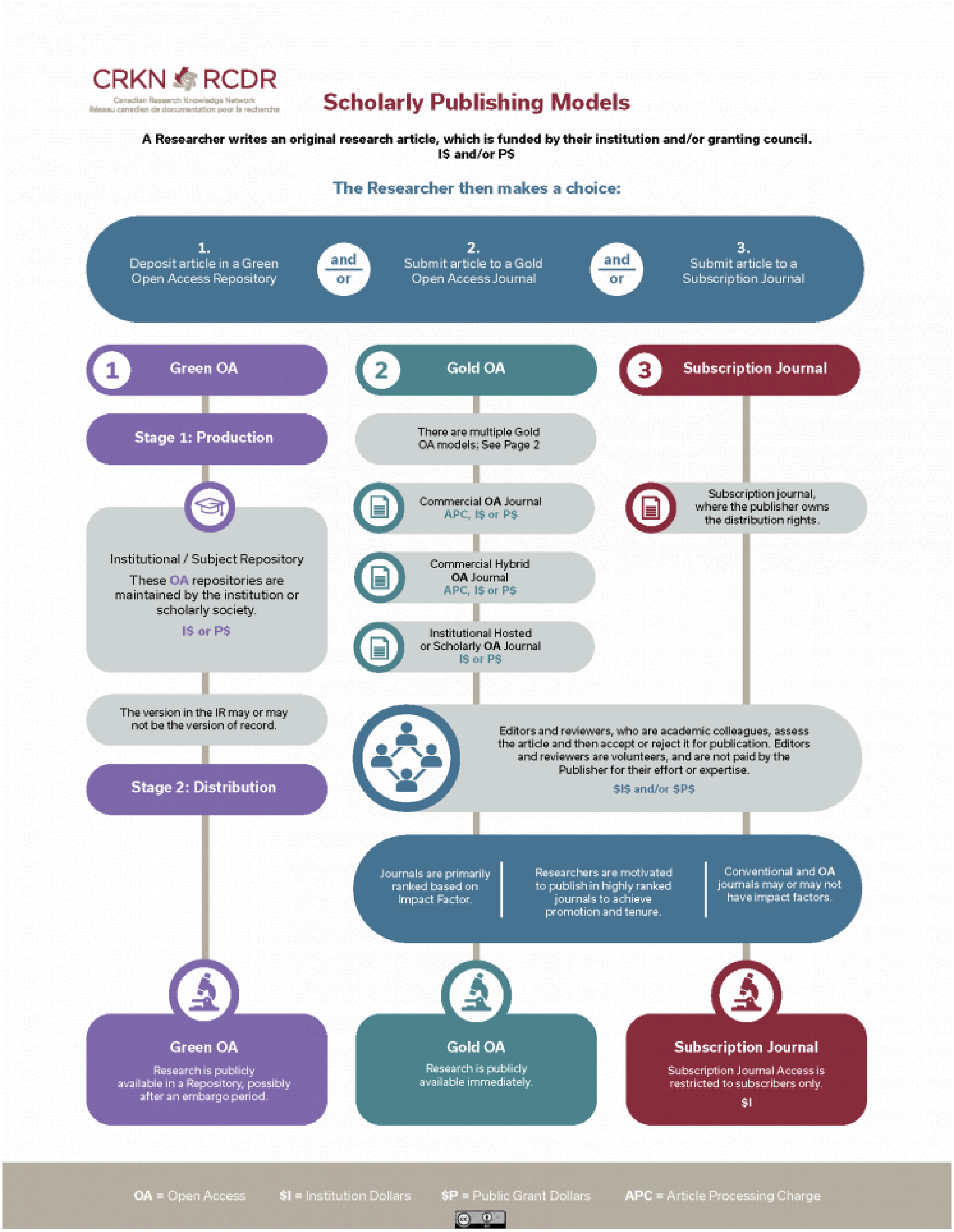
May, Christopher. (2018). Academic Publishing and Open Access: Costs, benefits and options for publishing research. Licensed under CC BY-NC.

Adaption

Portions of this section has been adapted from information found on the Open Access Netherlands website.

Open Access Models

While a basic mandate to provide scholarly research for free unites all approaches to open access (OA), that does not mean that different communities have not adapted OA principles to suit their needs and values. In the contemporary publishing landscape one can identify several different manifestations of OA that range from those that do as little as possible to disrupt the traditional publishing ecosystem to those that eschew traditional publishing conventions altogether.



CRKN RCDR
Canadian Research Knowledge Network
Réseau canadien de documentation pour la recherche
Scholarly Publishing Models
A Researcher writes an original research article, which is funded by their institution and/or granting council.
I$ and/or P$
The Researcher then makes a choice:
1. Deposit article in a Green Open Access Repository
and
or
2. Submit article to a Gold Open Access Journal
and
or
3. Submit article to a Subscription Journal
1 Green OA
2 Gold OA
3 Subscription Journal
Stage 1: Production
There are multiple Gold OA models; See Page 2
Commercial OA Journal
APC, I$ or P$
Subscription journal, where the publisher owns the distribution rights.
Institutional / Subject Repository
These OA repositories are maintained by the institution or scholarly society.
I$ or P$
Commercial Hybrid OA Journal
APC, I$ or P$
Institutional Hosted or Scholarly OA Journal
I$ or P$
The version in the IR may or may not be the version of record.
Editors and reviewers, who are academic colleagues, assess the article and then accept or reject it for publication. Editors and reviewers are volunteers, and are not paid by the Publisher for their effort or expertise.
I and/or P
Stage 2: Distribution
Journals are primarily ranked based on Impact Factor.
Researchers are motivated to publish in highly ranked journals to achieve promotion and tenure.
Conventional and OA journals may or may not have impact factors.
Green OA
Research is publicly available in a Repository, possibly after an embargo period.
Gold OA
Research is publicly available immediately.
Subscription Journal
Subscription Journal Access is restricted to subscribers only.
$I
OA = Open Access
$I = Institution Dollars
$P = Public Grant Dollars
APC = Article Processing Charge

Green Open Access

Green OA refers to the self-archiving of a research output in a publicly-accessible institutional or subject repository (usually after an embargo period).

An important feature of green OA is that authors are still able to participate in the "traditional" publishing system. In this way, green OA does not supplant current academic publishing practices, instead it complements them, allowing researchers who are often incentivized to publish in prestigious closed access journals to continue to meet these obligations while also making a version of their work available to a wider public audience that cannot access the version of record.

For green OA to work, it needs to be supported by traditional publishers, as it relies on their permission to make a version of the article available in another venue outside of the journal. A publisher's support for green OA is spelled out in the publication agreement that authors sign with journals upon acceptance of their manuscript. To learn more about publisher agreements, review the Author Rights chapter.

Publishing Green Open Access

An author who would like to publish under the green model must first select a journal that permits self-archiving as outlined in their publisher agreement or must be willing to request such permission from the publisher if such permission is not initially offered. Once an author has confirmed that they have permission to self-archive their work, they will then need to confirm that they have an appropriate version of the work to make available (See: Publisher Agreements and Publisher Negotiations).
Having secured an acceptable version of the work, authors are free to then make that work available in an online repository. While some publishers permit the posting of the work on a personal or departmental website, more commonly they require that the research is posted in either an institutional or disciplinary repository (e.g. cIRcle – University of British Columbia's digital repository). OpenDOAR is a directory of OA repositories that can help you identify an appropriate place to archive your work.

Green Open Access Embargos

For green OA, publishers often request that authors respect an embargo period (See: Publisher Agreements) before the work is released openly. Because of embargo periods, self-archiving as a method of OA does not allow for the public dissemination of research as quickly as gold OA. As a result, it may be more difficult for authors to comply with OA mandates (imposed by funders or their institutions), which usually include timeline requirements.

Gold Open Access

In its simplest form, **gold OA** refers to making research freely available immediately upon publication in an OA journal. Unlike the green model of OA, there is no waiting period during which the work is only available in a toll access journal before being posted online for broad public dissemination. Authors may prefer gold OA as it presents only one workflow and produces only one version of the article. Unfortunately, many authors are deterred from gold OA publishing because prestigious open access journals often charge article processing charges (APCs).

Publishing Gold Open Access

Article Processing Charges (APCs)

APCs are fees that authors are expected to pay to cover the cost of publication of their articles. The standard rationale for APCs is that if publishers cannot charge for access to journals, they need to cover the cost of production somehow and make up these funds by asking the author to cover costs. APCs range in price from a few hundred dollars to thousands, with many prestigious journals charging upwards of $3000. The transfer of payment for the cost of academic publishing from libraries to individual researchers introduces many new complications into an already complex and somewhat dysfunctional publishing system. The range of fees presented by different OA journals leads to another important question about OA; is there an obligation to produce and publish research on a cost-recovery model, or should publishers be free to commercially exploit it? As discussed in the Publication Ecosystem section, early OA advocates expected that the internet would result in a marked decrease in the cost of publication based on easier dissemination and a democratization of publishing.

Today, given that well known journals with impressive Journal Impact Factors are often charging the highest APCs, it appears that the significance of the prestige economy was greatly underestimated by these early visionaries.

Paying for Gold Open Access

The introduction of APCs has altered the relationship between publishers and authors because for the first time authors are directly involved in the economic calculus of publishing. Understandably, authors often resent being asked to contribute to the cost of publishing their own research and many simply cannot afford to. In response to the introduction of APC costs, various stakeholder groups have come up with strategies to support researchers and cover these new costs. Funders are now allowing researchers to write APC costs into grants, academic institutions are creating APC funds to support their faculty and academic libraries are negotiating new types of access agreements (often referred to as "**transformative agreements**") that cover the cost of OA publishing in a specific publisher's journals.

Unsurprisingly, the transfer of publication costs from subscribers to authors has not solved many of the inequalities built into the academic publishing system. In a discussion on roadblocks to better OA models, David Crotty wrote the following about shifting inequity within the system:

> The flaws in the author-pays business model for journals have been evident for more than a decade. The APC model represents a lateral move in terms of access, greatly improving access for readers but shifting the inequity in the system onto authors. It allows everyone to read the work of others, but limits the ability to publish one's own work to those with sufficient funds to cover the costs of doing so. This greatly disadvantages authors from less-wealthy regions of the world, along with unfunded researchers, and entire fields without the significant funding structures found in some of the sciences that are largely driving the move to APC models. Waiver programs are already under strain, and there seems little willingness among wealthy nations or authors to overpay in order to support their less-well-off colleagues.[1]

Learn more about the economics of publishing.

Selecting an Open Access Journal

While gold OA may be as simple as publishing in an OA journal, for many researchers selecting an appropriate open journal is a daunting proposition as it may require them to consider publication venues outside of those they are familiar with. As mentioned in the Publication Ecosystem chapters, fear of predatory publishers is another consideration. Luckily many tools have been developed to help researchers identify relevant and high-quality OA journals in their field. Examples include:

- Directory of Open Access Journals: Large database of vetted OA journals across publishers and disciplines. Search by title or field.
- Enago Open Access Journal Finder: Enter your manuscript abstract to help you shortlist trusted OA journals that are the most compatible with your research. Relies on DOAJ to vet legitimate journals.
- IEEE Publication Recommender: Helps you choose a journal from electrical engineering, computing, biotechnology, telecommunications, power and energy and other technologies, in which to publish your research. OA filters are available.
- Open Journal Matcher: Recommends open journal options based on the abstract for your paper.

Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.bccampus.ca/openscholarship/?p=89#h5p-7

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.bccampus.ca/openscholarship/?p=89#h5p-8

Notes

1. Crotty, D. (2019, October 9). Roadblocks to better open access models. The Scholarly Kitchen. https://scholarlykitchen.sspnet.org/2019/10/09/roadblocks-to-better-open-access-models/

Other Open Access Models

While all forms of open access (OA) fall broadly into either the green or gold classification, there are additional, nuanced, forms of OA which are used to highlight distinguishing features among the varieties. Because these terms are also often used to describe OA, it is worth understanding their unique features.

Platinum or Diamond Open Access

Platinum OA gets its name from its association with gold OA, as it is seen as a premier or superior form. The distinguishing characteristic of platinum OA is that articles are published OA immediately in OA journals but there are no article processing charges (APCs) back to the author. As discussed previously, APCs are a common characteristic of gold OA, yet it is not true that all or even most OA journals charge these fees. Many gold OA journals rely on institutional support, grants, memberships etc. to fund their publication and as a result do not ask their authors to contribute any additional funds. It is because these journals do not charge back any costs to authors that they are granted the platinum distinction.

Hybrid Open Access

Hybrid OA is used to describe a journal that publishes both gold OA and traditional subscription-based research. These journals present their authors with the choice to either pay an APC and have their work disseminated as OA, or to submit it as a non-OA article. Hybrid journals are a contentious issue among OA advocates, as they largely reinforce the supremacy of traditional publication venues and often provide an additional revenue stream to already profitable journals. Hybrid journals also tend to have substantial APC charges, with the more prestigious journals charging the highest fees. Notably, academic libraries take issue with hybrid journals as they charge authors to make a subsection of their articles OA, but still require libraries to pay undiscounted subscription fees to access the additional pay-walled content. As a result, hybrid journals are often accused of "double dipping".

Bronze Open Access

Bronze OA refers to scholarship that may be publicly available online but does not include clear reuse permission. Because of this lack of clarity, bronze is used to confer its inferior status in relation to gold or platinum OA literature, which is clearly marked for reuse. Whether or not bronze OA meets funder requirements or other OA polices is dependent on individual polices. According to a 2018 study, Bronze OA, while little talked about, may be the most prevalent form of OA in practice. As mentioned earlier in this section, bronze OA is also called *gratis* OA.

Dig Deeper

To learn more about the challenges of hybrid OA, review:

Matthias, Lisa. (2018). The worst of both worlds: Hybrid Open Access. Licensed under CC BY.

Kingsley, Danny and Philip Boyes. (2016). Hybrid open access – an analysis. Licensed under CC BY.

Open Access Mandates

As interest in and support for open access (OA) grows, funders and institutions have responded by enacting their own OA policies. These polices are an important force within the larger OA movement as they encourage and sometimes require researchers to make their research publications openly available. Critics of OA mandates express concern over policies that appear to dictate where and how authors can publish and often cite academic freedom as an argument against such policies. Balancing a desire to support OA with the need to support researcher choice can be complicated for funders and institutions. As a result, the success of OA mandates is unevenly distributed across geographical regions and organizational structures.

Europe is Leading the Pack

In Europe, where funding is very centralized, there has been a concentrated effort to operationalize a broad OA policy referred to as "Plan S". Plan S was put forward by cOALition S, a group of national research funding organisations supported by the European Commission and the European Research Council. Since its announcement in 2018, stakeholders in Europe and across the globe have shared both their support for and criticism against the project and the proposed implementation strategy. While its original objective was to reach complete OA for all funded research by 2021, the plan was pushed back a year in order to give publishers time to ensure their publications would meet Plan S requirements for authors.

Other concerns have emerged over Plan S and have been addressed by the addition of new principles. Despite these modifications, many are still worried about the consequences – both intended and unintended – that Plan S will have on the academic publishing ecosystem.

In January, 2023 cOAlition S reaffirmed an earlier commitment to discontinue support for "transformative journals" – journals that were gradually moving from from subscription to OA models – by the end of 2024. Initially conceived as a stopgap measure to grant journals necessary time to transition to OA, there was some concern that Plan S would continue to support hybrid OA models in the face of publisher pressure to do so. The 2023 announcement confirmed that cOAlition S continued to "firmly oppose" hybrid OA and would not be changing its implementation timelines.

Publishers Push Back

The impacts of Plan S are felt far beyond the European Union. European researchers publish widely across international journals and publishers alongside researchers from every part of the globe. It remains to see how these large publishers will adapt to plan S requirements and whether or not exceptions will be carved out for European researchers, or if they will completely transition to OA.

In early 2021, a group of over 50 publishers signed a statement opposing a provision on authors' ownership rights put forward by Coalition S. In the statement, the publishers expressed concern over Plan S's Rights Retention Strategy, under which funded authors could still publish in traditional subscription journals so long as they immediately made their article OA in a repository (via the green route to OA). Some publishers, notably Springer Nature, have so far refused to comply with this element of Plan S, making it clear to authors that they must choose a gold OA option if they want to meet Plan S obligations.

Reflections – Should Governments Dictate How Academics Publish?

In April 2023, a report surfaced that a leaked document revealed the Europe's Council of Ministers is close to releasing a position paper calling on funders to make "immediate and unrestricted open access the default mode in publishing…with no fees to authors." Proponents of OA are excited to see the EU take such a strong position in favor of platinum OA, but critics worry about mandating OA compliance and restricting researcher choice in their publication venue

How much control should funders have over researcher publication venue? Is mandated OA a step in the right direction, or government overreach?

North America and The Nelson Memo

North America has seen a much more uneven growth of OA mandates and while many notable funders do require OA (for example: The Bill & Melinda Gates Foundation, National Institutes of Health, National Science Foundation), many others do not.

Individual institutions also have OA policies in place, with MIT and Harvard being notable examples. The University of British Columbia does not currently have an OApolicy, but did issue a position statement in 2013 in support of OA.

A comprehensive database of funder and organizational mandates from around the world can be found at ROARMAP.

On August 25, 2022, the White House Office of Science and Technology Policy (OSTP) released new guidelines on increased, expansive public access to the results of federally funded research. The guidelines, or the "Nelson Memo," acknowledges the need to learn from the positive outcomes of the accelerated rate of sharing research due to the COVID-19 pandemic and provides instruction to national funders to update their public access policies to ensure that all peer-reviewed scholarly publications resulting from federally funded research "are made freely available and publicly accessible by default in agency-designated repositories without any embargo or delay after publication."[1]

It largely remains to be seen how this Memo will impact the transition to full scale OA in the US, but it is an important signal of shifting priorities and values within the US funding and scholarly publishing landscape.

Canada's Tri-Agency Open Access Policy

The Tri-Agency Open Access Policy on Publications came into effect, with new requirements for grants awarded by the major Government of Canada granting agencies. The three granting agencies are the Canadian Institutes of Health Research (CIHR), the Social Sciences and Humanities Research Council of Canada (SSHRC), and the Natural Sciences and Engineering Research Council of Canada (NSERC).

The policy applies to all SSHRC and NSERC grants awarded after May 1, 2015. CIHR grants have required open access compliance since January 1, 2008. The policy requires that all peer-reviewed journal publications arising from Tri-Agency-supported research are freely accessible online within 12 months of publication.

Dig Deeper

To learn more about the impact of OA mandates, review:

Larivière, Vincent and Cassidy R. Sugimoto (2018). Do authors comply when funders enforce open access to research?

Notes

1. Office of Science and Technology Policy. (2022, August 25). Ensuring free, immediate, and equitable access to federally funded research (OSTP Public Access Memo). The White House. https://www.whitehouse.gov/wp-content/uploads/2022/08/08-2022-OSTP-Public-Access-Memo.pdf

Open for Whom?

> "Something has gone wrong along the road to achieving complete open access in scholarly publishing, and the stakes have changed. Thirty years ago, there was a problem with access to information. Today, we have a problem with who controls publishing and moreover, with the control and governance of the whole range of scientific process and output. Former inequalities remain. New inequalities are emerging. Is open access the beginning of a new and more egalitarian episode of scientific communication? Or is it just another Trojan horse, allowing private companies to extend their control of the Big Data now generated by science?"[1]

It would be misguided to end of the Open Access chapters without addressing some of the limitations of open access (OA). In recent years, critical responses to OA have increased and many supporters have grown disillusioned with the co-opting of OA by commercial publishers and the movement's inability to address and correct larger inequities that exist within the academic publishing ecosystem.

Decolonizing Open

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=96#oembed-1

Open Dialogues: Daniel Heath Justice, Centre for Teaching, Learning and Technology, University of British Columbia.

With the rise of gold pay to play OA models, **Global North** countries with robust funding models have a greater ability to contribute to the open dissemination of literature. On the flip side, researchers from the **Global South** are not be able to participate in OA to the same degree, resulting in the inability of their research to have the same global impact.

There has also been growing awareness around the complexities of imposing OA on the knowledge of indigenous peoples and marginalized groups. **Colonizer** cultures have a well established history of appropriating the cultural artifacts, practices and information of colonized peoples and it is imperative that OA principles recognize this practice of extraction and avoid recreating it within the discourse of open.

In a recent report on open science prepared for the Canadian Commission for UNESCO, the authors highlight the imperative to decolonize OA, not only as a moral imperative, but for the betterment of science:

> "Debates and policy recommendations from Global North institutions on Open Science and open access usually deal with access to and dissemination of research outputs (still largely in journals and books). Promotion of these policies has tended to focus on the benefits, such as increased visibility and citations, paying little attention to the burden and the risks—particularly for knowledge-holding communities on the margins or scholars from the Global South…In this context, open access tends to reinforce the hegemony of science done and published in the Global North at the expense of local knowledge, seldom in open access. This reduces intellectual diversity and contributes to the homogenization of science and creativity."[2]

Case Study – Digitizing African Cultural Heritage

A 2018 study commissioned by the French Government outlined a possible path towards restitution of African cultural heritage obtained by the French state during its colonial expansion. One recommendation put forward by the study was to digitize and make available as OA resources all cultural works that would be returning to their respective African home nations. Critics of the report challenged this recommendation, arguing that digitizing the artifacts would:

- Risk placing the French government in a position of returning Africa's material cultural heritage while retaining control over the generation, presentation, and stewardship of Africa's digital cultural heritage for decades to come.
- Create a double standard by requiring African cultural heritage to be digitized and made available when the same demands are not made of its own national institutions.
- Prevent African communities from enjoying full autonomy in devising any access strategies for restituted material and digital cultural heritage.

In your opinion, what obligations should holders of appropriated cultural heritage have to the cultures and peoples that the works belong to? Is the responsibility to make culture and history widely available greater than that of restitution?

Learn more

Because the chapters in this book are meant to serve as brief introductions to the topics presented, there isn't space to discuss critiques of open access in sufficient depth. Although not required, you are encouraged read the resources in the *Dig Deeper* section before moving on.

Dig Deeper

To learn more about critical responses to OA, review:

Chan, Leslie. (2017). Confessions of an Open Access Advocate. Licensed under CC BY-SA.

Ulrich, Herb. (2018). Open Access and Symbolic Gift Giving. Licensed under CC BY-NC.

Turin, Mark. (2019). Ownership, Control, Access & Possession in Open Access Humanities Publishing. Licensed under CC BY.

Pavis, Mathilde and Andrea Wallace. (2019). Response to the 2018 Sarr-Savoy Report: Statement on Intellectual Property Rights and Open Access Relevant to the Digitization and Restitution of African Cultural Heritage and Associated Materials Licensed under CC BY.

Notes

1. Herb, U., & Schöpfel, J. (2018). *Open divide emerges as open access unfolds*. In U. Schöpfel & U. Herb (Eds.), *Open Divide? Critical Studies on Open Access* (pp. 7–13). Litwin Books. https://doi.org/10.5281/zenodo.1206390
2. Chan, L., Hall, B., Piron, F., Tandon, R., & Williams, W. L. (2020). Open science beyond open access: For and with communities — A step towards the decolonization of knowledge (Report prepared for the Canadian Commission for UNESCO). Ottawa, Canada. https://doi.org/10.5281/zenodo.3946773

Pathways to Open - Conclusion

In the Open Access – Pathways to Open chapters, you have explored the pathways to open, including OA challenges and opportunities and the growth of funder and institution OA mandates and policies.

Open access (OA) is a set of principles and a range of practices through which research outputs are distributed online, free of cost or other access barriers. OA provides greater readership due to open widespread sharing, an increase in citations of the material shared, and it eliminates access barriers based on the time it takes to go through the traditional publication processes. Funders (e.g. Tri-Agencies) and institutions (MIT, Harvard) have responded to OA through the development of mandates and policies that encourage and sometimes require researchers to make their research publications openly available.

While there are a number of benefits to OA, the challenges, such as the importance of impact metrics in the academy and the offloading of cost to publish to the researcher (i.e. APCs), impact the success of the movement taking a larger hold. Additionally, there are a number of inequalities within the OA movement that need to be addressed by the community, including equal participation of research sharing from the Global South and the potential for OA to reinforce a culture of extraction of Indigenous knowledge. The OA movement needs to ensure that it does not replicate the publishing practices of the past.

OPEN ACCESS - ACTIVITIES

Open Access Plan

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https://pressbooks.bccampus.ca/openscholarship/?p=100#h5p-9

Open Access Activity Bank

The Open Scholarship Primer Activity Bank are activities that you will complete as part of each chapter. The concept behind the activity bank is to learn by doing. This bank is adapted from the D106 Assignment Bank and the Agora Challenge Bank.

Now that you have completed the Open Access chapters, apply what you have learned so far by completing the Activity Bank.

To complete this activity:

1. Go to the Activity Bank,.
2. Filter to Open Access categorized activities.
3. Complete as many activities as interest you.

OPEN EDUCATION - CREATIVE COMMONS

Creative Commons (CC) licenses are types of open licenses that can be applied to Open Educational Resources. These licenses make it easier to share and reuse the work you create. This chapter will explore the basic concept of Creative Commons licenses and how they relate to copyright.

In the following chapters you will:

- Explain the basic concept of Creative Commons licenses and how they relate to copyright
- Explain the difference between using a work under “fair dealing” rules and using one with a CC license
- Give examples of what one can/cannot do with resources that have different CC licenses (BY, NC, SA, ND)
- Point to ways to find CC licensed content of various types
- Apply a CC license to their own work, and share that work in a format that is easily re-usable by others

What is Creative Commons?

In the Open Education – Creative Commons chapters we will explore how the principles and strategies of open access publishing and open research can be applied to teaching and learning. The use of **open copyright licenses** and internet technologies have the potential to reduce student costs and lower access barriers to education by making it more distributed, equitable, and open. We'll be begin with a look at Creative Commons – Creative Commons licenses are the most commonly used type of open copyright license used for the sharing and reuse of learning materials in education.

Creative Commons as an Organization

Creative Commons (CC) is both a nonprofit organization and a worldwide community. It was founded in 2001 in the United States, by Lawrence Lessig, Hal Abelson, and Eric Eldred. As noted in the CC Certificate program for Educators and Librarians, the founding of CC was in part in response to the 1998 Sonny Bono Copyright Term Extension Act (CTEA) in the U.S., which extended for another 20 years the term of copyright for every work in the United States, from the life of the creator plus 50 years, to life of the creator plus 70 years. Lessig (a Stanford Law Professor) and Eric Eldred (a publisher dedicated to publishing works that had passed into the public domain) challenged the constitutionality of CTEA; their case, Eldred v. Ashcroft, went all the way to the U.S. Supreme Court, where they lost. The nonprofit CC organization was inspired by the goal to make more creative works freely available on the internet, even while working within the terms of copyright laws.

Though CC was started in the U.S. (and is still headquartered there), it is now a global organization and network that "helps overcome legal obstacles to the sharing of knowledge and creativity to address the world's pressing challenges" (Creative Commons: What We Do). The CC Global Network has hundreds of individual and institutional members, as well as chapters in many countries (including CC Canada). There are also several Creative Commons Platforms, which are groups of people who work across countries and chapters on particular topic areas, including Copyright Reform, Open Education, and Galleries, Libraries, and Archives (among others).

General Overview of Creative Commons Licenses

This video from Creative Commons provides an overview of the purpose of using Creative Commons licenses.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=103#oembed-1

Wanna Work Together? (2009). By Creative Commons

Creative Commons is perhaps best known for their suite of CC licenses. These are built on top of copyright in the sense that they allow creators to retain copyright while at the same time granting others permission to use the works under the conditions stated in the license. In addition, "CC licenses work around the world and last as long as applicable copyright lasts (because they are built on copyright) and as long as the user complies with the license" (CC Certificate for Educators & Librarians, 3.1)

This means that anyone who owns copyright in a work (see the Defining Intellectual Property chapter) could choose to add a CC license to that work, granting permission to others to use, revise, redistribute that work under certain conditions–depending on the type of license chosen (see below). It also means that if a work has a CC license, those who want to use it do not have to contact the copyright holder to ask for permission so long as they are using the work under the terms of the license.

Each CC license has three layers. First, there is the legal code, with terms and conditions that can be enforceable in a court. Second, there is a "commons deed" that summarizes the legal terms and conditions in more plain language. See, e.g., the legal code of the CC Attribution license (CC BY 4.0) and the commons deed of CC BY 4.0.

There is also a third layer of CC licenses, which is machine-readable code that allows software and search engines to recognize that a work is CC licensed. Creators can access machine-readable html by using the CC license chooser and then embedding that html code into a web page. In addition, if works are shared under a CC license on some content-sharing platforms (such as YouTube, Flickr, Wikimedia Commons, and more), these platforms include the machine-readable code when you share your work with a CC license. See, for instance, how to add CC licenses to SoundCloud.

Fair dealing and CC licenses

Copyright law in Canada protects a wide range of works and is automatic upon creation of a work in a tangible form. If you wish to reproduce a substantial part of a copyrighted work, you may only copy the work if you have express permission from the copyright owner or if the Copyright Act specifically allows you to do so. If you work in an educational setting, you may be familiar with "fair dealing" practices (in the U.S., there are similar practices for "fair use"). While fair dealing is an exception to copyright (and therefore done without permission from the creator), CC licenses are agreements you enter into with a creator, providing you advanced permission to make certain uses of the work.

Both "fair dealing" and CC licenses allow you to reuse or redistribute copyrighted works under particular circumstances and with certain restrictions, though these differ between the two. Generally speaking, fair dealing tends to be more restrictive than CC licenses on how much of a work you can reuse, and for what purposes.

Other Open Copyright Licenses

Creative Common licenses are the most common license used for open content in teaching and learning contexts (e.g., text, video, images). However, software and data often feature different open licenses, such as the GNU General Public

License. that may have slightly different factors around warranties and liabilities. There are many different types of open software licenses, and the Choose a License resource created by Git Hub provides an overview of them.

Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.bccampus.ca/openscholarship/?p=103#h5p-10

Adaptation Statement

Adapted from the Creative Commons Certificate for Educators and Librarians Unit 1: What is Creative Commons from Creative Commons, under CC BY 4.0 license.

What Are the Different Types of Creative Commons Licenses?

This short video provides a useful overview of CC licenses and how they can be used to provide different kinds of permissions or restrictions on reuse of works.

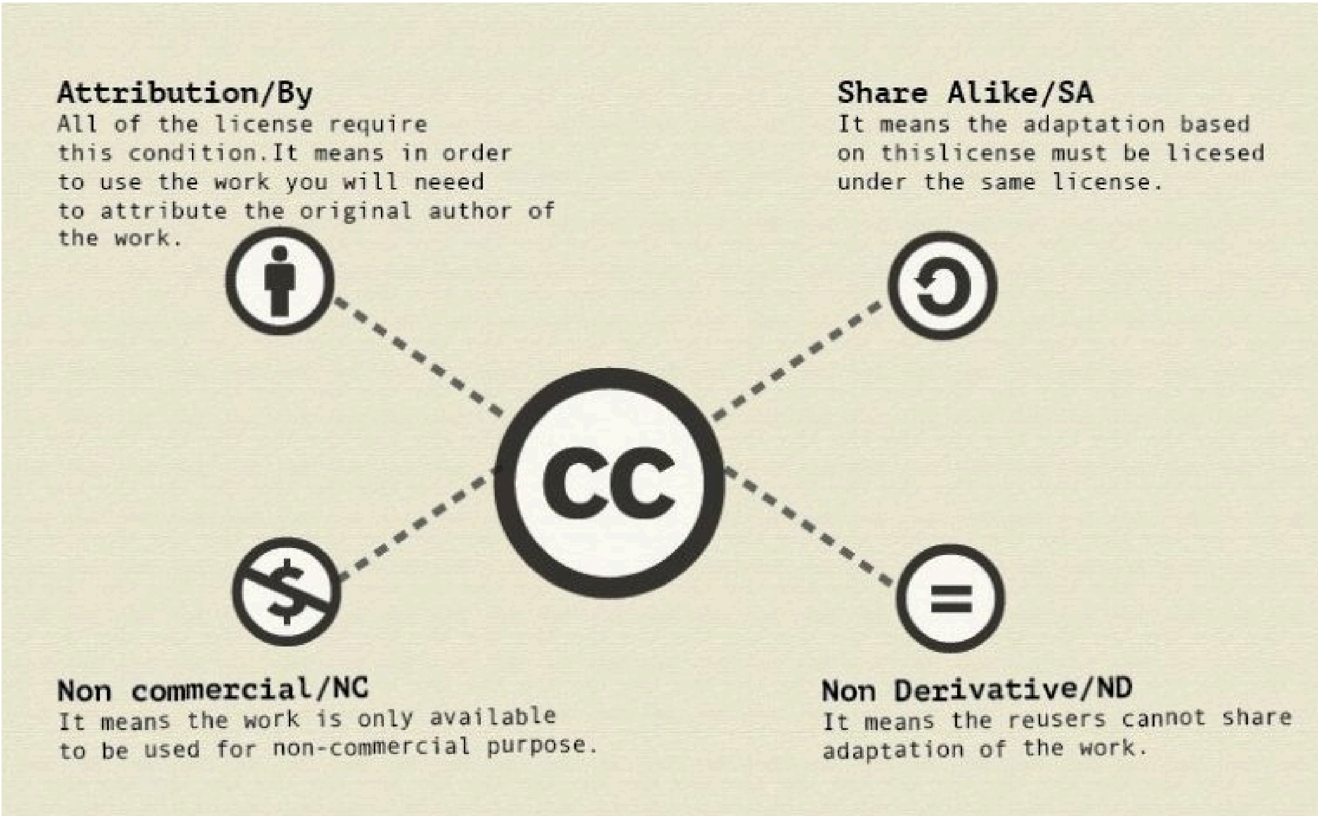
One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=114#oembed-1

There are six different types of Creative Commons licenses. These licenses are designed so that creators have options to provide restrictions on how they want their work to be used. They are made up of four license elements.

Four license elements

Each CC license is made up of one or more of four license elements: Attribution (BY), Share Alike (SA), NonComercial (NC) and No Derivatives (ND).

Attribution (BY)



Attribution (BY)

"BY" refers to attribution. This means in order to use the work, you must attribute the author of the work. All of the Creative Commons licenses require this condition (CC0 does not, but according to the CC FAQs is it not a "license").

Share Alike (SA)

Share Alike means that if you create an adaptation of a work that has this license, the adaptation must be licensed under the same or a compatible license. See the Creative Commons page on compatible licenses to learn more.

NonCommercial (NC)

NC means that the work may only be used for non-commercial purpose. In NC licenses, non-commercial is defined as "not primarily intended for or directed towards commercial advantage or monetary compensation" (see, e.g., CC BY-NC 4.0). What matters here is the use to which the work is being put, not the user: one has to consider whether the use is for a commercial purpose, not whether the user is a commercial entity. A for-profit company could possibly use a work licensed CC BY-NC in a non-commercial way. In addition, using the work in a tuition-based educational course may still be considered a non-commercial use. The definition of "non-commercial" in these licenses is somewhat vague, and while some uses are clearly commercial and others clearly not, some may be in more of a grey zone. Find more information on how Creative Commons interprets non-commercial use on the CC Wiki.

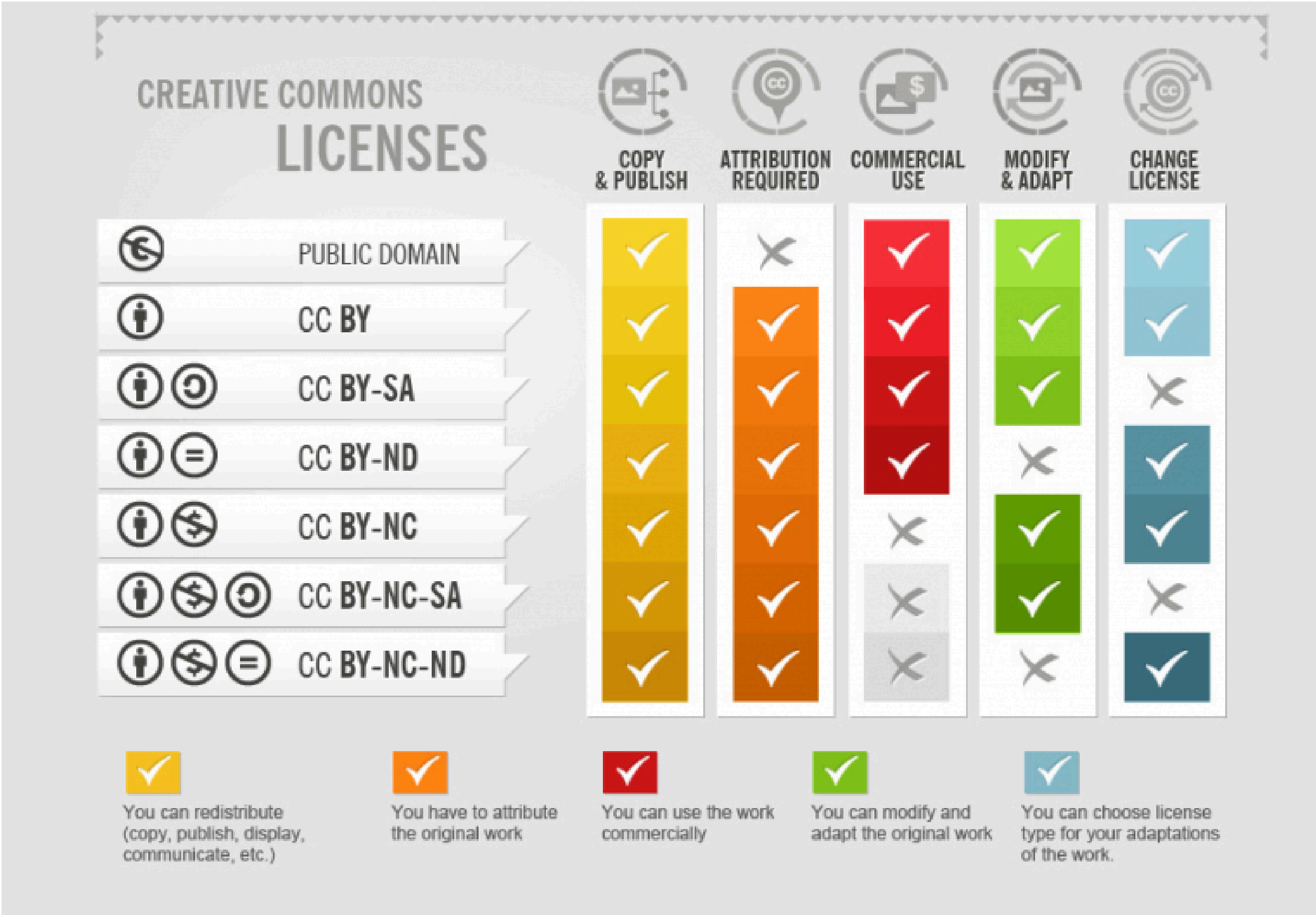
Non Derivatives (ND)

ND means that you cannot share an adaptation of the work, though you could use and share it in its original form. An example of an adaptation of an image would be changing its colour, blurring it, or adding another image on top of it. An example of an adaptation of a written work would be translating it to a different language. The points below, adapted from section 3.3 of the Creative Commons Certificate for Educators and Librarians, provide more details on what is and is not considered an adaptation:

- Syncing a musical work with a moving image **is an adaptation** regardless of what applicable copyright law may otherwise provide.
- Technical format-shifting (for example, converting a licensed work from a digital format to a physical copy) **is not an adaptation** regardless of what applicable copyright law may otherwise provide.
- Fixing minor problems with spelling or punctuation **is not an adaptation**.
- Reproducing and putting works together into a collection **is not an adaptation** of the individual works so long as they have not themselves been adapted. For example, combining stand-alone essays by several authors into an essay collection for use as an open textbook is a collection and not an adaptation. Most opencourseware is a collection of others' open educational resources (OER).
- Including an image alongside text, as in a blog post, a slide, or an article, **does not create an adaptation unless** the photo itself is adapted.

Six CC Licenses

The four elements above can be combined to make up six different licensing options. Note that all CC licenses require attribution, but otherwise the license elements can be combined to allow for or restrict various activities, such as commercial use or adaptation.



The four elements above can be combined to make up six different licensing options. Note that all CC licenses require attribution, but otherwise the license elements can be combined to allow for or restrict various activities, such as commercial use or adaptation.

Attribution (CC BY)

The CC BY license allows others to reuse, adapt, remix, and and distribute the work for any purpose, including commercial use. The only requirement is that the work or adaptation must be shared with attribution to the creator.

Attribution Share Alike (CC BY-SA)

The CC BY-SA license allows others to reuse, adapt, remix, and distribute the work for any purpose, including commercial use. It requires attribution to the creator, and also that if you adapt the work and share it you must give your adaptation the same or a compatible license.

Attribution NonCommercial (CC BY-NC)

The CC BY-NC license allows others to reuse, adapt, remix, and redistribute the work for any non-commercial purpose; commercial use of the work is not allowed. Attribution to the work's creator must be provided.

Attribution NonCommercial Share Alike (CC BY-NC-SA)

The CC BY-NC-SA license allows others to reuse, adapt, remix, and distribute the work for any non-commercial purpose; commercial use of the work is not allowed. In addition, if you adapt the work and share it you must give your adaptation the same or a compatible license. Attribution to the work's creator must be provided.

Attribution NoDerivatives (CC BY-ND)

The CC BY-ND license allows others to reuse and distribute the work in an unadapted form for any purpose, including commercial use; adaptations are not allowed (see above under the ND license element for more about what counts as an adaptation). Attribution to the work's creator must be provided.

Attribution NonCommercial NoDerivatives (CC BY-NC-ND)

The CC BY-NC-ND license allows others to reuse and distribute the work in an unadapted form for non-commercial purposes; neither commercial use or adaptation is allowed. Attribution to the work's creator must be provided.

Dig Deeper

If you are at UBC, please see the UBC Copyright Office's information on fair dealing, and compare with what the various CC licenses allow, as explained in the next section: What are the different types of Creative Commons.

Public Domain Dedication (CC Zero)

Aside from the six types of Creative Commons license, Creative Commons also provides a public domain dedication tool, CC0, which is a way to relinquish all copyright and mark one's work as being in the public domain. The **public domain** consists of all the creative work to which no exclusive copyright or intellectual property rights apply. Some countries do not allow creators to dedicate their work to the public domain through a waiver or abandonment of copyright rights, so CC0 includes a "fall back" license that allows anyone in the world to do anything with the work unconditionally.

Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.bccampus.ca/openscholarship/?p=114#h5p-11

Adaptation Statement

Adapted from The Creative Commons Certificate for Educators and Librarians section 3.3: License Types from Creative Commons under CC by 4.0 license.

Image credit: The license types logos, and the CC logo, are from the Creative Commons downloads web page, used under the CC Trademark Policy.

Finding and Reusing CC Licensed Works

Creative Commons estimates that there are over 1.6 billion creative works that have a CC license. In the next part of the text, we'll be looking specifically at educational materials that have CC licenses and how those can be discovered and used for teaching and learning, but we'll start here with the basics of finding and reusing CC licensed works.

Finding CC Licensed Works

There are multiple websites that you can use to find CC licensed or public domain works. Here are a few:

- Open Educational Resources Guide – The UBC Library's OER Guide has a curated list of places to find CC licensed materials, including images, textbooks, and audio.
- Examples from the Open UBC website– The Examples section from the Open UBC website showcases a list of openly licensed courses, tools and databases that are created by people at UBC.
- Creative Commons Search – The Creative Commons organization has built a search tool for creators seeking to discover and reuse openly licensed creative works. At this time, the tool only searches for images, but they plan to add more types of CC licensed materials in the future.

Reusing and Attributing CC Licensed Works

The first thing you must be sure to do when reusing a work with a CC license is to check that your intended use adheres to the terms of the license. So, for example, if you want to make an adaptation of a slide, diagram or image with a CC BY-SA license, and you plan to share that adapted work with anyone else, you must license it with the same or a compatible license.

Secondly, as mentioned in "What are the different types of Creative Commons Licenses?", **all CC licenses require that attribution be given to the creator.** Even if the work is CC0 or Public Domain, it is still a good idea to attribute the creator: doing so means others can find the original, and the person who created it, to see if they might like to use some of that person's or organization's other work that may have a CC license or a dedication to the public domain (CC0).

Attribution is similar to citation, though not exactly the same. **Citation** is a long-standing practice in which scholars give credit to others whose work they are quoting, paraphrasing, or building upon in their own work. It has standard practices, rules and styles. One may often be citing works that are "all rights reserved" under copyright and that can't be reused in their entirety.

Attribution, in connection with CC licenses, is about crediting a copyright holder who has given their work an open license that requires providing credit to the creator. Attribution in this context is for works that have an open license and that can be reused in their entirety (so long as attribution is provided). See the BCcampus Self-Publishing Guide chapter on Citation and Attribution for more information on citation, attribution, and the differences between them.

How to Attribute a CC Licensed Work

The best practice for attributing CC licensed work is to apply the TASL approach:

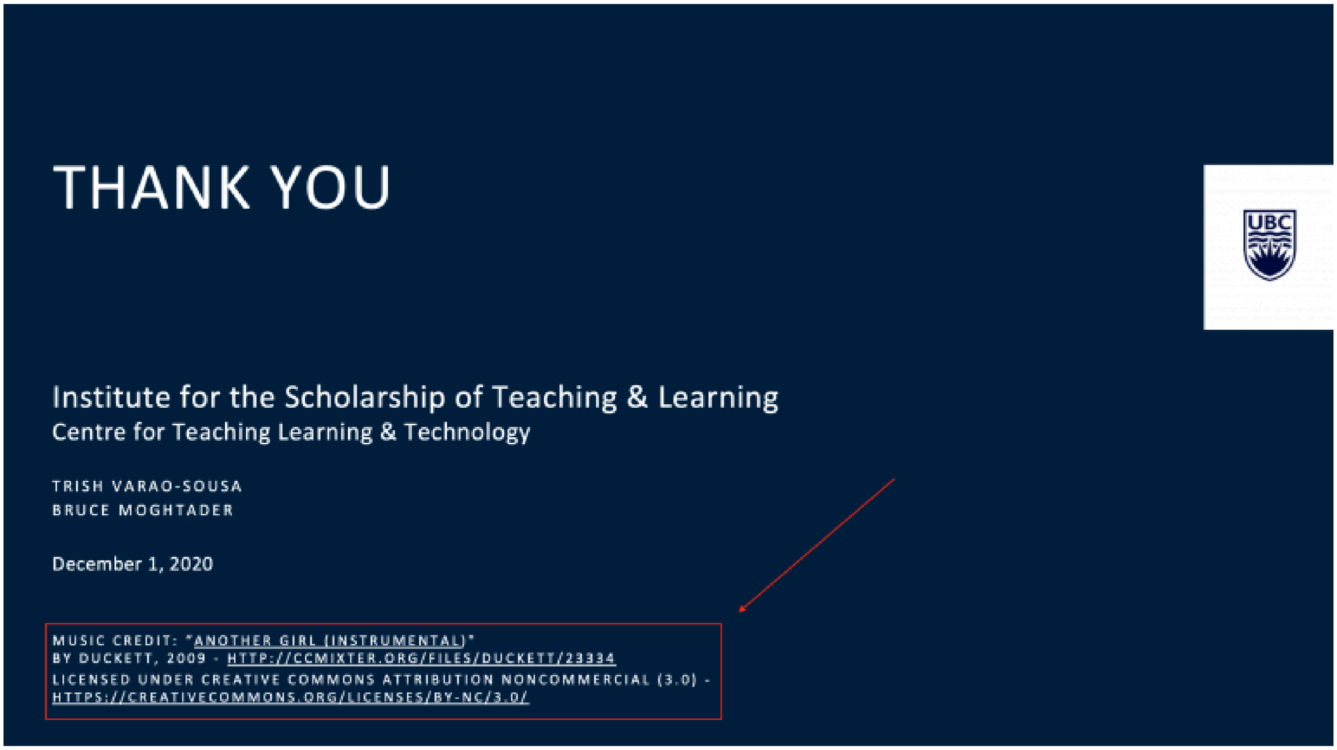
T = Title
A = Author
S = Source
L = License

Here is an example of an attribution that uses the TASL approach:

Beech forest Mátra in winter by Susulyka (CC by SA 4.0)

In the attribution, the title of the work is linked to the URL of where the image can be found (in this case, on Wikimedia Commons), the author's name is linked to the author's page, and the Creative Commons license is linked to the Creative Commons license page.

Here is another example: this video, which is a recording of workshop, uses a bit of openly licensed music at its start and end. The video concludes with this final slide, which provides the attribution for the music:



The attribution list the title, creator, source, and license of the song used. Additionally, the the source of the item is written out since hyperlinks are usually not clickable in videos.

You can see more examples of attribution in Best Practices for Attribution, from the Creative Commons Wiki. The UBC Copyright website page on image attributions also has further examples of how one could attribute CC licensed works.

There are also some useful tools that automate the attribution process:

- Creative Commons Image Search – The Creative Commons Image Search has an auto attribution feature.
- Flickr CC Attribution Helper (Only for Flickr Images)

Remixing CC Licensed Works

Scenario – Adapting a work that has CC BY-ND license

Let's consider this scenario: Preeda wants to create an open textbook for her ECON 101 course. She decides to search for existing ECON 101 textbooks and adapt them so that the context of the textbook is appropriate for her course. She then realizes one of the textbooks she adapted has a CC BY-ND license. She is unsure whether she can still use material from the ND licensed textbook to create her open textbook. Given what you've learned so far, do you think she will be able to do so?

It turns out that the answer to this question is more complicated than it might at first seem. Preeda is looking to create a textbook that includes and adapts several other openly licensed resources, and she could do so in different ways.

Remixes

One way in which Preeda could create a new open textbook using materials from several others is to create a **remix**, which would count as an **adaptation** of the original works. A work that is a remix often includes materials from multiple sources and weaves them together so that it's not always clear when one ends and another begins. In an open textbook, for example, there may be text that is used under a CC license mixed in with other text, and with new words and sentences added in by the person making the remix.

In the Creative Commons Certificate course for Librarians & Educators section 4.4, the idea of remix is compared to a smoothie, where originally separate ingredients are mixed in together in a blender (see a useful blog post about the smoothie metaphor by Nate Angell).

Collections

As already noted in the CC BY-ND section of the What are the Different Types of Creative Commons Licenses? part of this chapter, putting together non-modified existing works (or portions of them, such as a chapter in a book) into a collection does not count as an adaptation: a **collection** "compiles different works together while keeping them organized as distinct separate objects" (CC Certificate for Educators and Librarians, section 4.4). Instead of a smoothie, a collection would be if you had several different foods served at the same time without being mixed together (or, in Nate Angell's metaphor, a TV dinner):

Using "No Derivatives" Material in a Textbook

Would Preeda be able to take a chapter or a portion of a chapter from the ND licensed textbook to use in her textbook if she is creating a "collection," and if if she doesn't modify the material licensed ND in any way that would count as an adaptation?

There isn't a straightforward answer, though the CC FAQs provide some guidance under the question "Can I reuse an excerpt of a larger work that is licensed with the NoDerivs restriction?"

- "Incorporating an unaltered excerpt from an ND-licensed work into a larger work only creates an adaptation if the larger work can be said to be built upon and derived from the work from which the excerpt was taken. Generally, no derivative work is made of the original from which the excerpt was taken when the excerpt is used to illuminate an idea or provide an example in another larger work."

This is somewhat vague, and it's in part because, as the same answer to the FAQ above notes, "What constitutes an adaptation, otherwise known as a derivative work, varies slightly based on the law of the relevant jurisdiction."

So can Preeda use CC-BY-ND licensed material for her textbook? As you can see, the question about what Preeda may do is complicated, and perhaps the best thing for her to do in this situation is either: (1) not use the material from the ND licensed work, or (2) consult the copyright office for her institution (e.g., the UBC Copyright Office).

Licensing a Textbook

After consulting with the copyright office and her colleagues, Preeda has decided to use the ND licensed work as part of collection in her textbook. Preeda was planning to license her textbook with a CC-BY-SA license, but then realized this license may not be compatible with the ND licensed work she used in her textbook. Does this mean Preeda has to change the license of her textbook to CC-BY-ND in order to be able to use as a collection? According to the Creative Commons FAQ on using CC licensed works in collections, Preeda can still use the ND licensed work in a collection even if her textbook is licensed under the CC-BY-SA license. However, how could Preeda license her textbook so that the reader will know which part of the textbook is under the ND license?

On the license page, Preeda can indicate that "**Except where otherwise noted**, this website is licensed under a Creative Commons Attribution Share Alike 4.0 International License," and write the page or chapter of the textbook that us exempt from the CC-BY-SA license. An example of this can be seen on the Keep Teaching site's Copyright license page.

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.bccampus.ca/openscholarship/?p=118#h5p-12

Dig Deeper

Consider a different scenario Preeda might find herself in: If some of the materials she hopes to use for her textbook are licensed CC BY-SA and some CC BY-NC, can she create a remix using those, and if so, what license can she give her open textbook?

- See the CC FAQs on remixing materials and licensing those remixes for information to help answer these questions. If you have questions or comments after doing so, please raise them in the discussion board on the POSE Canvas site.

Applying a CC License and Sharing One's Own Work

Now that you have learned about the six different types of Creative Commons licenses (and the public domain dedication tool, CC0), how would you apply a CC license to works you create?

Considerations Before You Use a CC License

First, be sure you understand the terms of the licenses and CC0, including what others can do with the work once you apply one of these. Review the Creative Commons licenses chapter.

Here are some other questions to consider.

What would happen if you decide to use a CC license and later change your mind? The original license cannot be revoked, and if someone finds the work under that license they can still use it according to those terms. Creators can remove their original works with the earlier licenses from where they posted them, and re-share with a new license, but earlier versions with the earlier license may still be accessible in some places. See "Things to Consider after CC licensing" from the CC Certificate for Educators and Librarians for more information.

What if someone uses your CC licensed work in a way you don't approve of? The only restriction on purpose of use in Creative Commons licenses is in the"NonCommercial" licenses that restrict the use of works to non-commercial purposes. For works with any other CC license, others are allowed to use them for any purpose (though perhaps with other restrictions depending on the license, such as no adaptations allowed (ND) or that adaptations must be shared with a compatible license (SA)). All CC licenses that allow adaptation, however, require that adaptors clearly mark that the work is an adapation, and do so in a way that does not suggest the creator agrees with the changes. A creator can also ask that attribution to them be removed from someone else's use of the work. See "Things to Consider after CC licensing" from the CC Certificate for Educators and Librarians for more information.

What happens if someone violates the terms of the license? In brief, their right to use the work ends immediately and they could be liable for copyright infringement (unless they use the work under fair dealing or another limitation or exception to copyright). In the current 4.0 versions of the CC licenses, if users comply with the license within 30 days of learning they have infringed the license terms, their right to use the work under the license is automatically reinstated. In recent years, there have been an increase in cases of "copyleft trollling" which involves the intentional use of older versions of Creative Commons licenses that do not have the 30 day grace period. In such cases, a copyright holder may license a work with complex attributions and user who does not provide a proper attribution could be liable for copyright infringement and have to pay a fee.

See "License Enforceability" from the CC Certificate for Educators and Librarians for more information.

Choosing and Applying a CC License

If you decide you do want to use a CC license, you need to choose which one based on what you would like others to be able to do with the work without asking your permission. The Creative Commons license chooser can be helpful in making this choice.

How do you apply a license or CC0 to your work? There are several ways to do so:

- Put a notice of the CC license on the work, such as a sentence that reads, "This work is licensed CC BY-SA 4.0." You could do so, for example on the first slide of a slide deck, or in a caption on an image, or in the credits of a video. Often creators will include an image of the license button as well (see Creative Commons downloads), though this isn't required.
- Post the work on a platform that allows you to choose a CC license; a number of photo-sharing and video-sharing platforms allow you to choose a CC license rather than marking your work with the default "all rights reserved."
- If you are putting the license on a website, you can use the CC license chooser to get machine-readable html code to include on the site.

See the Creative Commons Wiki page on marking your work with a CC license for more information.

Sharing Your Work

Once you have created a work and applied a CC license to it, where and how should you share it with others? There are many options, including content sharing platforms that allow you to choose a CC license for your work (such as Flickr for images or YouTube for videos), or a repository such as those listed in the UBC Library Open Education Guide.

Note that sharing in one of these ways can help ensure your work is more easily findable by others, including through tools such as CC Search or the OASIS OER meta search tool, which search various repositories and sharing platforms. If you create or adapt an open textbook, consider submitting it for inclusion in the BCcampus Open Textbook Collection.

Adaptation Statement

Ethical Consideration of Creative Commons

When sharing knowledge, it is important to consider both accessibility and ethical responsibility. Creative Commons licenses make it easier to share and reuse materials, but they do not always account for cultural context or the preferences of knowledge holders. Some knowledge, especially that which is deeply connected to communities and traditions, requires careful thought about how it is used and shared. In some cases, Creative Commons licenses may not be the most suitable option for ensuring that knowledge is shared in a respectful and contextually appropriate manner.

Working with Traditional Knowledge

As in the Traditional Knowledge chapter, Traditional Knowledge (TK) refers to the knowledge, know-how, skills, and practices passed down through generations within a community, often forming part of its cultural or spiritual identity. Some forms of traditional knowledge may carry a TK Label, which indicates cultural protocols on how it should be shared.

While TK Labels differ from Creative Commons licenses, it is important to respect the knowledge holder's preferences and follow appropriate cultural protocols when using licensed materials that incorporate traditional knowledge. Additionally, there is a risk of misuse or appropriation, which not only involves taking something of value from a community but also profiting from it without proper recognition or permission.

To avoid this, it is essential to engage with the knowledge holders, obtain consent, and ensure that any use aligns with their cultural protocols and expectations.

Consideration on Accessibility

Scenario: What is the consequence of not using an accessible format?

Let's consider this scenario: Vanda has created a CC BY licensed graph that explains how supply and demand gets affected during depression. the graph became popular and it became used in various ECON courses in universities.

One day Mia, who is a visually impaired student, took an ECON course which uses the graph that was created by Vanda. Mia has hard time interpreting the graph as the graph does not have an alternative text, nor a caption that describes what the graph is about. The course uses other CC by licensed graphs that also do not have alt texts. Every time when this type of graphs are used, Mia has to contact their instructor to ask for clarification on what the graph is about.

CC license allows to easily re-use and share your work. However, what are the consequence if the works you share are not accessible? What are the things that Vanda could have done in order to make their work more accessible?

Many works with a CC license are shared in digital format, and it is important to ensure they follow accessibility guidelines so that they can be used by people with different abilities. For example, video and audio recordings should have text captions or transcripts, images should have alternative text, and documents should be organized in way that allows those using screen readers to navigate them easily. In case of the scenario above, Vanda could have provided alternative text to the graph so that students like Mia can interpret the graph. See the UBC OER Accessibility toolkit for more information.

Ethical Aspect of AI

While Creative Commons licenses are designed to enable sharing and remixing, the rise of AI introduces new ethical complexities. AI systems often train on large datasets that include openly licensed content such as images, text, or audio. In many cases, the original creators may not be aware that their work is being repurposed for this type of use. In addition, training AI models on large open datasets requires significant computational power, often relying on non-renewable energy sources and raising environmental sustainability concerns. This raises important questions about consent, attribution, and potential misuse.

Gen AI Considerations: "The basic premise is that open is not synonymous with good. Open may lower the barriers to harmful uses. In order to mitigate harm, including safety and security concerns, open licenses need to evolve from simply being "open" to being "open" and "responsible""

-Paul Stacey, [AI From an Open Perspective]

This quote highlights the importance of pairing open licensing with ongoing ethical reflection and thoughtful governance. As AI continues to shape how content is used and shared, creators and educators are encouraged to consider not only how their work can be reused, but also how it might be applied in new and potentially unintended contexts.

Let's consider the scenario below:

Scenario – Sharing CC licensed work

Let's consider this scenario: Sulan created a drawing of people studying using a computer and released it under a CC-BY-NC license, allowing educational and non-profit institutions to use her work. Over time, her drawing became very popular.

A year later, her friend introduced her to an AI image generation tool and demonstrated its capabilities using the prompt "people studying using a computer." To Sulan's surprise, the generated image closely resembled her artistic style. She felt conflicted—while she had willingly shared her work for educational purposes, she had never intended for it to be used in training AI models. The realization left her with mixed emotions, raising questions about artistic ownership and the unintended consequences of open licensing in the age of AI.

Reflecting on Sulan's case above, there are many considerations when using AI. Since AI is a relatively new technology, there are still many grey areas and unknowns regarding its usage. When incorporating AI into creative work, several ethical factors needs to be considered:

- What is the social impact of AI?
- Who owns the copyright of the AI work? (Review "Can Machine be an Author")
- What is the environmental impact of using AI to generate OER?
- How can we mitigate the potential harms of AI while maintaining a balance with open sharing and creative commons licensing?

In the next section, Creative Commons and AI, we will explore alternative methods to mitigate the harmful effects of AI.

Dig Deeper

To learn more about Ethical Consideration of Creative Commons License, review:

- Blog post: *Sharing Indigenous Cultural Heritage Online: An Overview of GLAM Policies* by Creative Commons
- Blog post: AI from Open Perspective by Paul Stacey

AI and Creative Commons

As discussed in Can a Machine be an Author?, there is an ongoing debate about whether AI can be considered the author of a work. Since AI is a relatively new technology and there are still many grey areas, the guidelines are continuously evolving. Below is how various communities, including Creative Commons, educational institutions, and copyright organizations, are addressing AI-related challenges:

Creative Commons and AI

> "We recognize that there is a perceived tension between openness and creator choice. Namely, if we give creators choice over how to manage their works in the face of generative AI, we may run the risk of shrinking the commons. To potentially overcome, or at least better understand the effect of generative AI on the commons, we believe that finding a way for creators to indicate "no, unless…" would be positive for the commons."
>
> -Anna Tumadóttir, Questions for Consideration on AI & the Commons

As we covered in the chapter, What is Creative Commons?, Creative Commons operates on top of copyright law. In the United States, there are several strong cases where using copyrighted works to train generative AI models could be considered Fair Use, even though that is also use case dependent. However, the use of openly available content in GenAI models may not always align with the original creator's intention for sharing it. This is especially relevant since much of this content was likely shared before the development of GenAI, meaning the creators may not have anticipated its use in such a context.(Ross, 2024) As of August 2024, Creative Commons is exploring the development of preference signals to enable steward of collection of content to indicate their criteria regarding the term of use of the content in AI training. This initiative aims to empower creators with more nuanced control over how their content is utilized in the context of generative AI.

Mitigating the Use of AI

There are multiple initiatives that are developing licenses , preference initiatives or softwares that are mitigating uses of AI or machine learning. Below are few examples:

Preference Signals

Creative Commons is developing a preference signal for collection stewards to indicate their preferences on how AI systems should contribute back to the collection when reusing and benefiting from the content.

Rail License

RAIL (Responsible AI License) is a license that allows software developer to restrict the use of their AI Technology in order to prevent irresponsible and harmful application, such as preventing AI software to use it for surveillance or malicious purpose.

Nightshade

Nightshade is a tool developed by researchers at the University of Chicago to protect artists' work from unauthorized use in training AI models. It uses a data poisoning approach by subtly altering digital images in ways that are imperceptible to humans but cause AI systems to misinterpret the content, thereby disrupting attempts to replicate the artist's style.

Have I Been Trained

Have I been trained? is a search engine developed by Spawning that allows users to check if their images have been used in AI training datasets. Spawning also created a tool called ai.txt, which enables website owners to create a text file specifying rules to prevent AI from scraping their data.

Dig Deeper

To learn more about Creative Commons and AI:

- Blog post: Fair Use: Training Generative AI by Creative Commons
- **Creative Commons.** (2025 June). From Human Content to Machine Data – Introducing CC Signals

Adaptation Statement

Adapted from Ross, R. (2024, August 23). *Six Insights on Preference Signals for AI Training*. Creative Commons.

Creative Commons - Conclusion

In the Open Education – Creative Commons chapters, you have explored Creative Commons licenses, reusing and revising CC-licensed works, and sharing your own work with a CC license.

Creative Commons licenses are built on top of copyright and work within existing copyright laws. Due to this, creators are able to retain copyright while granting others permission to use their work. Within this framework, there are four elements to Creative Commons licenses which are combined to make up six licensing options: Attribution (BY), Share Alike (SA), NonCommercial (NC), and Non Derivatives (ND).

NonCommercial (NC) is determined by whether the use of work is for commercial purpose, not whether the user is a commercial entity. In practice, a for-profit entity could use a work with an NC license if their use is not for a commercial purpose, while a non-profit entity might violate the terms of the NC license depending on the purpose for which they are using the work.

All six CC licenses require attributing the creator in any reuse of the work, and the best practice for attributing CC licensed work is to use TASL (Title, Attribution, Source and License). Works with CC0 do not require attribution, though it can still be a useful practice to do so.

A collection, where you put together multiple non-modified existing works, does not count as an adaption. As a result, you could create a collection that includes some works with an ND (non-derivatives) license if you do not make changes to those works that would count as adaptations. To support reuse more broadly, in order to make your CC-licensed work reusable, it is recommended to provide an accessible format so that it will be easier for other creators to re-use and remix the work.

More recently, the rise of AI introduces new ethical challenges such as unintended reuse, environmental impact, and consent. This highlights the need for responsible use and evolving licensing approaches like preference signals or protective tools.

OPEN EDUCATION - OPEN EDUCATIONAL RESOURCES

Open Educational Resources (OER) are any teaching and learning materials that are made available to others to use without cost, and with an open license that allows them to reuse, revise and redistribute them. This chapter will outline the advantages of using OERs, qualities that make a resource "open", and provide you with some key concepts that will prepare you to use, adapt, and create your own open educational resource

In the following chapters you will:

- Explain what makes an educational resource open
- Give examples of why learners and instructors value and use open educational resources
- Define each of the 5Rs, of OER and describe the associated permissions
- Identify workflows for adopting, adapting and creating OER
- Identify and evaluate sources of open educational resources
- Describe a set of steps for sharing OER
- Develop and share an open educational resource

What is OER

In the previous chapters we explored Creative Commons licenses, and how to apply these to resources and media. In this section we will be exploring Open Educational Resources (OER) and what makes a resource open. We will also look at how you can find, adapt, revise, remix and create and share OER.

Let's begin by looking at an early definition of OER from Hewlett Foundation:

> "OER are teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge."
>
> William and Flora Hewlett Foundation (via the Internet Archive)

In this widely used definition there is both an emphasis on openly licensed materials or those in the public domain. Additionally, it emphasizes that OER not only includes more traditional resources like textbooks and modules, and it also more expansive including: test banks, tools, videos and software.

The following video developed by the Council of Chief State School Officers provides a short overview of OER.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=129#oembed-1

What is OER? by The Council of Chief State School Officers used under a CC-BY 4.0 License

Now that we have a shared definition of OER, let's take look at some of the initiatives and drivers that have informed the OER movement.

Free Open Source Software Movement

The open educational resources movement initially stems from the open-source software movement, whose outputs are often referred to as FOSS – Free Open Source Software or FLOSS – Free/Libre Open-Source Software; in the later, the word "libre", has been added to underscore that this is software that is free of restrictions. Open-source software is software that is freely licensed to use, copy, and change in any way as the source code is openly shared so that people are encouraged to voluntarily improve the design of the software.

In the early days, computer software was open-source, allowing people to modify and improve software for their own purposes, a practice that had been established in academia; however, as software creation costs increased and software companies came to the market by the 1980s legal restrictions began to be imposed on the software, thus eliminating the collaborative element within the community. The FOSS movement began as a response to the locking down of software with some major initiatives like the GNU project, the GNU Manifesto, and the GNU General Public License, to what we see now with Github.

Dig Deeper

To learn more about the GNU project and the GNU Manifesto, read the The GNU Manifesto Turns Thirty.

Open Education Developments

As the open-source software work was occurring, other groups began investigating applying the open ethos to other kinds of information sources.

The MERLOT project began in 1997 with the California State University Center for Distributed Learning. MERLOT was modelled after the National Science Foundation-funded project, "Authoring Tools and An Educational Object Economy (EOE)." MERLOT was the first major open education repository that provides access to mostly free, online curriculum materials for use by higher education faculty and students.

Similarly, during this time arXiv was being developed, as Joanne Cohn and Paul Ginsparg recognized the problem of sharing physics preprint articles through email and developed a central mailbox repository for academics to share e-prints. This initial sharing was focused more on simplifying workflows but is identified as the first step toward open access in scientific publishing.

For open education, there were two major initiatives that have had a great impact on academic institutions moving toward open education. Rice University created CONNEXIONS (now OpenStax), a web-based platform to facilitate sharing education resources. Now OpenStax, the platform helps to develop and share open textbooks. The second major initiative was MIT's OpenCourseWare Initiative, which launched in 2001 with a goal of openly and freely sharing educational materials from MIT's courses. MIT OpenCourseWare shares course materials online in what the MIT Council called a desire to contribute to the "shared intellectual commons," and through the financial support of the Mellon Hewlett Foundation they've provided over two thousand courses free online (their website listed 2400 as of 2021).

These individual projects had a huge impact on open education practice in academic institutions, but larger policy initiatives also were being developed, more firmly rooting open into how institutions developed their larger education strategies.

Dig Deeper

To learn more about the history of OER, review: *A Brief History of Open Educational Resource* and *OER – A Historical Perspective*.

Organization Supports for OER

Due in part to the success of MIT's OpenCourseware, the UNESCO Forum on the Impact of Open Courseware for Higher Education in Developing Countries convened in July 2002 to foster awareness of open education resources, promote understanding, secure development, and discuss strategies and policies on OER. Of great importance was the adoption of a final declaration in which participants "expressed their … wish to develop together a universal educational resource available for the whole of humanity, to be referred to henceforth as Open Educational Resources"(UNESCO, 2002, p. 6).

As policies and declarations were, in some ways, codifying open as a strategy for education and resource outputs, organizations and foundations were supporting these efforts through funding and organization around open practices.

The Mellon Hewlett Foundation is a non-partisan granting organization that provides grants to research universities contributing to public knowledge, to performing arts centres engaging local diverse communities, and to grassroots organizations working on international development. Since 2018, it has provided over $170 million US to develop OER, starting initially with the MIT OpenCourseWare project. The foundation provides grants to major universities (MIT, Harvard, Carnegie-Mellon, Open University, Rice), and has funded projects to support OER development, including OERCommons at the Institute for the Study of Knowledge Management in Education (ISKME).

In addition to funding, organized practices in open licensing were stimulated by the founding of Creative Commons in 2001. Creative Commons was created to support the legal use of distributing, adapting, modifying, and sharing of open resources (see the Creative Commons chapter for more about CC's history). CC has become the standard of licensing for open education content and is considered foundational to the work of open education.

In the more recent years since 2012, there have been some major advancements in open education initiatives at the world level with the United Nations Educational, Scientific and Cultural Organization (UNESCO) Paris OER Declaration, where the term open educational resources were founded and UNESCO states were encouraged to participate in the creation, use, and research around OER.

In November 2019, UNESCO adopted five OER Recommendations:

- Building capacity of stakeholders to create access, use, adapt and redistribute OER;
- Developing supportive policy;

- Encouraging inclusive and equitable quality OER;
- Nurturing the creation of sustainability models for OER; and
- Facilitating international cooperation.

A Timeline of Events that Informed the Development of OER

We have included a timeline below that shows some of the events informing the OER movement. It is important to acknowledge that the movements and events on the time represented only a strand of OER and open education history.

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.bccampus.ca/openscholarship/?p=129#h5p-13

Dig Deeper

To learn more about UNESCO statements on open education and OER, review: Forum on the impact of Open Courseware for higher education in developing countries final report.

What Makes an Educational Resource Open?

Although you can find a variety of educational resources online, just because a resource is available on the web it does not mean that the resource is available for you to use. In this section, we'll discuss different aspects of what makes a resource open and a few different factors that may impact an OER's reusability. Let's start with the following short introduction video for an overview of what we mean by the "open" in open educational resources, and the "5Rs of open".

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=131#oembed-1

As was mentioned during the video, open is not a binary attribute (in which a resource is either open or it's not) but rather a spectrum that asks how available and editable a resource is. David Wiley, whose scholarly work has influenced the open education movement, proposes that a truly open resource can be reused in its original format, copies of the resource can be retained for personal archives or references, and the resource can be modified or altered to suit specific needs. It can also be adapted with other content to make something new, and it can be shared with anyone else in its original or altered format.

Browse through the 5Rs of OER in the section below. We have included some questions and activities to connect OER and the 5Rs to your current disciplinary practice and context.

The 5Rs of OER

Open Educational Resources provide teachers, learners, and others with legal permissions to engage in these 5R activities:

Reuse

Reuse refers to content that can be reused in its unaltered, original format. This involves the right to use the content in a wide range of ways (e.g., in a class, in a study group, on a website, in a video).

Revise

Revising allows OER to be adapted, adjusted, modified, or altered. These revisions can range from translating the language of an OER to adapting it for your teaching and learning context. Revising enables instructors and faculty to make changes to OER and open textbooks to adapt the format and content for their course. Revisions may include changing the format of the OER or adapting the OER to your teaching, learning, and disciplinary context.

Dig Deeper

For more in-depth information on revising open textbooks, read Modifying an Open Textbook: What You Need to Know.

Remix

Remixing OER refers to combining the original or revised content with other materials to create something new. One example of remixing is mashups and remixes. Remixing open educational resources involves combining resources like open textbooks and media into something new. One example of remixing is the creation of open textbooks through the remixing of different open textbook sources. For example, you could develop a new open textbook by remixing media and content from different OER.

Dig Deeper

For step by step instructions on remixing content, read the ISKME's Teachers and Makers Remix Lab 2013.

Redistribute

Redistribute means that content can be shared with anyone else in its original or altered format. Users have the right to share copies of the original content, their revisions, or their remixes with others. For example, they can share them directly with other individuals or post them on websites.

Retain

The 5th R (Retain) was introduced seven years after the 4R's (reuse, revise, remix, and redistribute) were identified. As the cost of textbooks has been climbing, institutions have been trying to make books more affordable by decreasing access to them (buyback, rental, subscription, digital rights management).

Retain refers to making, owning, and controlling copies of the content (e.g., download, duplicate, store, and manage).

Consider a publisher eBook that you purchase. Depending on the contract you may not have permission to download multiple copies of the text, and you may only be able to use the text in certain formats. Compare this to an open textbook that you can retain. You can access the open text, download it, make copies of it, and control your own copy.

Creative Commons Licensing

As we discussed in the Creative Commons module, CC licenses provide legal permissions to access and use resources in specific ways. While a free and perpetual granting of the 5R permissions by means of an "open license" qualifies a creative work to be described as open content, many open licenses do place requirements (e.g., mandating that derivative works adopt a certain license) and restrictions (e.g., prohibiting "commercial" use) on reuse of the work. The inclusion of requirements and restrictions in open licenses make open content less open than it would be without these requirements and restrictions.

Open Formats

While open licenses provide users with legal permission to engage in the 5R activities, many open content publishers make technical choices that interfere with a user's ability to engage in those same activities.

Scenario: What is the consequence of not using an accessible format

Let's consider this scenario: Erina found a CC-BY licensed infographic that provides information about the food supply chain in the US. They want to modify the infographic so that the infographic fits in a Canadian context. However, the infographic is only available in PDF format so Erina cannot edit the image. In the end, they decide to not remix the infographic and create a new infographic from scratch.

In this situation, the creator wanted someone like Erina to be able to revise the work, but they didn't share it in a way that makes revising easy to do. What would make it easier for Erina to reuse to work?

The ALMS Framework provides a way of thinking about technical choices and understanding the degree to which they enable or impede a user's ability to engage in the 5R activities permitted by open licenses. Specifically, the ALMS Framework encourages us to ask questions in four categories:

1. **Access to Editing Tools**: Is the open content published in a format that can only be revised or remixed using tools that are extremely expensive (e.g., 3DS MAX)? Is the open content published in an exotic format that can only be revised or remixed using tools that run on an obscure or discontinued platform (e.g., OS/2)? Is the open content published in a format that can be revised or remixed using tools that are freely available and run on all major platforms (e.g., OpenOffice)? In the scenario above, one way the creator could make it easier for Erina to reuse the work would be to provide a format that easily allows for adaptations or remixing. The creator of the infographic could have provided an .eps (vector file) file format of the infographic in addition to the PDF format so that it will be easier for Erina to modify the infographic.
2. **Level of Expertise Required**: Is the open content published in a format that requires a significant amount of technical expertise to revise or remix (e.g., Blender)? Is the open content published in a format that requires a minimum level of technical expertise to revise or remix (e.g., Word)? In the scenario above, if the creator has created a fancy infographic with complex JavaScript animation, it would still be hard for creators like Erina to edit the work.
3. **Meaningfully Editable**: Is the open content published in a manner that makes its content essentially impossible to revise or remix (e.g., a scanned image of a handwritten document or a PDF of a scanned document without optical character recognition)? Is the open content published in a manner that makes its content easy to revise or remix (e.g., a text file)? In the scenario above, if the creator of the infographic has used the creator's handwritten text, it would be hard for creators like Erina to replicate the text.
4. **Self-Sourced**: It the format preferred for consuming the open content the same format preferred for revising or remixing the open content (e.g., HTML)? Is the format preferred for consuming the open content different from the format preferred for revising or remixing the open content (e.g. Flash FLA vs SWF)? Going back to the scenario above, if the creator of the infographic has only provided an .ai(illustrator) file for their infographic, creators like Erina will need an access to Adobe Illustrator in order to edit the infographic.

Using the ALMS Framework as a guide, open content publishers can make technical choices that enable the greatest number of people possible to engage in the 5R activities. This is not an argument for "dumbing down" all open content to plain text. Rather it is an invitation to open content publishers to be thoughtful in the technical choices they make – whether they are publishing text, images, audio, video, simulations, or other media.

Accessibility

Open licenses and formats can help provide access to learning but the resources themselves may not be fully accessible. For instance, according to Statistics Canada, an estimated one in five Canadians over 15 years old has a disability. This factor slices through all sectors of our society and is a significant part of every community and it impacts how people are able to use, or learn from, an OER. Accessibility is about making sure all of the materials, including images and media, in an OER are accessible by as many users/students as possible. Designing OER for accessibility is good learning design.

Accessibility for education gives all students equal opportunities to learn. Following accessibility best practices and guidelines when creating or adapting OER helps to broaden the goals of open education to make learning be more inclusive and equitable. In the below video, Tara Robertson, a former accessibility librarian with CAPER-BC, says while the open education movement has helped people in different parts of the world access content that they would otherwise not be able to view or interact with, there's still room for more inclusivity:

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=131#oembed-2

UBC Open Dialogues: How to Make Open Content Accessible by Emi Sasagawa used under a

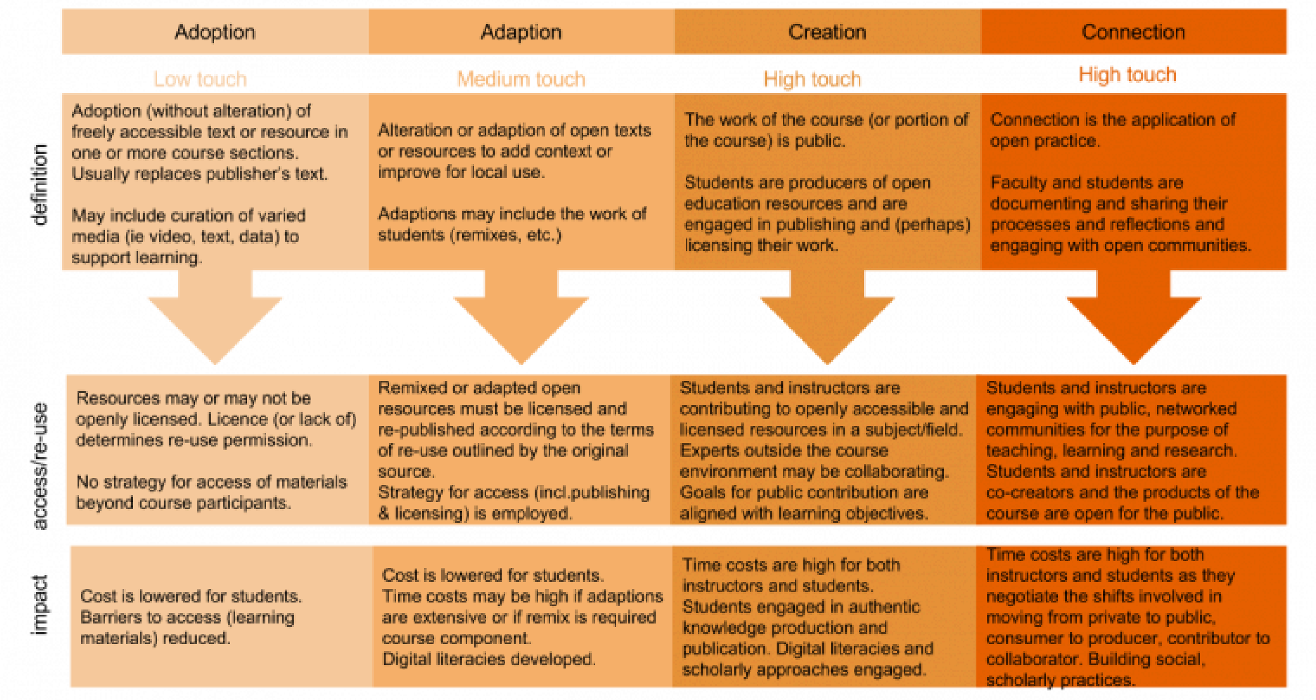
It can be easier when faculty and instructional designers think about the accessibility of their open educational resources proactively, from a universal design perspective, rather than trying to retrofit their already created resources. The *OER Accessibility Toolkit* is a resource for getting started with creating open and accessible educational resource — resources that are accessible for all students. As you work through the content of the *OER Accessibility Toolkit*, you will find that the suggestions provided are intended for the non-technical user. If you are looking for more technical descriptions of how to make your work accessible, we suggest you review the WCAG (Web Content Accessibility Guidelines).

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.bccampus.ca/openscholarship/?p=131#h5p-14

The Spectrum of Open

In addition to the 5Rs, we can also look at OER according to how people will use them. This can help us think about open educational resources beyond only considering licensing and format. This spectrum allows us to consider what we want to do with OER and how much time and effort may be required for different approaches.

Figure 1: Spectrum of Open Practice



The concept of "touch" that we have articulated here refers to notions of interaction between and among participants in the course as well as interactions with "public" communities and individuals. This may also have an impact on the design effort related to the course. For example, courses supporting interaction with various external communities and resources over a period of time (wikipedia editing; publishing on YouTube; etc) require a high touch approach to the design and also to the ongoing support of those interactions.

Adoption

Adoption of an open copyright licensed (e.g. Creative Commons) resource is a good first step to engaging in open practice. Replacing a high cost textbook with an open textbook or other open resources (e.g. videos, simulations, etc.) reduces barriers for students to access course material needed for their success. According to the 2020 AMS Academic Experience Survey (AES), 67% of students surveyed did not buy textbooks due to the cost. Adoption of an open resource supports all students to achieve success by providing equal access to all resources available in the course regardless of their finances.

Examples

The following are examples of open resource adoption by faculty at UBC:

- Introduction to Physics (PHYS 100) adopted an Open Stax Textbook at UBC in 2015 saving $90,000 in textbook costs
- Math, CS lead in adopting open education resources at UBC
- In 2020/21, an estimated 19,152 UBC students enrolled in courses using open resources in place of paid textbooks.

Adaption

Adaption is the modification or alteration of an open copyright licensed resource for use within a course. Adaption provides the opportunity to improve teaching materials, provide important local context, and sharing knowledge to ensure sustainability and the ongoing health of open content. There are a variety of ways content can be adapted for course use — instructors adapt content and/or students adapt content for their own use. Including students in the adaption process encourages peer-to-peer learning, authentic learning opportunities, and digital and information literacy development.

Creation

Many teaching materials can be openly licensed and made available for others to revise or reuse, such as syllabi, lecture notes, presentation slides, case studies, videos, podcasts, study questions, quizzes and more. Some faculty choose to create entire open textbooks (e.g. CLP Calculus) or to post all of their course materials on an open website (e.g. LAST100). Of course, there may be some resources you don't want to share because you want to reuse them in future years yourself (e.g. exams). But you may be willing to share other materials. Even if you think other teachers or students might not find them valuable, even if you think they are very specifically tied to your course context, you might be surprised at how they could spark ideas in others to use in their own teaching.

When you create your own content, you need to consider what someone would want or need to do with your content once they discover it. If they are actively seeking OER content, then we have to assume that they may at some point want to apply any or all of the 5Rs to your materials.

You have to ask yourself the question: "How OPEN do I want to be in my sharing of content?"

Connection

Connection is the application of open practice and extends beyond the use and creation of OER to connecting with communities beyond the classroom. Open pedagogy is an umbrella term that is often used in this area to describe the application of open strategies to the social practice of teaching and learning.

Open Pedagogy

Defining open pedagogy is challenging and we'll be exploring it in more depth in the next chapters. Some would say that open access and permissions for re-use are key: "Open pedagogy is that set of teaching and learning practices only possible in the context of the free access and 5R permissions characteristic of open educational resources." David Wiley: Defining Open Pedagogy

Others would offer a broader definition:

> Looking at open pedagogy as a general philosophy of openness (and connection) in all elements of the pedagogical process, while messy, provides some interesting possibilities. Open is a purposeful path towards connection and community. Open pedagogy could be considered as a blend of strategies, technologies, and networked communities that make the process and products of education more transparent, understandable, and available to all the people involved. – Tom Woodward in an excerpt from an interview in Campus Technology

Open Assignments

One can also involve students in adapting or creating OER through open assignments. We will discuss much more about open assignments in the Open Pedagogy chapter, including considerations of risk and privacy, but when students publish or share their work openly, they are often extending their scholarly practice beyond the classroom and engaging with communities or people outside of their courses. Here are a couple of examples as a preview:

- Students could do some course assignments on open platforms such as blogs (e.g. UBC Blogs) or wikis (e.g., UBC Wiki).
  - For example, students in Geography at UBC are creating multiple kinds of educational resources that are posted on a public site, including case studies, infographics, videos and more: Student Research on Environment and Sustainability Issue.
- As part of a course, students could edit or create Wikipedia articles.
  - Students in Spanish 312 at UBC wrote several Wikipedia articles in a project called "Murder, Madness and Mayhem".
  - Students in Food, Nutrition and Health at UBC wrote or edited Wikipedia articles on various foods.

Why Use OER

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=137#oembed-1

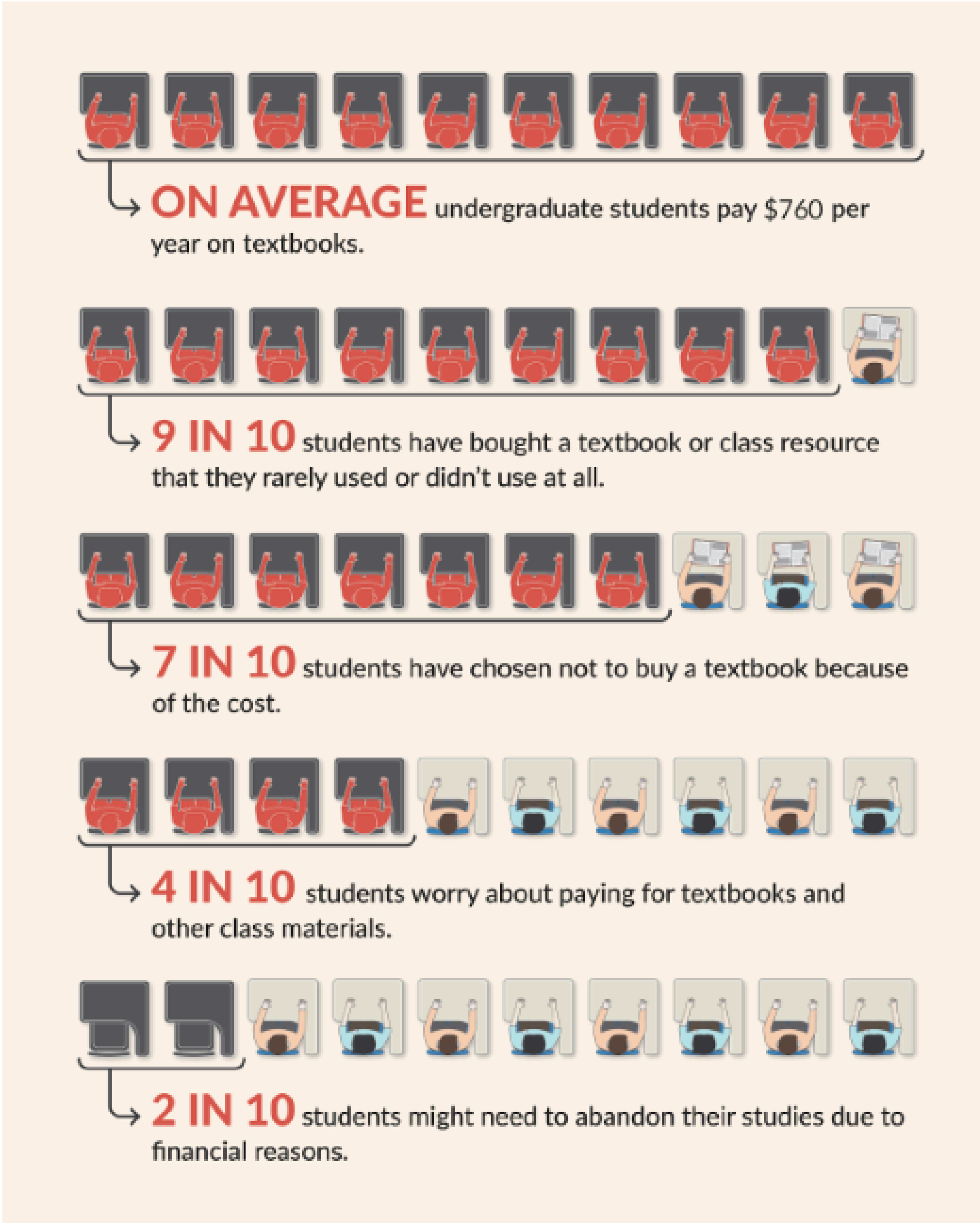
TEDxNYED – David Wiley – 03/06/10 by TEDx Talks under a Creative Commons Attribution license.

Using open educational materials in your course means your course can save students money, make educational materials more accessible and can allow you to customize and contextualize your materials. As an educator, what benefits do you see in using OER for you and your students?

Saves Costs for Students

OER can offer drastic savings in the cost of education. Some students who otherwise cannot afford to buy expensive textbooks or other course materials will appreciate this affordable option when taking your course.

Graphic from the UBC AMS, used in the 2019 Open UBC Snapshot.Graphic from the UBC AMS, used in the 2019 Open UBC Snapshot.



Not being able to afford textbooks and other learning materials can be a real teaching and learning issue. According to the 2019 AMS Academic Experience Survey (AES), over 71 per cent of UBCV undergraduate students reported going without textbooks or resources due to cost at least once, with 35 per cent of students reporting they frequently or often go without textbooks due to costs. Additionally, 40 per cent of undergraduate respondents reported that they are not sure they can pay for their course materials. The survey also found that over 16 per cent of both graduate and undergraduate UBCV students reported experiencing food insecurity (unsure of the ability to obtain food or feed oneself) on a monthly basis. The use of OER helps ensure that students have access to the materials they need in order to meet the learning goals of a course regardless of their financial situation.

Helps Prior to Learning and After Learning

If an instructor opens their own course materials and shares them with the public, it greatly enhances opportunities for learning for both students who already took the course and prospective students.

Students often would like to look over course materials before the term begins. If students have that opportunity to take a look at the course materials it will help them make more informed decisions in choosing their courses, and will give them the opportunity to prepare themselves for the class.

Students may also want to revisit their course materials after the quarter/semester is over to refresh their memories or to further study the topics. Open course materials will help them reinforce what they have learned and further develop their level of understanding in the area.

Provides Peace of Mind for All Users

If you're reusing someone else's materials, one of the best reasons for using OER is for peace of mind about attribution. The resources are licensed to allow the sharing of content and so you will not need to contact the author about making use of their work provided that what you want to do falls within the open license. Open educational resources are free at the point of use, so you will not need to provide monetary compensation for using them. Then there is the opportunity of discovering alternative ideas for presenting and teaching your subject matter or being able to point your students to the alternative explanations for further study.

Other Benefits

- Showcases research to the widest possible audience
- Enhances a school's reputation as well as that of the teacher or researcher
- Social responsibility – provides educational resources for all
- Shares best practice internationally
- Creates additional opportunities for peer review
- Maximizes the use and increases the availability of educational materials
- Raises the quality standards for educational resources by gathering more contributors

What other benefits do you see? Do the above make sense? Think about what OER can do for you and your students.

Dig Deeper

Select two of the videos from the Open Dialogues playlist. Listen to UBC faculty talk about their projects and why they use and create open educational resources. As you watch these videos think about the extent that these examples might be applicable in your current practice.

Adaptation Statement

Adapted from What are the benefits in using OER? from How to Use Open Educational Resources licensed as CC-BY.

Adapted from Why OER Matters, Open Washington, used under a CC-BY_SA License.

Finding & Evaluating OER

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=139#oembed-1

There are many different repositories that focus on collecting open educational resources for people to download and use. While each OER that you are considering using must be evaluated for its content, you can save yourself some time by evaluating the entire repository in which it's located. The idea is that a good repository will have good resources within it.

Workflows for Finding OER

Selecting a Resource

Open educational resources exist everywhere. There is no one place where you can find content, and a simple search for resources on Google can yield millions of possible results. While narrowing your search to resources licensed for adaption, there are many considerations when selecting an OER to use.

As with research practices, developing a workflow on what you are interested in finding and how you will identify the most useful content and discard other content is a necessary part of being effective in finding material. The next step considerations that will help you are: 1) narrow down the number of resources you may find when searching for content; 2) select the most appropriate content based on your specific context and and needs.

Checklist for Including Third-Party OER

As you find existing openly licensed content which you would like to adapt to integrate into your own course, consider the following review criteria:

Permissions

- Do you have copyright permission to adapt and reuse the resource as you wish?
- Before reusing content, check the license details and the exact terms of reuse to see if there are any restrictions on modifying the resource to create something new.

Appropriateness/Relevance

- Is the content appropriate to your audience? Consider, for example, level (i.e. first year, fourth year, etc), expertise/assumed background knowledge.

Clarity, Comprehensibility, and Readability

- Is the content clear, comprehensible, and well organized (logic, sequencing, and flow)?

Consistency and Accuracy

- Does the resource use consistent language, terminology?
- Is the content accurate, error-free and unbiased?
- It the resource free from factual, grammatical, or typographical errors?

Adaptability and Modularity

- Is the resource in a file format that allows for adaptations, modifications, rearrangements, and updates?
- Can the resource be easily divided into bite-sized pieces that can be re-mixed or reordered?

Production Quality

- Is the information clear and understandable?
- Is the layout and interface easy to navigate?
- Do the design features enhance learning?
- For audio or video resources, is the sound quality high?
- Are there broken links or obsolete formats?

Interactivity

- Does the resource encourage active learning and class participation?
- Are there opportunities for students to test their understanding of the material (e.g., a video with embedded questions)?

Interface

- Is the text free of significant interface issues, including navigation problems, distortion of images, charts, and any other display features that may distract or confuse the reader?

Cultural Relevance

- Is the text culturally insensitive or offensive in any way?
- Does the resource make use of examples that are inclusive of a variety of races, ethnicities, and backgrounds?

Accessibility

- Is the content accessible to students with diverse abilities?
- Do images have alternate text that can be read?
- Do videos have accurate closed-captioning?
- Are students able to access the materials in a quick, non-restrictive manner?

Adapting OER

In the Creative Commons chapter, we explored how open licenses often give permission for making derivative or revised versions of the original. This is important for OER as it is rare to find resources that are perfect for your learning context. How familiar is the following scenario?

Scenario – Assigning a Textbook

Dr. Ferreira is assigning his 3 credit Biology 101 course a textbook. Upon review of the textbook, they notice that the students will only need half of the text to cover the course, some of the learning activities need updating to incorporate recent findings in the field, and the content needs restructuring to flow better with the course content. This book will cost students $150.

With "closed," or material under copyright restrictions, Dr. Ferreira would not be able to make these changes to make a cohesive learning experience for his students. Resources with adaption licenses allow a work to be revised, modified, altered, or customized in any way that is suitable for the situation. Adapting OER offers the following benefits:

- Save time when preparing lessons as resources don't have to be made from scratch.
- Benefit from the experiences of teachers who have taught your subject area before, and also improve their resources for your learners.
- Cheaper than buying expensive texts or subject resources that don't allow adaptations to suit your needs.
- It is legal to adapt and repurpose. No-one will be sued for copyright infringement.

What is an Adaptation?

The following video shows a common adaption example when engaging in OER.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=141#oembed-1

OER adaptions are any modifications made to the already existing openly licensed content for your own purposes. Adaptions to OER can be made in any number of ways and are only limited by your specific needs.

As the video showed, simply taking an openly licensed image and modifying the size and adding descriptive text is an adaption. Similarly, taking a set of openly licensed test questions, removing a few options and adding them to your resource is considered an adaption. Adaptions can be simple modifications made to an object to make it useful for your content.

Examples of OER Adaption

Some adaptions can be simple and low time commitment, while others may be more involved and require greater restructuring and additions to the content. The following are some examples of more complex adaptions of OER.

Diversity, Accessibility & Inclusive Design

The focus of many open education projects is to provide access to education. But what does access mean if the materials are not accessible for each and every student? Do they fulfill the mandate to deliver fully open education? Adaptions to existing OER to improve a resource to make it usable by people with the widest possible range of abilities, operating within the widest possible range of situations (environments, conditions, and circumstances) is an excellent example of equitable OER adaption.

Adapting a text to better represent a diverse population is one way in which open educational resources can improve equity and inclusion. Learners can relate more to the content if they see themselves represented in the materials from which they learn, which can be addressed through things such as: including images of people with diverse identities and abilities, changing names of characters in fictional scenarios or case studies to better reflect people from many parts of the world, revising examples to include situations, issues, and questions that are relevant to many different people.

Example: Dr. Benjamin Cheung is adapting Principles of Social Psychology to replace images with ones that show more diversity to better reflect identities within his classrooms.

Translation

Imagine the world of OER possibilities if the content shared across the globe was translated. Translation of texts in a variety of languages increases the breadth of OER content available for use while supporting the diversity of scholarly voices and increasing access to resources from all parts of the world.

Example: Examples of OER in languages other than English, including adapted translations can be found at the OER In Other Languages portal.

Updating

The ability to update content is one of the most beneficial parts of engaging in OER adaption. Due to the open nature of OER, there is greater potential for sustainability of content over time as the overhead to update (e.g. technical requirements, etc.) is not as cumbersome as more traditional forms of publishing. This allows for updating the resource with the latest research discoveries or theories that can support subject areas that are changing quickly (e.g., political science, media studies, cultural studies, etc.)

Example: Teaching in a Digital Age – Second Edition has not only been updated to add and expand more content, but A.W. (Tony) Bates has also made additions which examines three emerging technologies (artificial intelligence, virtual/augmented reality, and serious/educational games).

Learning Design

A great benefit of OER is the ability to adapt content to the specific requirements of the course, student needs, and teaching and learning preferences.

Example: Fundamentals of Business: Canadian Edition was modified to add content from the Canadian context, adding quizzes at the end of every chapter, and updating the learning objectives to meet the needs of the course.

Practical Adaption Consideration

It will come as no surprise that the biggest consideration when adapting a resource is the license assigned. For OER, Creative Commons is the standard license used to assign usage rights. For more in-depth detail about Creative Commons, review the Creative Commons chapter. However, finding the license information and understanding the terms of use can sometimes cause some concern with using the content.

Finding the License

Many OER will have a license attached to them directly, either at the beginning or end of the resource or, in the case of an online object, on the landing page of the resource. For example, the resource Naming the Unnamable: An Approach to Poetry for New Generations has a license section in the metadata or information about the book. However, sometimes the license information is not as simple to find. You may need to search with sections of a website called terms of use, copyright, permissions, or licenses as the entire site may have a single license for all resources.

License Terms of Use

While licenses will tell you how a resource can be used, open licenses, like Creative Commons, will also outline requirements related to citing, identification of modifications, assigning licenses, and sharing back with the community. This will impact your adaption as you may need to include aspects of your work that you may not have considered.

Review the following two Creative Commons licenses.

[table id=1 /]

The two Creative Commons licenses [CC BY and CC BY-SA] outline terms of use of the object, and while both require attributing the original work and identification of modifications, the Attribution-ShareAlike 4.0 International (CC BY-SA 4.0) requires those that adapt and share the original work to use the same license as original.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.bccampus.ca/openscholarship/?p=141#h5p-15

File Formats

Adapting content sometimes can be a complicated process as the file formats that are shared may not be easily editable. When sharing OER, original source files used to create the content and the availability of these source files can vary widely, even from the same hosting service.

For example, LibreTexts sometimes offer a downloadable PDF, but no editable files. This means that you will need to manually copy and paste the contents of the text that you want to use, and spend time cleaning up the formatting. This will greatly impact the amount of time spent on adapting the content. This can be even more complicated when adapting media files.

Later in this text you will learn about Creating OER. File formats will be mentioned again as a part of your creation workflow. Sharing content is only one part of the workflow. Sharing your resource in a format that is available for editing provides the greatest advantage to the community.

Dig Deeper

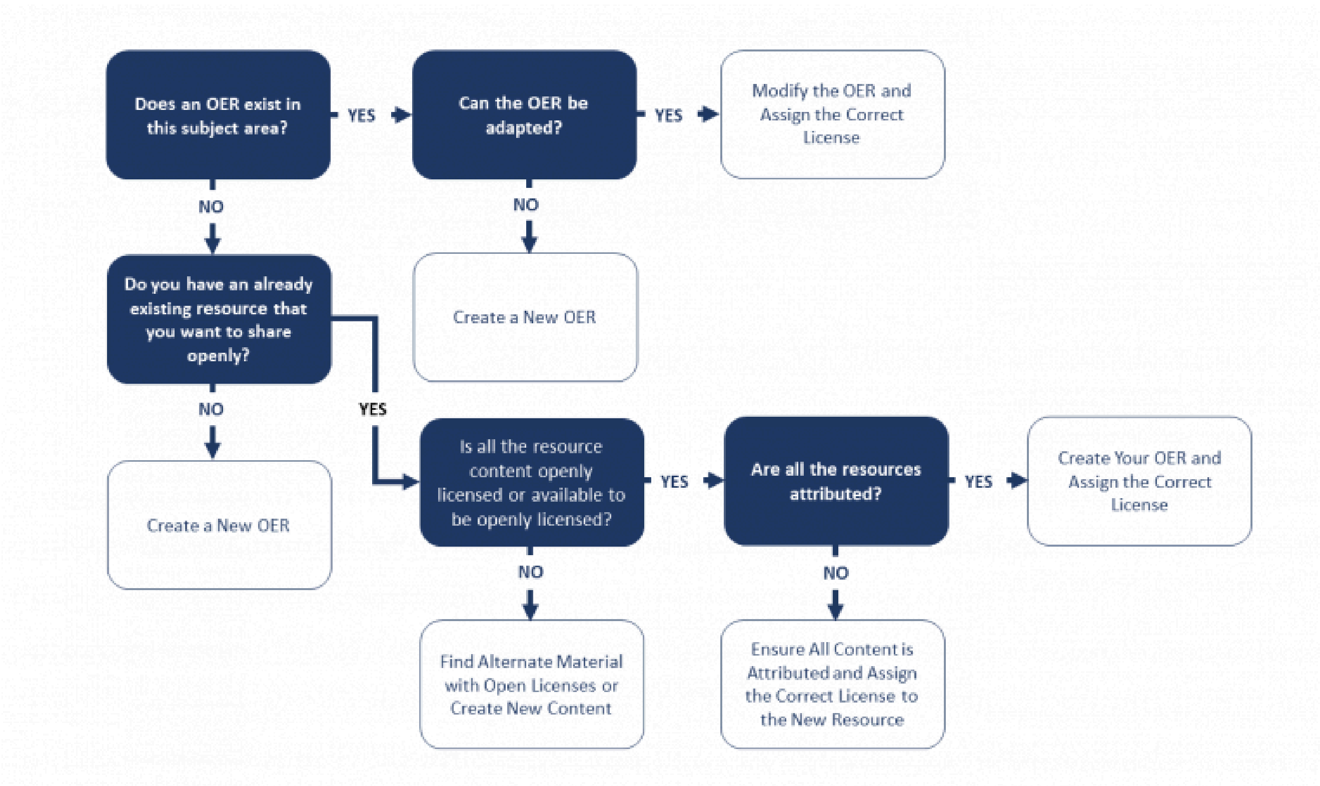
If you want to learn more about using third party materials in your OER, you can watch the webinar on Navigating Fair Dealing and Open Resources – Third Party Materials in OER by eCampusOntario.

Adaptation Statement

Creating OER

Creating OER is a very appealing idea for many educators who see the value of their work and the potential to support their students and colleagues. There are many reasons to consider creating OER.

The open educational resource movement has been around for well over 20 years, and with it comes many resources that can be reused, revised, remixed, and redistributed. The first thought before creating OER should be to check if the content already exists and could be adapted. The health and continued success of the commons requires sustainable growth through adapting and improving content.



Take a moment and think about an OER project that you are interested in starting, have already started, or have completed in the past. Go through the decision tree. Were there any moments during the decision tree review that you hadn't considered in the past? How would you deal with these issues in your OER creation?

Workflows for Creating OER

Workflows for developing OER will depend on the medium in which you are creating. Textual content will differ from video content; however, there are common workflow elements across all OER that will help you plan your OER project. Review the following steps in the OER Workflow.

Step 1. Copyright & License Review

If you are choosing to use a preexisting resource, you will need to ensure that you can share the content openly.

- Identify license of any materials already being used in the resource
- Track down original sources and licenses for any unattributed materials
- Identify content that needs to be replaced with open resources

Step 2: Identify Needed Resources

- Identify the license being used in your OER project
- Identify compatible licenses for existing materials you want to use in your OER
- Identify what resource types you need and for what purposes

Step 3: Selecting a Tool

While selecting a tool to develop an OER is often at the top of the mind, OER can be created with most tools. The "openness" of the object is largely dependent on the license and the file format that is provided to potential users. However, there are some questions you can ask yourself to select the best tool for the kind of resource you are developing.

- **What am I trying to achieve with this OER?** This will impact your tool decision because of the different features these platforms offer. For example, if you are writing a textbook and you want to achieve a higher level of student engagement, you might be better off choosing Pressbooks (which offers H5P capabilities) over the UBC Wiki, which has no interactive opportunities for students.
- **What are the Learning Objectives?** This is a great question to consider if you're involving students in creating OER. For example, if you want to have students contribute to the project through posting their assignments or papers, or have them help create content for your project, then a Blog or WordPress site is much better suited to that than Pressbooks where, for example, you would have to request permission to have extra accounts made.
- **How will I evaluate my project?** If you are interested in metrics, then using a platform like Pressbooks would be useful since it provides some metrics tracking. If you are looking to easily keep track of the number of student assignments completed, then bundling up student work into a journal with OJS would be a good choice.
- **What are the tools used by other faculty in my department?** While this shouldn't be used as a sole criterion for which tool to use, it is useful to talk to other faculty members creating similar OER to see what they are using. There might be a specific reason why a specific tool is being used, and using the same tools consistently can be helpful. For example, if you choose to create a set of questions using WeBWork, students who have used it in the past won't have to re-learn a new platform or software.

UBC directly supports the use of Open Journal Systems (OJS), Pressbooks, UBC Blogs (WordPress), UBC Wiki, and WeBWorK. The tools that UBC supports have gone through a review for FIPPA compliance, so if you choose to use a different tool make sure you and your students are informed about their information privacy.

Step 4: Assigning a License

Assigning an open license to your work will depend on a few considerations.

First, you will need to decide what rights you would like to maintain and give to users of your OER. This will direct the type of license you will assign. Review the Creative Commons chapter for more details.

Second, if you have used materials in your OER that are openly licensed, for example under a Creative Commons license, you will need to abide by the sharing and adaption requirements of the license. This will impact the kind of license you can use on your resource. The following video outlines these considerations:

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=144#oembed-1

Creating OER and Combining Licenses – Full. (2012). By TheOGRepository. Licensed under Creative Commons Attribution-ShareAlike 3.0

For further help, you can use the Creative Commons Choose a License tool or the license compatibility chart on the Creative Commons wiki.

Step 5: Sharing the OER

Sharing open educational resources can be difficult, so developing a workflow for sharing your content through repositories and community networks will help to increase the reach of your work. The Sharing OER chapter will cover strategies in developing a workflow.

Significant Creation Considerations

While the general process for creating OER is outlined in the video above, there are several significant issues that should be considered prior to creating your resource. These considerations aren't specific to what you create and the license you attach but address how you plan your resource before it is developed to ensure the greatest potential of your content for yourself and others.

Sharing in an Open Environment

A common issue encountered by those engaging in OER creation is the desire to use content that was already created for the classroom environment. The difficulty with using previously developed educational content is often you have not considered the licensing and attribution processes needed in OER development — mainly making sure that the existing materials can be included in your newly-created open learning resource. Many of the materials you use in courses are likely copyrighted, or you might not have taken note of the licensing or attribution information to make sure they are open. Often retroactively trying to find the licenses can be difficult because the attributions to the original resources are missing.

If you're adapting an existing resource, you've likely used images, graphs or charts to illustrate your lectures, handouts or modules under [Fair Dealing](). However, according to [UBC Copyright's guidelines for open courses and OER](), Fair Dealing exceptions **cannot be relied upon** in open environments since the audience is not limited to registered students.

Scenario – Creating an OER from an Existing Resource

Professor Nader has developed a slide presentation on ocean biodiversity. They have heard about OER and are interested in releasing the slide presentation into the commons, allowing anyone to reuse, remix, and share.

Review the opening slide: [Ocean Biodiversity]()

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.bccampus.ca/openscholarship/?p=144#h5p-16

It is good academic and scholarly practice to always provide citation when using or building off of other people's work. Additionally, tracking your resources so you can update or refer back to the source will help eliminate the guesswork and gray zones for using the resource and making the transition from closed to open smoother.

Accessible & Inclusive Design

Often when people engage in OER development a goal is to develop freely accessible content. The issue with this goal is "accessible" often means available to access but not accessible to all in the sense of providing a resource that addresses the widest possible range of abilities within the community. With OER creation, accessibility can often be an afterthought, which causes issues in design and time when attempting to apply accessibility practices once a resource is created. Inclusive design is beginning with accessible and inclusive practices already embedded into the creation process. When beginning an OER, starting with the core principles of accessible and inclusive design will ensure all possible users of the resource, including those specifically within your education environments, are served.

You can return to the [What Makes an Educational Resource Open?]() chapter for more information on accessibility and OER.

Dig Deeper

To learn more about Accessible and Inclusive Design for OER, review: Open UBC OER Accessibility Toolkit.

Student Engagement

When embarking on developing OER, you may also want to include students in the writing process. Open pedagogy, or OER-enabled pedagogy, is the practice of engaging students in the co-creative process of OER development. This will be addressed in more detail in theOpen Pedagogy chapter. If you are engaging in students creating OER, it's important to discuss with students the benefits, barriers, and potential risks associated with publishing their work openly, including:

- Engaging in a discussion about intellectual property.
- Discussing the various options they have for choosing a license for their work.
- Providing students with a variety of options to share or not share their work publicly. These options could include publishing with a pseudonym or publishing in a way that only other people in that class can see their work.

GenAI as a Tool for OER

The rise of **GenAI** presents a transformative opportunity for OER. While OER is often promoted for being free for students and instructors, the act of creating or adapting OER is often heavily time and resource intensive. To address these barriers, GenAI can be used as a tool to support the rapid creation and adaptation of OER. By lowering the technical and time-related barriers to content creation, GenAI has the potential to help to democratize the OER landscape, making high-quality educational resources more accessible to a wider audience. Additionally, GenAI tools can allow for quicker updates and responsiveness to new information, making OER more dynamic and relevant—especially in fast-evolving disciplines.

Let's first explore some of the ways GenAI is being used as a tool for OER and then we'll dive into to some of the ethical issues and tensions in doing so.

Creation

One of the most recognized applications of GenAI tools in education is content creation. Educators are increasingly leveraging these tools to streamline the development of a wide variety of open educational resources (OER), including open textbooks, lesson plans, course modules, quiz banks, interactive handouts, instructional images, and multimedia content such as videos and animations. By automating and accelerating the drafting process, GenAI significantly reduces the time and effort traditionally required to produce high-quality, openly licensed learning materials.

Moreover, the integration of GenAI with open technologies—such as H5P—enhances the creation of interactive and engaging OER. These platforms often provide "recipes" or templates that include suggestive prompts and auto-formatting capabilities, helping educators generate complex learning objects more efficiently. Some systems even offer direct integration with GenAI tools, enabling real-time content generation within the authoring environment.

In addition to being a powerful tool for creation, GenAI can serve as a valuable "sounding board" for educators during the OER development process. It can review drafts for clarity, tone, grammar, accessibility, and inclusiveness, while also identifying potential content gaps or suggesting improvements to better align materials with learning objectives. This multifaceted support enables educators—especially those working in open and collaborative contexts—to iteratively refine their resources and ensure they meet both pedagogical and equity-driven goals.

Adaption

GenAI also excels at transforming text, making it an especially powerful tool for adapting OER to meet the unique needs of instructors, curricula, learning outcomes, and student populations. Its adaptability allows educators to customize existing OER to fit specific contexts—whether aligning with a local curriculum, addressing diverse learner profiles, or supporting culturally responsive pedagogy.

For example, GenAI can function as a virtual learning designer, adjusting the complexity, tone, and depth of content to suit learners at different educational levels. An open textbook originally created for undergraduate students can be revised to support Grade 12 learners, ensuring the content remains pedagogically sound while matching their cognitive and developmental stages. This kind of level-specific adaptation empowers educators to maintain the pedagogical integrity of OER while increasing their relevance and usability.

GenAI is also highly effective at restructuring content for clarity and usability. It can reformat dense paragraphs into tables, bullet points, or infographics to improve readability and information retention. Furthermore, it has the potential to improve accessibility by helping to generate alt text for images, ensuring that visual components of OER are meaningful and navigable for learners with visual impairments.

Through these transformation capabilities, GenAI significantly contributes to the creation of diverse, flexible, and inclusive OER. It enables educators not only to repurpose and localize existing resources but also to extend their reach, ensuring all learners—regardless of background, ability, or location—have access to high-quality educational materials.

Scenario – What is one's scholarly responsibility when using GenAI?

Let's consider this scenario: Dr. Chen, a university environmental science instructor, finds an open educational resource on climate change that was originally developed for a general education course. Wanting to tailor it for her upper-level majors, she uses a generative AI tool to increase the scientific depth, integrate current research, and align the material with her course objectives.

As she reviews the AI-assisted adaptation, Dr. Chen pauses to reflect: How does this technology challenge her disciplinary expertise—and where is her own scholarly judgment essential to maintaining the rigor and integrity of the content?

Remixing

GenAI can also enable educators to combine diverse texts, formats, and perspectives into cohesive, context-specific learning materials. This function supports one of the core principles of OER—adaptability—by making it easier than ever to curate and blend content from multiple sources into a unified resource that is pedagogically aligned and learner-centered.

With GenAI, educators can efficiently integrate OER materials that span different authors, disciplines, and media formats—such as combining excerpts from open textbooks, multimedia elements, datasets, and scholarly articles. The tool can assist in harmonizing language, tone, and structure, ensuring that the resulting resource maintains clarity, coherence, and a logical flow. This remixing process can also be used to restructure existing OER for different instructional formats, such as shifting from traditional lecture-based content to flipped classroom models, project-based learning, or asynchronous online modules. Educators may also use GenAI to adapt and combine content across disciplines—for instance, weaving together history and literature texts to support interdisciplinary inquiry—or to scaffold content for learners with varying levels of prior knowledge. The result is a highly flexible and customizable learning experience that reflects both the goals of the curriculum and the diverse needs of students.

From Text to Dialogue

> "What if, in the future, educators didn't write textbooks at all? What if, instead, we only wrote structured collections of highly crafted prompts" – David Wiley; https://opencontent.org/blog/archives/7238

Traditionally, OER has focused on static formats such as textbooks, slide decks, and handouts. GenAI tools are now reshaping this landscape by enabling dynamic, conversational learning experiences. These tools can simulate the responsiveness of human tutors, allowing students to engage with open content in real time—asking follow-up questions, exploring topics at their own pace, and receiving tailored explanations. This evolution transforms OER from passive to interactive, supporting more active, inquiry-based learning and giving students greater agency in how they explore and internalize complex ideas.

According to David Wiley, GenAI tools bring us closer to solving "Bloom's two sigma problem"—a concept introduced by educational researcher Benjamin Bloom, who found that students who received one-on-one tutoring performed better than 98% of those in traditional classroom settings. Tutoring, Bloom argued, is one of the most effective instructional methods, but until now, it has been difficult and costly to scale. GenAI tools, Wiley suggests, have the potential to make personalized tutoring widely accessible at a reasonable cost. Instead of simply reading about a topic, learners can have meaningful conversations with AI-powered resources that mimic human dialogue. This opens up opportunities for Socratic questioning, adaptive feedback, and scenario-based learning.

With GenAI, educators can design OER not just as content, but as guided learning conversations that adjust to each learner's pace, curiosity, and context. As a result, OER becomes more inclusive, accessible, and learner-centered—supporting multilingual interaction, voice-based learning, and immersive simulations. GenAI thus has the potential to redefine OER as a flexible, engaging conversation engine that invites exploration and empowers learners to direct their own educational journey.

Should GenAI be used for OER

There are many tensions and ethical considerations around the use of genAI, especially in open education, that must be taken into consideration when using these tools. We'll explore them in the next section.

Tensions and Ethical Issues in GenAI and OER

Now that we've explore how genAI can be used as a tool for OER, there is a greater question: should it? Let's explore some of the ethical issues in using generative AI for OER.

Copyright

> "Because we trained the machines. All of us. But we never gave our consent. They fed on humanity's collective ingenuity, inspiration and revelations (along with our more venal traits). These models are enclosure and appropriation machines, devouring and privatizing our individual lives as well as our collective intellectual and artistic inheritances." -Naomi Klein, The Big Bot Problem

There are multiple areas where copyright should be considered when using genAI; two important areas to consider when using it for OER are the content that the genAI tool has been trained with and the content that the genAI tool generates:

- **Use of content to train AI models**: Many generative AI tools have been trained on copyrighted works often without the permission of copyright holders. While some organizations may argue that this use is considered fair dealing under current copyright legislation, there are a number of lawsuits where creators are arguing that GenAI tools are creating unauthorized derivatives and have stolen or appropriated their work. This also means that AI-generated content could be subject to future copyright claims.
- **Applying copyright to generated output**: Can work created by AI be copyrighted? This question remains uncertain, as copyright law is often shaped by court cases and legal challenges. In most jurisdictions, including Canada, copyright law generally requires human authorship—works must be "original" and reflect human skill and judgment to qualify for protection. As a result, purely AI-generated content typically cannot be copyrighted. However, if a human significantly contributes to the creation process—for instance, by crafting detailed prompts, editing output, or making substantial modifications—their contribution may be eligible for some copyright protection, even if the AI-generated portion itself remains uncopyrightable. In recognition of these complexities, the Canadian government launched a public consultation in October 2023 titled *"Copyright in the Age of Generative Artificial Intelligence"* to explore how current laws should adapt, though no legislative changes have been made yet. Adding further complexity, some AI platforms like OpenAI or Midjourney have varying terms of service that influence ownership and licensing of AI-generated works.

Veracity and Accuracy

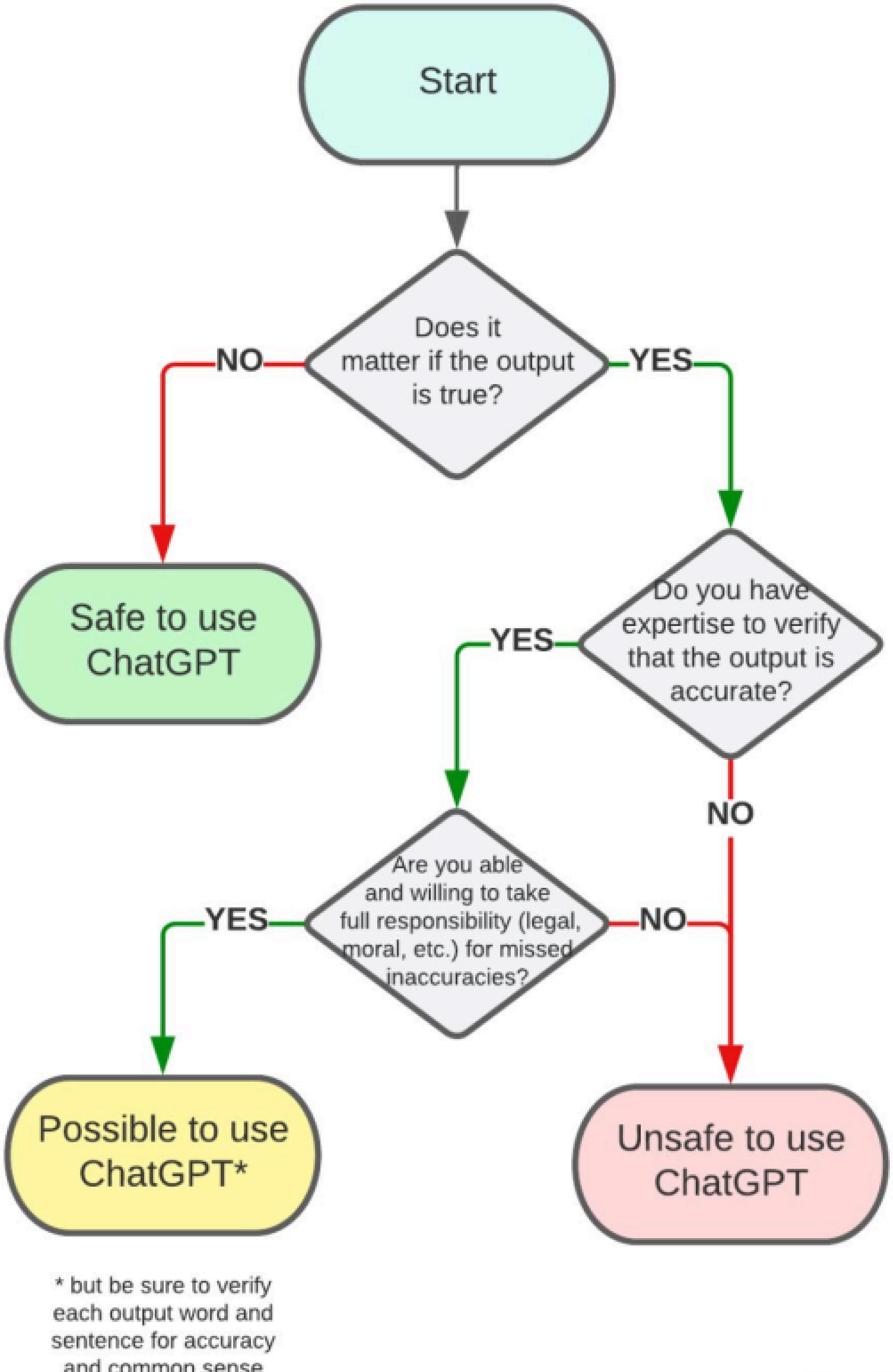
GenAI tools are well known to produce inaccurate or made-up answers, which are referred to as hallucinations. This flowchart at the right outlines the process of using for considering if you should use genAI, in this case ChatGPT, for your task. The key questions it suggests are:

- Does it matter if the output is true
- If it does, do you have the expertise to verify if the output is accurate?
- Are you willing to take responsibility for missed inaccuracies

Educators and learners need to trust OER to rely on them. If AI-generated content is found to contain errors, it may cause users to question the overall reliability of OER, undermining years of advocacy around their legitimacy and quality. Additionally, if genAI tools generate inaccurate or misleading content, and that content is incorporated into OER without careful review, it can perpetuate false information across educational ecosystems. This is particularly problematic in fields like science, history, or healthcare, where factual accuracy is critical.

Is it safe to use ChatGPT for your task?

Aleksandr Tiulkanov | January 19, 2023



Privacy

Privacy is another area of concern when using genAI tools. When instructors or students interact with genAI platforms—especially those hosted by third parties—they may input sensitive data such as names, institutional affiliations, learning needs, or performance information. If this data is not adequately protected, it could be exposed or misused. GenAI tools also often retain user inputs to improve their models. If educators include proprietary content, unpublished research, or confidential institutional materials while generating OER, there's a risk this information could be stored or later surfaced in other users' prompts. OER creators should avoid including sensitive or non-public information when using genAI to draft or revise open resources.

The use of genAI in OER creation can also raise concerns about the **provenance** of content—where it came from and whether it may have inadvertently included private or copyrighted information through training data or prompt context. OER creators should document how genAI was used in the resource development process and ensure proper attribution or disclaimers, supporting transparency and trustworthiness.

Some GenAI platforms track user behavior or prompt history to personalize interactions. While this can improve user experience, it may also lead to surveillance or profiling, particularly harmful in open educational contexts where equity and freedom of thought are valued.

Bias

Bias is another important concern that affects the effectiveness and inclusivity of using genAI as a tool for OER. GenAI models are trained on vast datasets that often reflect dominant cultural, linguistic, or ideological norms. These data sets may prioritize certain data sources that may not be open or trustworthy and genAI tools often perform better in English and major global languages, while less widely spoken or regional languages may be underrepresented or poorly handled. When genAI tools are used to generate textbooks, lesson plans, or quizzes, they might:

- Marginalize non-Western perspectives or underrepresented voices.
- Reinforce stereotypes related to race, gender, ability, religion, or geography.
- Omit important contributions from diverse communities in various fields of study and neglect alternative epistemologies (e.g., Indigenous knowledge systems).
- Generate inappropriate, offensive, or factually incorrect outputs.

OER created with biased GenAI may inadvertently perpetuate narrow worldviews, making them less inclusive and less effective for global or diverse learners. Such biases can shape learners' understanding in ways that ignore pluralistic or interdisciplinary approaches, limiting the pedagogical value of the OER and hindering the democratization of knowledge and access that is central to the OER movement.

Try This Out

Ask a genAI tool of your choice to create an image of a professor at a university. What doe the genAI created professor look like? What are their surroundings? How does the image reflect the biases inherit in the genAI tool and it's training data? How could you modify your prompts to overcome such biases?

Equity

While genAI has the potential to make it easier for more people to create content and access knowledge, if it is not introduced in an inclusive and thoughtful way, it could actually make existing inequalities worse.

The most advanced genAI tools are often expensive and locked behind paywalls. Not all instructors or students will have access to the same tools nor the same skills to work with them. Using these tools effectively often requires fast internet, modern devices, technical prowess, and strong computing power—resources that aren't available to everyone. This creates a gap between those who can take full advantage of genAI and those who can't. On a larger scale, most companies and countries—especially those in under-resourced regions like the Global South—don't have the infrastructure or funding to create or control genAI companies or technologies themselves. This limits their ability to shape how these tools are developed and used.Because of this digital divide, students and communities with fewer resources may struggle to use genAI to create or adapt OER. As a result, fewer voices and perspectives may be represented in openly shared content, reducing its diversity and relevance.

There is growing concern that genAI could negatively impact jobs in education, especially as some institutions consider replacing teaching assistants with AI tools to cut costs. While AI can handle tasks like grading or answering basic questions, it lacks the empathy, cultural awareness, and personalized support that human educators provide. In well-funded schools, AI may be used to supplement human help, but in under-resourced institutions, it risks becoming a full replacement—potentially widening the gap in educational quality. This could deepen existing inequities, leaving students in underserved communities with fewer meaningful learning supports, while also reducing opportunities for early-career educators.

Environmental Impacts

Environmental concerns should also be taken into consideration when using genAI to create or modify OER. Training and operating genAI models—especially large language models—require substantial computational power, leading to high energy use and carbon emissions. These immense computational resources also generate heat. To prevent overheating and maintain optimal performance, data centers use cooling systems which consume large amounts of water. It is estimated that a single genAI prompt that creates a 500 words of content uses the energy equivalent to charging a smartphone for 5 minutes and consumes a standard size bottle of water.

OER advocates often focus on ethical and sustainable practices. Individuals can also chose to run genAI models on their own computers which can reduce the load on large data centers and avoid water-intensive cooling systems. They can also use smaller genAI models which consume far less energy and water than large models like GPT-4. These models are often great tools for core OER activities such as creating quizzes, lessons, or adapting content.

It's also important to recognize that universities and institutions have significant leverage when selecting technology vendors. When partnering with genAI companies, Universities should prioritize platforms that are transparent about their energy use, water consumption, and carbon emissions, and that actively pursue sustainability goals. Being aware of these often-hidden resource costs enables educators and institutions to make more informed, responsible decisions.

Recommendations and Guidelines

t's important to use genAI thoughtfully. The following list, which was partially adapted from BCcampus, provides some guidelines and recommendations for using gen AI for OER:

- Be cautious with your use of AI generated content. Use genAI for tasks where it adds real value—not just for novelty.
- Manually review and assess all AI generated content for accuracy, appropriateness, and usefulness before including it in any OER. AI generated content should be reviewed by more than one subject matter expert to ensure the validity of the content. As an OER author, you are ultimately accountable for the content that you share in your OER, therefore you must manually verify the accuracy of the content.
- Closely review any AI generated content for bias, including language or images that reinforce cultural or societal stereotypes around race, ethnicity, colour, ancestry, place of origin, political beliefs, religion, marital status, family status, ability, sex, gender identity and expression, sexual orientation, age, and class and/or socioeconomic status. Consider reviewing and assessing the outputs of AI generated content using your institution's EDI statements and ask whether the content aligns with these considerations.
- Do not use generative AI to generate content for an area or subject where you do not have the appropriate level of knowledge or understanding to verify the accuracy of the content. f you use AI to create a summary of another work, you should ensure that you are familiar enough with the original work to determine whether or not the generated summary is an accurate representation of the original work before using the summary.
- Be transparent about your use of generative AI. Just like attributing the reuse of open content, you should include statements within the OER that let others know that you have used generative AI in the creation of the OER. This should include;
    - what content was generated
    - what tools were used to generate the content, including links to the tool,
    - how you used that tool (ie what prompts was the tool given that generated the content)
    - the date the content was generated
    - what steps were taken to review the content to ensure it was valid and correct.
    - Be cautious with intellectual property
- As much of the legal consensus around AI generated content suggests AI created content is not copyrightable, you should not apply a Creative Commons license to AI generated content as Creative Commons licenses can only be applied to content that is copyrightable.
- Ensure accurate representation: prompt genAI to reflect diverse viewpoints and challenge dominant narratives. Use or advocate for GenAI models trained on inclusive and representative datasets to minimize cultural, linguistic, and demographic bias.
- Support open-source, community-driven AI models that are smaller and more efficient. Advocate for transparency and sustainable tools at the institutional level.

Dig Deeper

To learn more about genAI and OER, review:

- Flexible Learning for Open Education (FLOE) Project — AI in Education: A collection of articles from leading educators and researchers, supported by the William and Flora Hewlett Foundation in partnership with Etika Insights.
- The Psychosocial Impacts of Generative AI Harms – study by Vassel et al (2024) that explores the experiences of users with marginalized and minoritized identities emphasizing the need for a critical understanding of the psychosocial impacts of genAI tools when deployed and utilized in diverse social contexts.
- Judicious AI Use to Improve Existing OER – an article by Kimmons et al (2025) that explores in part how open education can serve as a space for more sustainable and equitable uses of AI to achieve socially valuable goals.
- Navigating AI in Open and Higher Education: Critical Guidelines and Practical Applications by Maja Bali, Equity Unbound / American University Cairo
- The AI + Open Education Initiative from MIT Open Learning is a series of rapid response papers and multimedia projects about how genAI might accelerate or hinder the promise of open education.
- BCcampus GenAI in Teaching and Learning Toolkit: The Least You Need To Know as Educators

Attribution Statement

Sharing OER

> Openness in education means more than just access or legal certainty over what you are able to use, modify, and share with your students. Open education means designing content and practices that ensure everyone can actively participate and contribute to the sum of all human knowledge.
>
> – 5.4 CREATING AND SHARING OER from the Creative Commons Certificate for Educators and Librarians

By now you probably have a good sense of why sharing OER is valuable to users. However, investment in sharing OER remains limited.

In the article, The Uncertain Future of OER by Tom Berger, the open education sharing economy is identified as not having seen complete success. Berger notes, "…teachers have not taken those materials, adapted them, and re-uploaded them to share their improvements—in the OER field, unlike at Wikipedia, the revising and remixing seem to be happening offline, if at all, and the original resources are not undergoing continuous improvement" (Berger, 2018).

While it can be debated whether the resources are being used and/or improved upon, the issue Berger identifies here is valid. Sharing OER is complex.

Sharing open educational resources is difficult because the discoverability of OER isn't systematic. Unlike libraries where standardization of discovery practices are in place and controlled by librarians and knowledge organization professionals, OER can be found anywhere and everywhere. There is no one system that's going to make it easier to find content because there are just too many systems where OER can be shared. There also is no single process or workflow when it comes to sharing material. Sharing practices will depend on the creator of the OER and how they make decisions about their content. But the practice of generating a workflow to better understand where you are sharing content and how to collect data about those open resources can mitigate some of these difficulties and increase the success of OER in the sharing economy.

This section of the text will provide a workflow approach to sharing OER.

Considerations Before Sharing

Scenario – Sharing Openly Licensed Modules

Professor Pérez has completed a set of course modules titled "Inorganic Chemistry for Chemical Engineers." They have used images, created videos and textual content, and interactive elements. The content has been assigned a CC BY-SA 4.0 license and is ready for sharing.

While Professor Pérez has an OER to share, before sharing they need to consider their intent. What is the purpose for sharing, who do they want to reach, what are they hoping to achieve?

Sharing open educational resources requires a number of steps. When making decisions about sharing your open educational resource, you need to first have a sense of purpose and intent for sharing. The following are a few things to consider when deciding to share your content.

What do I want my OER to do for me?
It may be that the intent for sharing your OER is simply the use by others. This is a fine reason to share your resource. However, you may also want to share to connect with other educators, to gain metrics around the content being used, to promote the work so others may improve upon it. Knowing your intent can help direct where the content should be shared.

Who do I want to have primary access to my OER?
Identifying your key audiences is crucial for developing a plan for sharing your OER. Different spaces may cater to specific audiences, age ranges, and subject expertise. Some spaces may provide functionality that allows you to network with other educators creating similar content. You may also need to develop separate marketing plans or different messages depending on the audience.

Are impact metrics important to me?
Impact metrics refer to whether the repository tracks data about how your resource is performing (e.g. number of downloads, citations). Some repositories will provide very detailed metrics about your OER (e.g. geographic location of downloads, number of views, etc.). Deciding what kind of reporting is important to you and how you will use the metrics is a way to focus where you may share your content and what additional planning you may need to undertake to get the right impact metric details. For example, tracking if others have modified your work can be complicated and may require a different approach to data collection.

OER Sharing Workflows

When engaging in an OER sharing workflow, here are some larger issues to consider when addressing the discoverability and findability of your OER that go beyond how and where to share your content to make it available for people to use.

Developing Standard OER Metadata

Metadata is data about data. It is descriptive information about a particular data set, object, or resource, including how it is formatted, and when and by whom it was collected. For example, take a look at the kinds of metadata that could be added to describe the image below:

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.bccampus.ca/openscholarship/?p=152#h5p-17

UBC Library Elmscott Chaucce Ddigital Colouring Book, April 2018.

Metadata is extremely important in making content discoverable, whether it be on the general web or in a database like those used for research materials.

When developing metadata about your OER, creating a standardized approach is necessary. Standardized metadata, or metadata that has a common meaning, structure, and terms, will ensure your OER is made identifiable across platforms. Additionally, ensuring standardization of your metadata will support others to accurately attribute your work.

Developing OER Metadata

Before distributing your OER, you will need to develop standard metadata about your object. Many platforms you will use to share your content will have a standard structure for metadata entry and will identify the required information, or fields, before you upload your content. However, the details of the metadata (e.g. title, author, description, date created, etc.) need to be developed by the OER creator.

For example, this template shows the metadata that should be filled out for every resource that is shared in the Nordic University Health Hub on OER Commons. OER Commons has a standard metadata form, but the Mandatory Tags/Keywords have been defined by the group to support ease of finding resources on a given topic.

Metadata structure may change across different repositories; however, there are common fields that you will need to include. The table indicates some of those common fields.

[table id=2 /]

Take the time before sharing to fill in standard metadata descriptions that you can then use across all platforms.

Choosing a Repository to Share

Types of Open Educational Repositories

While there are several ways to share your OER once you have created and licensed them, posting them to an OER repository is a great way to increase access to your resource. However, there are different types of repository you have to consider when sharing, and each will offer different features and functionality.

[table id=3 /]

Common Features in OER Repositories

The types of repositories listed above have different features and are created for different purposes. Because of this, you may find you are sharing your resource across multiple repositories. However, there are many repositories out there and narrowing down which you will use is an important step in your workflow. There is no single repository that will meet all of your needs or have all of these features, so you will need to pick a few that are most important to you. The following are some of the most common features that will impact your decision about whether or not to use a particular repository. To find a list of OER repositories, go to the UBC Library Open Education Guide.

Hosting

Hosting refers to whether or not the OER can be uploaded to the repository directly. If not, then the resource must live elsewhere (e.g., a personal website) and a link is put in the repository.

Licensing

Some repositories require their items to have a specific license attached to them. Most repositories will accept a range of licenses, but there are some that are more specific.

Peer Review

Peer review is offered by some repositories as a service. In most cases, having your resource peer-reviewed is not required.

Accessibility

Sometimes a repository will have accessibility guidelines for their resources. Some repositories will have special features such as being able to upload multiple formats, video players, or embedded viewing.

Indexing/Discoverability

If the repository is indexed, it will show up within an overarching search engine (e.g., Google or Summon) which in turn makes its resources more findable.

Analytics

Analytics refers to whether the repository tracks data and is able to provide information about how the resource is performing (e.g., number of downloads, citations).

Archiving/Preservation

Some repositories are more stable than others or offer archiving services to ensure the OER is preserved for future use.

Sample OER Sharing Workflow

Now that the we know the workflow for sharing an OER, what does it look like in practice? Let's revisit the scenario of Professor Perez:

Scenario – Sharing Openly Licensed Modules

Professor Pérez has completed a set of course modules titled "Inorganic Chemistry for Chemical Engineers." They have used images, created videos and textual content, and interactive elements. The content has been assigned a CC BY-SA 4.0 license and is ready for sharing.

Having reviewed the purpose for sharing, developed standard metadata, and identified the appropriate spaces for sharing, Professor Perez's sharing workflow is the following:

Step 1: cIRcle Resource Upload and Metadata Creation

The first step was uploading the OER into cIRle, UBC's open repository that focuses on the archival standards of making the item accessible. cIRcle provided support for submitting and indexing to make the content easily findable. cIRcle is indexed in high-profile search engines like Google as well as academically focused search engines like Google Scholar and OAIster, making it quick and easy for scholars and others to find the work. Additionally, loading the OER into cIRcle provides long-term access. cIRcle is an archival space that provides a permanent URL so the links to the OER remain the same over time.

Note — Not all people have access to an institutional repository. Discuss your options with your home institution. If you are unaffiliated, MERLOT is a good option for housing your content as it is the oldest open educational repository available to those without an institutional repository.

Step 2: Upload Metadata to Additional Repositories

The second step for Professor Perez was to upload the metadata and the permanent link to OER aggregators. So, for example, Professor Perez loaded the information into OER Commons, Merlot, and AMSER, an applied science and math open educational resource repository. The OER will have a permanent location within cIRcle, but, the metadata for the object is going to be located in a variety of aggregators to support greater reach.

Step 3: Impact Metrics

The final step for the OER Sharing Workflow is impact and metrics. Professor Perez has shared their OER in 4 different places and may have a number of data points related to the use of her content from cIRcle, OER Commons, Merlot, and AMSER. Impact metrics and promotion will be covered in the next section.

Open Text Sharing & Discoverability

Sharing workflows are a little different for open textbooks. This chapter has focused primarily on open educational resources in a very broad way. For open texts, there is some added workflow. Watch the following video to provide you with some processes for open text sharing.

For additional details, review the Open Textbook Publishing Guide – Release Plan

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=152#oembed-1

OER Marketing & Promotion

Scenario – Promoting an OER

Jan has created a series of open 3D models and ancillary resources for their genomics course. They first developed the content to reduce barriers to access resources for students but Jan is curious about the potential of their resource to benefit and reach others. While Jan knows how to share the resource, measuring the benefit is not as clear.

OER & Measurements of Success

Developing strategies and approaches to measuring the success of an OER is more than just the collection of numbers. While repositories will have different kinds of data you can collect about the use of your OER (see Table 1), deciding what you want to measure will help guide you in gathering metrics to provide proof of the success of your project.

[table id=4 /]

By starting with an understanding of what you want to know about your OER's "performance," you will be able to develop a plan to gather the right metrics for your needs. When considering the success measure for your OER, think through the following questions:

- What constitutes success for your OER and how will it be measured? Pedagogical innovation? Surveys? Interviews?
- Who do you need to report to about your OER? Funders or your institution?
- What data is needed to indicate "success"? Adoption numbers? Number of students impacted?
- How do you need to use the data for your own portfolio? Tenure and promotion, merit?

Dig Deeper

To learn more about how individual faculty members and those who support them (e.g., librarians, instructional designers, etc.) can research the effect of their adoption of open educational resources, read the Guidebook to Research on Open Educational Resources Adoption.

Developing a Promotion Plan

A promotional plan is a strategy you develop for marketing your OER to a broader public. Unlike traditional publishing models where marketing and promotion are completed for you, engaging in open education activities requires some effort from practitioners in getting the word out about their resources. There are two ways to engage in developing your promotional plan.

Strategy 1 – Personal Connections

You may already have existing resources, personal channels, and networks that can support the promotion of your work. Consider the following:

- Use communications support at your institution
- If an OER community exists at your institution, discuss possible promotional opportunities through their channels
- Use your personal channels:
    - blog posts
    - social media (Twitter, Facebook, etc.)
    - listservs (in your discipline and across communities)
    - email signatures
    - conferences
    - webinars

Strategy 2 – External Networks

Search existing OER repositories, catalogues, and spaces for communities and groups that align with the subject matter of your OER. Consider the following:

- Search for organizations and networks with areas of interest relevant to your OER
- Identify existing organizations and networks you engage within your areas of expertise
- Using "academic" social media to share your resources (e.g. identify relevant hashtags on Twitter using Hashtagify)
- Identify existing listservs (i.e. Communities of Practice) that may support OER development and use
- Search through existing subject-specific OER repositories, catalogues, and spaces for sharing possibilities

Sample OER Sharing Plan

To get a clearer understanding of what a promotional plan could look like, review the following:

Global Storybooks is a free multilingual literacy resource for children and youth worldwide. The sharing plan provides general and subject-specific OER repositories, listservs, communities, and language learning websites where the Global Storybooks project could be shared to reach educators and learners in the K-12 range.

Open Educational Resources - Conclusion

In the Open Education – Open Educational Resources chapters we shared a broad overview of open educational resources. We explored some of the reasons for the rapid growth of open educational resources and examined different workflows for adopting, adapting, creating and sharing OER.

The development of open educational resources has been informed by events, movements and organizations. Events and organizations included the United Nations Charter of Human Rights, the Free software movement, and the open web. Students are increasingly advocating for faculty and administration to select open educational resources as a way to make education more affordable and accessible.

While there are different perspectives on what makes a resource open, according to David Wiley open educational resource should allow others to engage in the 5Rs: reuse, revise, remix, reuse, and retain. In addition to the 5Rs we can also look at OER according to how people will use them. The spectrum of Adaption, Adaption, Creation and Connection allows us to consider what we want to do with OER and how much time and effort might be involved.

Using OER can help save the cost of education for students, help prior to learning and after learning, and can provide peace of mind for all users. When finding and adopting OER use the Checklist for Including Third Party OER to help successfully integrate it into your course.

OER can be adapted for a variety of reasons including diversity, accessibility and inclusive design, translation, updating, learning design. Creative Commons licenses outline requirements related to attribution, identification of modifications, assigning licenses to adapted works, and sharing back with the community. This will impact your adaption as you may need to include aspects of your work that you may not have considered.

While how you develop OER will depend on the medium you are creating, the Workflow for Creating OER can guide you through the process. When sharing OER it is important to improve discoverability with metadata, and select an appropriate OER repository.

OPEN EDUCATION - OPEN PEDAGOGY

Open pedagogy is the application of the concepts of open to the practices of teaching and learning. It can involve a blend of strategies, technologies, and networked communities to empower students to have control and agency over their own learning. The Open Education – Open Pedagogy chapters will explore teaching and learning methods that build on principles of openness and learner participation.

In the following chapters you will:

- Consider different definitions of open pedagogy
- Understand pedagogical benefits and impacts to integrating an open approaches into teaching & learning
- Explore different examples of open assignments and projects
- Reflect on student right, privacy, and agency when working and learning in the open.

What is Open Pedagogy

So far, we've been exploring how the use of OER can help to ensure that learning materials are free of cost and access barriers. OER can also support academic freedom by enabling instructors to modify or add additional content to the materials to fit their specifications and goals, which in turn creates the opportunity to provide more relevant and engaging materials for students. Now, we'll look at how principles of open scholarship can be incorporated into the practice of teaching and learning.

Social and Equitable Practices

Open scholarship, as we've been learning, is founded on the premise of barrier-free and equitable access to knowledge, with the understanding that the creation and dissemination of knowledge is a social practice. Under this umbrella term, open education encompasses a set of practices directed at making the process and products of education more transparent, understandable, and available to all people. While open education includes the creation and use of OER to achieve these goals, it also includes the application of openness to the practices of teaching and learning (i.e. the pedagogy) and strives to support equitable participation in the creation of knowledge.

The core values for open pedagogy, as Caroline Sinkinson states, include teaching and learning practices that reduce barriers that prevent equitable access to education, including economic, technical, social, cultural, and political factors. Open pedagogy facilitates connections across the boundaries of learning experiences that occur within classrooms, on campuses, and in communities by critically engaging with tools and practices that mediate learning, knowledge building, and sharing. Open pedagogy also protects the agency and ownership of one's own learning experiences, choices of expression, and degrees of participation and resists the treatment of open as neutral by providing space for critical evaluation and reflection.

Open pedagogy is thus situated at the intersection of teaching and learning and social justice and often builds upon theories of critical pedagogy which sought to use the educational process to challenge existing knowledge and beliefs in order to achieve individual empowerment and social change. Earlier critical pedagogists, such as Paulo Freire, saw education as a librating and transformative practice or a practice in conformity:

> "Education either functions as an instrument which is used to facilitate the integration of the younger generation into the logic of the present system and bring about conformity or it becomes the practice of freedom, the means by which men and women deal critically and creatively with reality and discover how to participate in the transformation of their world." -Paulo Freire, *Pedagogy of the Oppressed*

Critical pedagogy is an educational philosophy drawn from critical theory where instructors and students critically evaluate systems of power in order to understand the oppressive nature of social and political systems. Critical pedagogists, such as Freire, argued that applying critical theory to education, "allows students to recognize connections between their individual problems and the broader social contexts in which their experiences are embedded". Open pedagogy applies much of the earlier work of critical pedagogy to the modern teaching contexts and encompasses a social justice approach to the collaborative and transparent construction of knowledge made openly available through networked technologies.

Dig Deeper

To learn more about critical pedagogy, read:

- Freire, P. (1968). *Pedagogy of the Oppressed*. New York: Seabury Pres
- Kirylo, D., Thirumurthy, V., Smith, M. and McLaren, P. (2010). *Issues in Education: Critical Pedagogy: An Overview,* Childhood Education.

Defining Open Pedagogy

Having a single definition of open pedagogy can be challenging. David Wiley initially suggested that open licensing of educational materials and permissions for re-use are essential: "Open pedagogy is that set of teaching and learning practices only possible in the context of the free access and 5R permissions characteristic of open educational resources." Many different scholars and educators have put forth additional definitions of open pedagogy that address aspects of the teaching and learning process that go beyond the use of open resources. These definitions include:

- A blend of strategies, technologies, and networked communities that make the process and products of education more transparent, understandable, and available to all the people involved. — Tom Woodward
- The potential of openness and sharing to improve learning, as well as a social justice orientation – caring about equity, with openness as one way to achieve this. — Maja Bali
- The ability for learners to shape and take ownership of their own education — Devon Ritter
- A means to connect with a broader, global community as well as a means to challenge and expand existing understandings of student centre learning — Tannis Morgan
- Freedom of action and authority — Jim Luke
- The shift of emphasis to student contribution to knowledge as opposed to simple consumption of knowledge — Heather Ross

Features and Attributes of Open Pedagogy

What are the commonalities across the different approaches to open pedagogy?

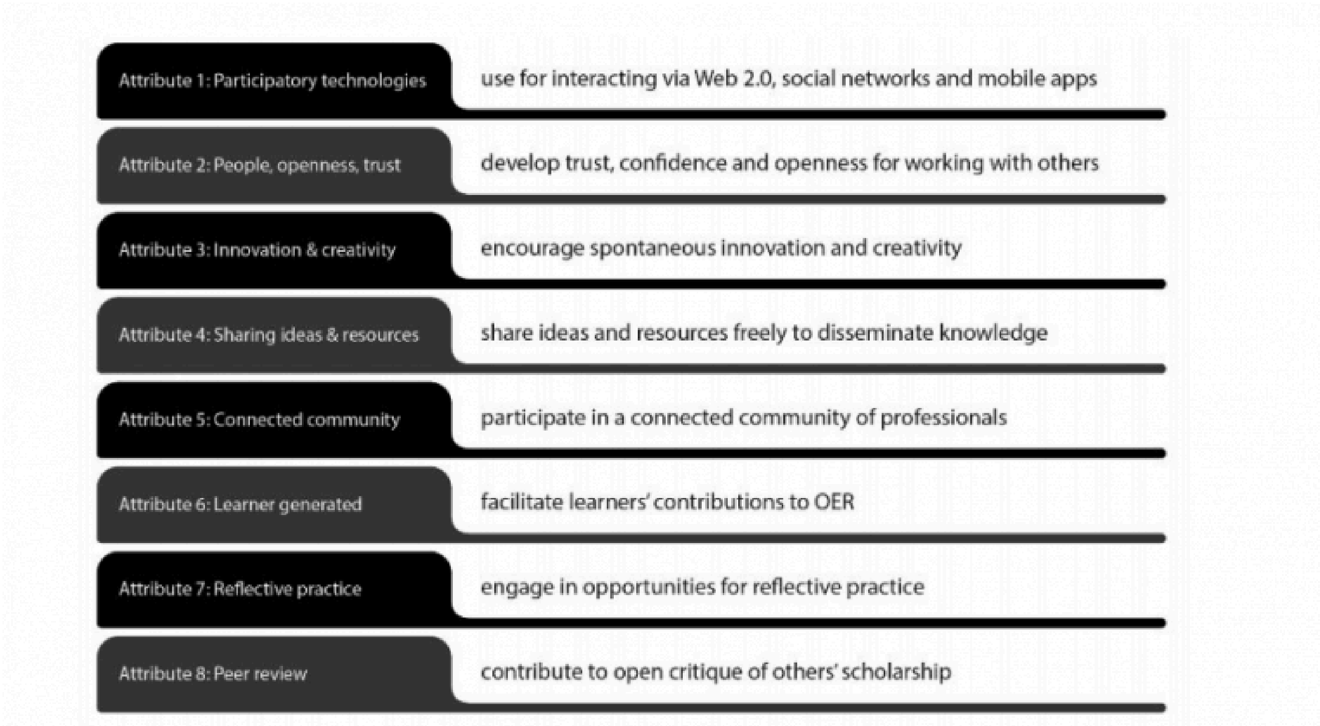
Tom Woodward highlights **three features of open pedagogy**:

- **open planning**: *Prior to the start of a course built on open pedagogy there is a focus on collaboration regarding what the course might be — the content, the lessons, the tools of construction, and the teaching strategies…You can see what other instructors have done — their resources, their lessons, or their reflections on what happened during their course.* As Tom points out, these processes are often hidden from public view. Making them open and accessible means that others can learn from them.
- **open products**: *Students are publishing for an audience greater than their instructor. That matters. Their work, being open, has the potential to be used for something larger than the course itself and to be part of a larger global conversation. This changes the experience of doing the work, but just as importantly it changes the kind of work you ask students to do.*
- **open reflection**: *After the course, reflecting and documenting how the course went is valuable both to the instructor and to those who might be considering similar courses or pedagogical strategies. People are happy enough to present and document success but it's still not common practice to reflect on elements that don't work well.* Documenting reflections on what worked and what didn't and making that public can lead to connections between people working to address the same challenges.

One could also consider a fourth feature:

- **open process (of creating OER)**: If you or your students create open educational resources for a course, it's useful to share not just the finished resources but also the processes of creating them. Sharing the process can mean many things, e.g., talking about how you made a teaching resource such as a video or podcast (what tools, software, what steps you took, pitfalls you ran into), describing why you created the resource in the way you did (what goals you had, what research underlies the creation of this resource), explaining how you have used the resource in a class and whether it was successful.

Bronwyn Hegarty suggests that are eight attributes of open pedagogy inform its features. These attributes include the use of **participatory or social technologies**, such as blogs or wikis, which facilitate learners being exposed to ideas and experts beyond their institutional walls, but also to diverse modes of sharing and collaboration. Additionally, as students' willingness to learn and stretch their boundaries in open spaces can be fragile, another attribute in open pedagogy is **openness, trust, and people**. Providing support and using scaffolding to build confidence and independence in an open learning situation can help motivate students.



Hegarty's Attributes of Open Pedagogy from: Hegarty, B. (2015) Attributes of open pedagogy: a model for using open educational resources Educational Technology, July-August, CC-BY 4.0

Another attribute Hegarty suggests is innovation and creativity. The exploration and choice of emerging technologies and new methods that take advantage of the rights inherent in OER as well as facilitate another attribute of open pedagogy, the sharing of ideas and resources. Open pedagogy relies upon peers to share willingly within connected communities. The use of technologies to connect communities can enable collaboration, sharing, and participation, which can enhance the quality and diversity of learning resources and ideas but also teaching methods and the design of learning environments.

Another attribute is that open pedagogy is **learner-generated**, which involves 'opening up' the process of teaching and learning to empower students to take the lead, solve problems, and work collectively to produce artifacts that they share, discuss, re-configure, and re-deploy. Building relationships where groups of learners work collectively, with reflective learning and peer review as natural outcomes, Hegarty states, is paramount to open pedagogy. Co-constructing knowledge through facilitated and shared **reflective practice** can drive deeper pedagogical reflection and student engagement. A vital component of reflective practice is the use of open tools for **peer feedback** and interactions, which can lead to transformational change.

Open Educational Practices

Open practice may involve:

- Using all and only open resources in one's course, such as readings that are not only free to read, but also openly licensed to allow downloading, revision, annotating, etc.
- One's entire course site is public and openly licensed even if one doesn't post ALL aspects of a course publicly. Of course, things such as student marks should remain private, and one may also choose to not post exams so they

can be reused later.

- Any student work or instructor teaching and learning resources that are posted to a public site are also given an open license.
- Openness extends to getting and incorporating feedback on the course and its open resources, whether instructor-produced or student-produced.
- Not only products are open (such as the course site, teaching and learning resources, student work), but also processes. For example, one shares the processes of designing a course, of how a video was created, of how well a particular open assignment worked, etc.
- One could open an entire course to participants from outside the institution (such as in a MOOC), still ensuring that the course elements are openly licensed

Dig Deeper

To learn more about about how different scholars are defining of open pedagogy, please read:

- DeRosa, R. & Jhangiani, R. (2017). *Open pedagogy*. Open Pedagogy Notebook.
- Schuwer, R. (2017). *April open perspective: what is open pedagogy?*. Year of Open.
- Sinkinson, C. (2018). *The values of open pedagogy*. Educause.

Students As Knowledge Creators

> "We are often asking students to do work just to show us that they can do it. I wanted them to do something that had genuine value and not just this makeup exercise they perform just to show [professors] they know how to do things." Dr. Rosie Redfield, UBC Zoology

While open scholarship focuses on equitable access to knowledge, the focus of open pedagogy is equitable participation in the *creation* of knowledge. In this way, open pedagogy often transforms the student experience within the classroom. It can help students begin to see themselves as scholars and it de-centres the instructor from the information expert to a facilitation role that supports student negotiation of ideas and transforms the efforts of their learning into open knowledge resources. If a core goal of scholarship is research, dissemination, and dialogue to further the knowledge base and growth of fields of study, then open pedagogy engages students in this very same process within their courses. In contrast to traditional learning assessments such as multiple choice quizzes or essays, student work in open pedagogy is seen as having value beyond just informing the learner or instructor. As such, students are asked to create new knowledge and given a degree of agency, autonomy, and control over their work.

In the below video, David Gaertner, Assistant Professor, UBC First Nations and Indigenous Studies, describes some of his motivations for why he engages his students in open pedagogy:

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=162#oembed-1

Open Dialogues: How to engage and support students in open pedagogies. (2018). By CTLT UBC.

Students as Producers/Creators

Having students be creators of content, described as a "Student as Producer" model by Mike Neary at the University of Lincoln, emphasizes the student role as collaborators with instructors in the production of knowledge. By engaging students in knowledge production and sharing, the model helps transform students from being the object of the educational process to being the subject of it. Additionally, in the student as producer model, the university's approach to learning and research are closer aligned; for example, students, similar to researchers, are asked to share their work with authentic audiences and not just with their immediate instructor or adviser. As Neary and Winn state, in this way students become part of the academic project of the University and collaborators with academics in the production of knowledge and meaning.

According to Derek Bruff, Director of the Centre for Teaching at Vanderbilt University, students are frequently involved in knowledge production outside of the classroom, through undergraduate research, internships, co-ops, etc. However, he suggests that there are many opportunities to engage students in knowledge creation within the classroom and suggests student as producer assignments or courses have the following aspects in common:

- Students are asked to work on problems that haven't been fully solved or questions that haven't been fully answered.
- Students are asked to share their work with authentic audiences, not just their instructor.
- Students are also given a degree of autonomy in their work.

Scenario – Engaging Students Through Open Work

Let's consider this scenario: In Dr. Smith's course on forest conservation, they have been asking students to research forest conservation policies in a specific region, critically evaluate the policies, and then write a seven to ten-page essay on the topic. Students seem to have a hard time engaging with the assignment and, in feedback, students have noted that the assignment is both hard but also that it feels like it is busy work. Dr. Smith feels like the assignment is valuable as it gets students to think critically about the topic of the class. More so, they feel like the work the students do has potential as scholarly work and are thinking about having students post their essays on a course website or blog.

- How would posting the work on the Internet change the nature of the assignment?
- What strategies or scaffolding could Dr. Smith incorporate into the assignment to ensure that the students are successful?
- Should Dr. Smith change the structure or the weighting of the marks for the assignment?

Renewable Assignments

David Wiley has argued that much of student work can be considered disposable: "These are assignments that students complain about doing and faculty complain about grading. They're assignments that add no value to the world – after a student spends three hours creating it, a teacher spends 30 minutes grading it, and then the student throws it away. Not only do these assignments add no value to the world, they actually suck value out of the world. As Hendricks states, it's not that such assignments have no value at all. They can often serve very well to encourage students to learn and apply information, gain research and other skills, engage in problem-solving, and more. If done well, they can show instructors the level of mastery students have achieved. But what is important to consider is find important to consider, is that "disposable assignments" don't provide any further value to the world after they're completed.

What makes an assignment renewable or disposable? A disposable assignment, Wiley suggests, is any assignment about which students and faculty understand the following:

- Students will do the work
- Faculty will grade the work
- Students will throw away the work

A renewable assignment is any assignment where:

- Students will do the work
- Faculty will grade the work
- The work is inherently valuable to someone beyond the class
- The work is openly published so those other people can find and use it

Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.bccampus.ca/openscholarship/?p=162#h5p-18

Risk, Privacy & Ownership

When we ask students to work in the open, what are we asking them to do? Open pedagogy assignments can involve students engaging with communities other than their peers in a classroom, opening their ideas up to public scrutiny, and creating and communicating in new way. When students openly publish their work through online platforms such blogs, wikis, open textbooks, social media, etc, they are not necessarily using the same format or skills that they would in writing a research paper or persuasive essay; instead they are applying new strategies to the information and knowledge they have to produce something people will use.

Working in the open and opening up our work to the public can be scary for almost all of us but doing so usually means it pushes us to a higher standard of work. However, when asking students to work in the open, there are a few considerations to keep in mind.

Risk

> "Risk is ever-present with open pedagogy, from the platforms that we utilize that mine and monetize our intellectual labour and the digital footprints that we require our students to leave in the course of their education to the open sharing of unpolished ideas and practices that leave us exposed and open to criticism and judgment. Open pedagogy involves vulnerabilities and risks that are not distributed evenly and that should not be ignored or glossed over. These risks are substantially higher for women, students and scholars of colour, precarious faculty, and many other groups and voices that are marginalized by the academy." **–** 5Rs for Open Pedagogy, Rajiv Jhangiani, Ph.D.

Learning involves risk taking. When students share their work openly, they are contributing to the building and sharing of knowledge and they are opening up their work for public review. When you are accustomed to learning and creating behind classroom walls and for the eyes of your professor only, working in the open can be both daunting and extremely rewarding. Students will want to understand:

- How their work may be evaluated by others?
- What their obligations are regarding copyright and appropriate citation of others' work?
- How they can license their own work (with an open license) to allow others to re-use and build on their work – while attributing them as the original author?

When sharing content outside of traditional classrooms, different people have different levels of comfort and risk and doing so may require grappling with issues of trust, privacy and ownership. The open Internet can often be a toxic place and students may also have questions such as:

- What agency do I have in deciding to work in the open?
- Who will see my work?
- Why would my work be of value to anyone?
- How does working in the open help me learn what I need for this course?
- What control will I have over my work?
- What support do I have?
- Whose voices are marginalized in open or online spaces and how will that impact me?

- If I'm using new types of technologies, who owns my data?

Addressing such questions directly, even building them into course discussions, can help students understand why they are being asked to work openly as well as help to build their buy-in and support for doing so. You may also want to provide resources for students, such as the Digital Tattoo project, that can help them make an informed decision about their digital presence. If you are asking students to create a work that can be considered as sensitive content, you may also want to recommend students to read Sharing Sensitive Content Online tutorial from the Digital Tattoo Project.

Dig Deeper

To learn more how open pedagogy can incur risk and ways to address these in practice, review the following:

- Campbell, L., (2018), The Soul of Liberty: Openness, Equality and Co-creation, Open World.
- Cronin, C., (2017), Open Education, Open Questions, Educause Review.
- Dhalla, A., (2018), The Dangers of Being Open. Medium.com.
- Gardner, S., (2011), Nine Reasons Why Women Don't Edit Wikipedia, In Their Own Words, Sue Gardner's Blog.
- Jhangiani, R., (2019), 5Rs for Open Pedagogy, Rajiv Jhangiani, Ph.D. Blog.
- Salter, A., (2015), Re-evaluating the Risks of Public Scholarship, The Chronicle of Higher Education.

Privacy

If there is a golden rule for open pedagogy, it is that **students should never be required or compelled to give up any of their privacy in order to complete an assignment.** When creating an open assignment, it is always good to provide students with options on how they may complete or share their work, such as:

- Publishing with a pseudonym
- Publishing in a way that only other people in that class can see their work
- Submitting only to the instructor or T.A.

Building such options directly into an assignments gives students agency and control over their work.

Additionally, it is also important to be aware of and comply with any relevant privacy regulations, such as BC FIPPA (Freedom of Information and Protection of Privacy Act), about identifying information for students. For example, FIPPA requires that student information be stored only in Canada and accessed only in Canada, which may impact the use of third party tools or platforms that store information outside of Canada. Students thus can never be required to use such tools but can consent to do so. According to this fact sheet from the University Counsel office on disclosing personal information outside of Canada, at UBC, consent for cloud-based tools may be used under the following conditions:

- In the course description, or in a written communication to the students, describe the cloud-based service and the information that it will be storing or accessing, and explain that if the students choose not to provide their consent they must see the instructor to make alternate arrangements; and
- Make alternate arrangements for students who decline to provide their consent, such as allowing them to sign in to the service using a false name and non-identifying email address.

Ownership

Many open pedagogy projects asks students to create open educational resources by adding a Creative Commons license to their work. However, students own the copyright in their own work, and should be given the choice whether or not to share or publish it with an open license. Talk with students about the value of OER and why you are asking them to publish their work openly. Be sure they know about the various options they have for privacy and for choosing a license.

If you are publishing students' work on an open site, ask for students' permission regarding how long they would like their work to be posted publicly. Some may not mind having it posted indefinitely, but some may wish to have their work taken down as soon as the class is finished. At the very least, let them know that if they later decide they would like it taken down, they can contact you.

GenAI Considerations

The use of genAI in open pedagogy raises a number of ethical considerations that educators and learners must thoughtfully navigate. When integrating GenAI into teaching and learning, particularly in open contexts, educators should take care to ensure that all activities conform to their institution's privacy, data security, and ethical guidelines. This includes being transparent with students about how GenAI tools work, what data they collect, and how that data may be stored or used. It's important to obtain informed consent when asking students to engage with these platforms, especially if they are required to enter personal information or academic work.

Instructors should also be mindful of issues related to authorship, academic integrity, and the potential for bias or misinformation in GenAI-generated content. These considerations become especially important when content is intended for public sharing as part of an OER project. Encouraging students to reflect on these tensions as part of the learning process can help them develop critical digital literacy skills and a deeper understanding of the ethical dimensions of knowledge production.

For a deeper exploration of these topics—including issues of bias, transparency, copyright, and power dynamics—see the **Tensions and Ethical Issues in GenAI and OER** section. This resource provides guidance on how to responsibly integrate GenAI into open pedagogy while fostering a learning environment rooted in equity, care, and informed

Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.bccampus.ca/openscholarship/?p=165#h5p-19

Dig Deeper

To learn more about student privacy at UBC: you might want to review the following resources:

- The UBC Learning Technology Hub Privacy Guide
- The Digital Tattoo Privacy and Surveillance Resources

Examples and Ideas for Open Assignments

What does open pedagogy look like inside of a course?

In this section, we've collected some examples of open assignments and projects at UBC and beyond. Let's start with the below video in which Janette Bulkan, Assistant Professor for Indigenous Studies in UBC's Faculty of Forestry, describes how she has been using a wiki to empower her students to create and share conservation resources:

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=167#oembed-1

Open Dialogues: Using wiki pages to advance student-created knowledge. (2018). By CTLT.

Scenario – Redesigning an Assignment

Let's consider this scenario: In Dr. Chan's course on food science, they have been asking students to design posters on specific issues related to the topics in the course. At the end of the course, there is a poster presentation session in which students have an opportunity to display their posters in the lobby of the faculty building. Dr. Chan has noticed that while the students put effort into the posters, very few students come to pick up their posters after the session and she ends up recycling them at the end of the term. They would like to redesign the assignment so that the students' work and efforts do not go to waste.

- What steps or strategies could Dr. Chan implement to make sure their students' work has meaning and is valuable beyond course?

Open Pedagogy at UBC

There are many specific examples of open pedagogy at UBC, such as:

Latin American Studies students creating and sharing video-based learning objects for their classes

In Jon Beasley-Murray's Introduction to Latin American Studies course, students are creating videos about specific course topics as well as writing weekly personal reflections on their blogs.

Engineering students creating an open online textbook

Agnes d'Entremount's engineering students are using the UBC Wiki to write an open textbook that will contain literature reviews and course topics. The open textbook will be set up on a UBC wiki, and will be available for future students to use and build on it.

Gender, Race, Sexuality and Social Justice students creating, publishing, and sharing zines

This project by Jessi Taylor and Erin Fields saw students in a GRJS course work together to collectively create their own zines around self-chosen topics that will allow students to bring the community into the classroom. The students' zines were incorporated into an open 'Zine Faire' day and put on display in Koerner Library.

Forestry students creating open conservation case studies

Students in several different forestry courses taught by Janette Bulkan and Fernanda Tomaselli are creating open education resources that can be used worldwide. The resources are created on the UBC Wiki and published on the UBC Open Case Studies site, which brings together faculty and students from different disciplines to write, edit, and learn with case studies that are free and open–they are publicly available free of cost, and they are licensed to allow others to revise and reuse them.

Courses across UBC having students analyze, edit, and improve Wikipedia

Wikipedia is one of the worlds most used open resources but it contains gaps and biases. However, any one can contribute to it and students in UBC courses in history, Latin American studies, biology, food sciences, literature, soil sciences, ecology, and more have been assigned to analysis, create or edit Wikipedia articles. For more information, see Tina Loo's or Jon Beasley-Murray's essays on why they used Wikipedia in the classroom.

Physics students creating course learning resources

In Simon Bates's Physics 101 course, students created original learning objects about a concept or topic in the readings which they found challenging. Students were encouraged to be creative and pick a topic that interested them and share their resources on a course blog. In order to create a collaborative learning community, students were asked to apply a Creative Commons license to their objects, so others could access and learn from their resources.

Classics students creating an open textbook/reader

Siobhán McElduff's students are creating an OER reader on socially stigmatized groups in ancient Rome as part of their course assignments. The reader will contain out of copyright and original translations of ancient texts, along with student-scholar created introductions, glossaries, images and other explanatory material.

Law students publicly analyzing issues and blogging

In Jon Festinger's law courses, students are invited to publicly analyze and reflect on issues related to their course as part of their participation marks.

Other examples beyond UBC

- Students writing multiple-choice questions: During each of the 10 weeks when there was no scheduled exam, this instructor asked their students to write multiple-choice questions. However, this assignment also served a pragmatic purpose in that the open textbook that they use for this course does not yet have a readymade question bank.
- Students creating open resources: *Introduction to the Brain* has been created by final year Psychology students including an introductory information pack for high school students and an activity with printable materials.
- Open assignment banks: This site hosts the assignments that participants in the open online digital storytelling course, ds106, complete as part of their work in the course. Rather than specifying assignments, everyone must do, participants can choose from an array of ones included on this site- all of them have been created by course participants.
- Students writing open textbooks: This book was created entirely by students in a Fall 2016 section of a first-year seminar at Plymouth State University. It was organized around a core set of open pedagogical practices. The theme for the course was "Whose Course Is This, Anyway?" Students created all learning outcomes, assignments, course policies, and grading processes.
- Students creating apps: In a course at TRU called Designing Legal Expert Systems: Apps for Access to Justice, students worked with non-profit 'client' organizations to take legal knowledge and rules as a series of decision-making trees and translate that onto an app.

Dig Deeper

To read about more examples of open pedagogy assignments and projects, you may wish to browse the Open Pedagogy Notebooks's Example Repository.

Ideas for Students

Students can also take the initiative on open projects. They can turn assignments, essays, and other academic work into an open educational resources. For example, if you are a student, you could:

- Consider applying a Creative Commons license to your work which makes it more shareable.
- Make your work easy to download or take apart for remixing.
- Publish your course essays on a blog or wiki or in an open journal.
- If you take photos or create images or other media, especially if you do so in the course of their studies, consider uploading them to a sharing platform like flickr that allows you to license them openly.

Publishing and sharing is a key part of scholarship and academic life and there are many options for students to publish their work and there are many options for publishing including creating a UBC site or blog for posting and sharing their work, posting their work to UBC Library's institutional open access repository, cIRcle.

Reflection on Open Platforms

UBC supports a number of different educational technologies that can support open pedagogy assignments. Two of the most commonly used are *UBC Blogs* and the *UBC Wiki*. Please read the following teaching guides, which include examples of how instructors using these platforms, and reflect upon your own courses:

- UBC Blogs
- UBC Wiki

Could you see yourself incorporating either of these tools into a course assignment? Would it make those assignments "open"? What would you need to do to get started? What questions would you have and what support would you need? What support would your students need?

Adaptation Statement

OER examples beyond UBC was adapted from Mural UDG Open Pedagogy module by Tannis Morgan. It is shared under a Creative Commons Attribution-NonCommercial 4.0 International License.

Open Pedagogy - Conclusion

In the Open Education – Open Pedagogy chapters, we've explored different definitions of open pedagogy and some examples of how it is applied in the classroom. We've also touched on some considerations, such as risk and privacy, when we ask students to work in the open. Open pedagogy is the application of the concepts of open to the practices of teaching and learning. It can involve a blend of strategies, technologies, and networked communities to empower students to have control and ownership over their own learning. A common strategy for open pedagogy is to transform traditional course activities so that students are collaborators with instructors and co-creators of knowledge and content. Such work is valuable, especially when it is openly published so other people can find and use it. In doing so, students experience authentic learning opportunities and are closer aligned with the academic mission of the University.

When engaged in open pedagogy it is important to treat students as we would want to be treated by our peers and collaborators. Students own the copyright in their own work, and should be given the choice whether or not to share or publish it publicly and with an open license. They should never be required or compelled to give up any of their privacy in order to complete an assignment.

OPEN EDUCATION - ACTIVITIES

Open Education Plan

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.bccampus.ca/openscholarship/?p=171#h5p-20

Open Education Activity Bank

The Open Scholarship Primer Activity Bank are activities that you will complete as part of each chapter. The concept behind the activity bank is to learn by doing. This bank is adapted from the D106 Assignment Bank and the Agora Challenge Bank.

Now that you have completed the Open Education chapters, apply what you have learned so far by completing the Activity Bank.

To complete this activity:

1. Go to the Activity Bank,.
2. Filter to Open Education categorized activities.
3. Complete as many activities as interest you.

OPEN RESEARCH - OPEN WORKFLOWS

Research **reproducibility** can be a challenge as project artifacts (i.e., methods, data sources, code, etc) are often created using different software and may be owned by multiple collaborators. A carefully planned workflow, especially one that is open, can help increase the ease of reproducing and replicating prior research, better collaboration and clear file management across the research lifecycle.

In this section you will:

- Understand the value of an open workflow
- Distinguish core concepts, such as reproducibility and replicability
- Understand the overall setup of reproducible research (including best practices for organizing research materials and data)
- Identify how OSF can help support an open workflow

What is an Open Worklfow?

Defining a Research Workflow

A **research workflow** is the series of steps and decisions made to do the research, and documenting a research workflow allows the process to be repeated or understood by others. What is included in a research workflow can have rigid standards for reproducibility in some disciplines (e.g., STEM fields) and may be less reliant on reproducibility st

An **open research workflow** is when each of step of the workflow is openly shared – making all stages of the research project transparent and reproducible. Clear documentation of your workflow includes using best practices around file naming conventions, project metadata, file formats, etc. Openness in workflow does not mean all your data is "exposed" and available for anyone to take, but is about making sure that all documentation can be accessed regardless of tools and formats used in the process of the research.

Workflow Stages and Tools

A research workflow has many stages between ideation and output, and many tools might be used throughout this process. The 101 Innovations in Scholarly Communication Project surveyed tools used by researchers for different aspects of their work and has sorted workflows into six higher-level stages: discovery, analysis, writing, publication, outreach, and assessment.

Sometimes the decision on what tools to use is determined by best practices in your discipline. But beyond disciplinary requirements, you can go a long way by documenting your process using an open workflow. Small decisions, such as consistent file-naming conventions or making open backups of data stored in a proprietary tool (i.e., saving your files as .xlsx format which is a Microsoft Excel Open XML Spreadsheet, and can therefore be opened in other applications, unlike .xls files), make it possible to continue work years or even decades down the line. These are small but intentional decisions that make all the difference to future scholars.

Reproducibility and Replicability

Reproducibility and replicability are different but related concepts. Historically, not all disciplines have considered the need for reproducibility or replicability, however more recently concerns relating to lack of replicability and reproducibility across fields have made the concepts more ubiquitously relevant.

Reproducibility

Reproducibility of research means that the workflow and data used in the research project can be used to yield the same results. For research to be reproducible, a new team of researchers must be able to use the same hypothesis, experimental method, data, population, and general conditions of the first experiment to reproduce the same results.

Replicability

Replicability of research means that when the same workflow (e.g., research question, experimental design or approach, context or population, and analysis plan) is used using **a new data set** the outcome is consistent (albeit with a small margin of error).

Both reproducibility and replicability are difficult to achieve because they rely on the reported workflow of the original research (which is often not completely transparent).

The Replication Crises

Over the past decade, many researchers have become concerned with the "**replication crisis**": evidenced by many large-scale studies failing to replicate what were thought to be universal phenomenon. The Nib has produced a visual narrative explaining the replication crisis in Psychology and the impact that it has across fields. There is an ongoing debate on whether a "replication crisis" equally applies to the humanities and social science disciplines as has been found in STEM. While reproducibility may not make sense in many humanities or social science fields, replication of findings, using similar methods and workflows, does. For example, a digital humanities project which uses a script to draw conclusions off of data will not be replicable unless that script is made available along with the publication. Thus, all disciplinary fields are at risk of a replication crisis when non-open workflows are used.

Scenario – Reproducibility

Let’s consider this scenario: you are starting a new collaborative research study and have engaged your partners in a conversation about how to make the results of the study reproducible. One of the project leads, an experienced researcher with many publications under their belt, makes the following comment:

“All of the results will be in the paper, won’t people be able to reproduce our results from there? If they have any more questions they can reach out directly.”

How would you respond to them?

Possible Response

You might state that even an extremely detailed description in the method section will not be sufficient in most cases to reproduce it. This could result from several aspects, including: different computational environments, differences in the software versions, contextual information about the sample, software updates, etc. Additionally, spending the time and effort to create a detailed workflow together will increase both the scientific validity of the final results as well as minimize the time required for re-running or extending further studies. Furthermore, depending on when the reproduction takes place, the authors may not be available to contact.

Dig Deeper

- Explore this Code Refinery lesson on motivation and reproducible research.
- Enroll in the free "Reproducible Research" Massive Open Online Course from Johns Hopkins.
- Frias-Navarro, D. et al. (2020). Replication crisis or an opportunity to improve scientific production?. *European Journal of Education*, *55*(4), 618-631. DOI: 10.1111/ejed.124
- Kiesler, N., et al. (2024). Where's the Data? Finding and Reusing Datasets in Computing Education. In *Working Group Reports on 2023 ACM Conference on Global Computing Education* (pp. 31-60). https://dl.acm.org/doi/pdf/10.1145/3598579.3689378
- Peels, R. (2019). Replicability and replication in the humanities. *Research integrity and peer review*, *4*(1), 1-12. 10.1186/s41073-018-0060-4

Best Practices for Open Workflows

Working in a reproducible and replicable manner requires examining the research workflow and finding ways to improve the organization and shareability of the materials, data, instruments, and decision-making process. Storing all materials related to the research study in one place, where they are organized in a meaningful way, helps make sure all materials are accounted for when building workflow documentation.

When working on research projects, some files that you might work with include:

- Raw data files
- Processed data files
- Code and scripts for manipulation and analyses of the data
- Outputs like figures and tables
- A record of the decisions about the specific tools and methods used
- Writing associated with your project

Documentation is a necessary part of research which allows others (or even the same research team) to reproduce or replicate the results of a study. Useful documentation includes:

- **Version Control documentation** –Version control is a system of recording changes made to a file or set of files over time that can later be reviewed. Version control allows researchers to track when changes were made and document the reasoning behind those decisions. The next chapter, Open Software, offers more guidance on version control.
- **Metadata** – Metadata describes the content and structure of a project, data, and files related to it. README files provide important information about a data file and project, and can be as simple as a text file (Example: README 4) or involve greater formatting and design elements (Example: Sulu). On the other hand, codebooks are intended as a guide to the variables in a data file. We'll talk more about metadata in the Open Data chapter.

Best Practices for File Names

When creating new computer files, use naming conventions to make it easier for anyone to find files and understand what each file does or contains. Using a good naming convention when structuring a project directory also supports reproducibility by helping others who are not familiar with your project quickly understand your directory and file structure. The most important part of a naming convention is that it's consistent.

- **Human readable**: use expressive names that clearly and meaningfully describe what the directory or file contains (e.g., code, data, outputs, figures).
  - **Example Naming Elements and Structure**: DescriptiveTitle_DocumentType_Date_Version
  - **Sample Named File**: SkyLabExperiment_ContractNegotiations_20170104_Rev0.pdf
- **Machine-readable**: avoid special characters (e.g., symbols or accents) and spaces. Instead of spaces, you can use - or _ to separate words within the name to make them easy to read and parse using programming codes or other forms of scripting.
- **Sortable**: Sorting allows you to quickly see what is there and find what you need. For example, you can create a naming convention for a list of related directories or files (e.g., 01-max.jpg, 02-terry.jpg, etc), which will result in sortable files.

- **Clear dates**: Use the ISO Date Standard of YearMonthDay (e.g. 20241106)
- **Consistent sentence case:** Switching between lower and Upper case can cause coding issues when switching between operating systems (Mac vs Linux vs Windows). To avoid case issues, using lower case naming or CamelCase. *CamelCase* is the practice of writing phrases without spaces or punctuation, indicating the separation of words with a single capitalized letter (e.g., instead of survey data, you would write SurveyData).

For practical examples of naming conventions, watch the following video:

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=177#oembed-1

Records Management 101: Document naming conventions. (2018). By the University of British Columbia's Records Management Office.

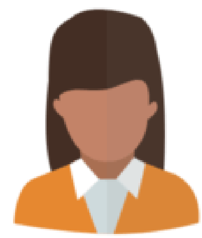
File Formats

In keeping with the FAIR principles, files should be in an open format, unencrypted and uncompressed. An open format is non-proprietary so that the file can be opened using open software that is not owned by a specific company. For example, instead of saving to an Excel file (.xls) which requires a specific license to open, save as a CSV or XML. Unencrypted data is accessible to anyone, whereas encrypted data is secure and locked and would require a pass code or key to unlock the data. An uncompressed file is one that is stored in the original format and hasn't been compressed into another format. The UK Data Archive provides a list of recommended data formats to make your data sharable, reusable and preserved.

Choosing formats that are operating system and tool-agnostic such as .csv and .txt is one way to avoid the issues related to tool licenses and to increase the potential for sharing fully usable and open content. The Open Software chapter provides more information on open source tools.

Scenario – Video Interview File Naming Conventions

Professor Sam Meyers is performing over 100 interviews with first-generation undergraduate students for research on information retrieval. Professor Meyers is developing a file naming convention to ensure the data is easily retrievable on their shared drive for future use. Their study is currently titled "IR Study." The interviewees have been labelled 1 to 100 for anonymity. The first video recording occurred on November 5, 2020, and was performed by graduate research assistant Karina Cassidy.



Professor Meyers and the research team decided to include the following information in the file naming conventions:

- Project Name
- Date of Data Collection
- Content of the File
- Researcher's Initials
- Interviewee Label

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.bccampus.ca/openscholarship/?p=177#h5p-21

Dig Deeper

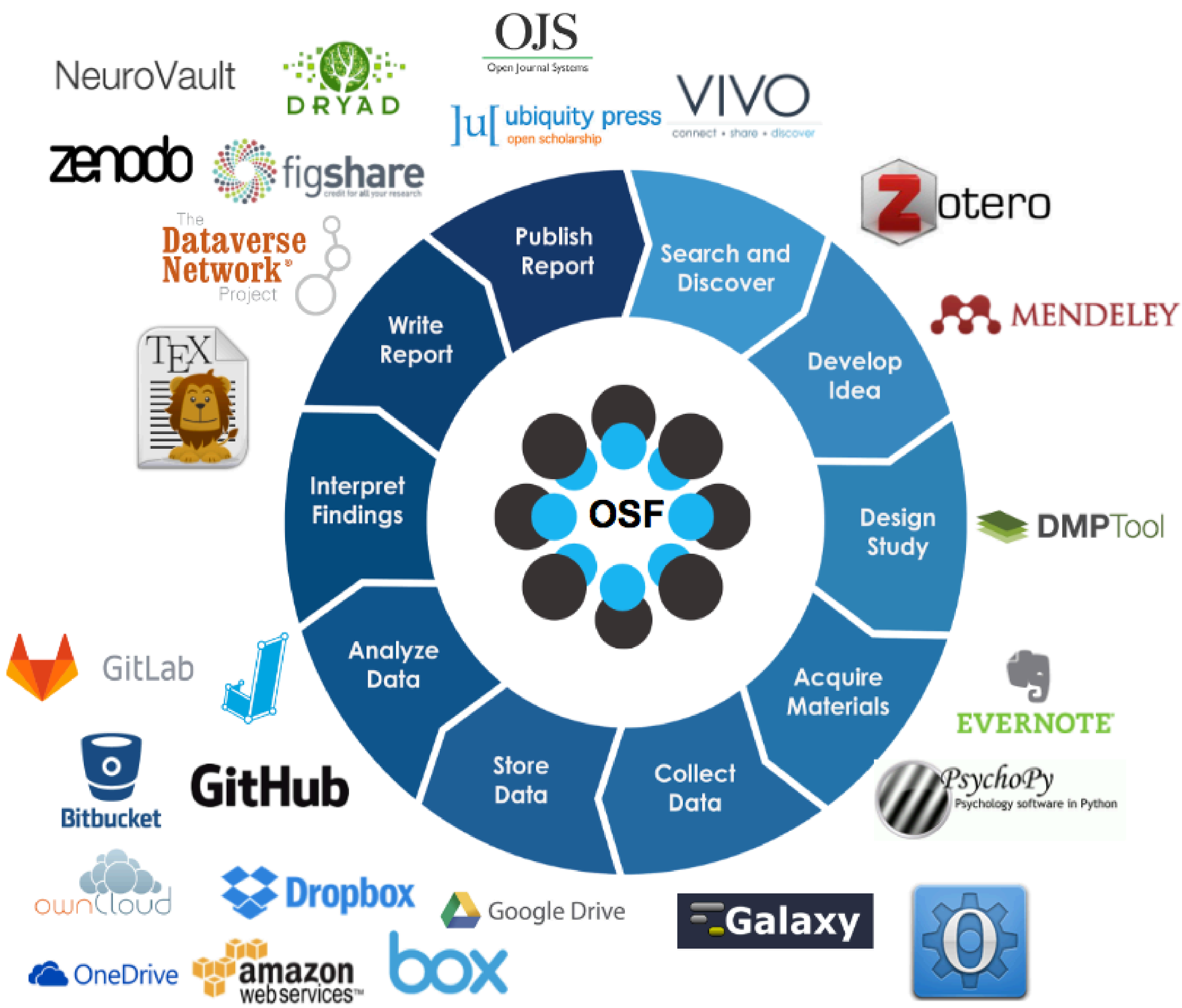
- Learn more about organizing information via the best practice guides from UBC Library Research Data Management.
- Review examples and guidelines file naming conventions.
- Stodden, V. C. (2011). Trust your science? Open your data and code. https://academiccommons.columbia.edu/doi/10.7916/D8KD27BK/download

Adaption

Open Workflow Management

As we learned in What is an Open Workflow?, a workflow can include many different tools and application across the lifespan of the research project. For example, if we review the OSF Research Life Cycle image (below) we can see that one research project could include the use of Zotero, DMP Tools, Evernote, GitHub, Zenodo, and more depending on the stages of the project.

Workflow managers, like OSF, can help to manage and organize various tools, content and documentation during the lifecycle of the project in one place, as well as allow you to publicly share the material in a meaningful way. Sharing all the elements of the research project in one location with persistent identifiers (e.g., Digital Object Identifiers (DOIs)) provides the opportunity for yourself and other researchers to engage in open workflows while supporting the scientific ideal of reproducible results.



OSF

OSF, formerly known as the Open Science Framework, is a free workflow management application that provides a central landing place for project components, regardless of digital format or owner. OSF provides a central place to bring together collaborators, project files, and to track versions of things.

Benefits of OSF

- Version control across the whole project
- Server locations in multiple countries, including Canada
- Ability to create a new structure or clone an existing project
- Sustainable access to your project (read-only at least) guaranteed for the next fifty years
- Ability to easily add collaborators outside of your institution
- Digital Object Identifier (DOI) creation at the project level
- Ability to "pre-register" a project, which essentially takes a snapshot of a project details and provides useful information for other researchers who may be interested in building on the work in the future

Considerations When Using OSF

While OSF can be a one-stop-shop while working on a project, it should not be the only final location for data and other project artifacts. Final outputs should live in a data repository and in some cases datasets may need to be linked to OSF from an external resource. There are also a few potential risks when using the tool, which include:

- All information is public, it requires the user to make decisions on what is appropriate to share (e.g., sensitive participant information, preregistration details)
- Server locations defaulting to the United States which may not appropriate depending on your dataset
- Uncertain longevity if the funding model changes (currently guaranteed for 50 years)

Dig Deeper

- Explore [example OSF projects and repository templates]
- Read about the preregistration revolution: Nosek, B. A., Ebersole, C. R., DeHaven, A. C., & Mellor, D. T. (2018). The preregistration revolution. *Proceedings of the National Academy of Sciences*, *115*(11), 2600-2606. https://www.pnas.org/doi/10.1073/pnas.1708274114

Open Workflows - Conclusion

In the Open Research – Open Workflows chapters, you explored open workflows, their importance in reproducibility and replicability in research across disciplines and best practices for organizing files and documentation.

A research workflow is a documentation of every step taken and decision made as part of a research project.

By creating an open workflow, you ensure that enough information is shared about how you got from an idea to a conclusion or output, and the tools that you used along the way, to allow someone else to replicate or reproduce your findings.

An open workflow, generally, provides publicly accessible documentation of research process and outcomes, including experimental design details, data, analysis conducted, code, etc. Using best practices around file naming conventions, project metadata, file formats, and tool selection, open workflows enables long term preservation and access to research files.

Each open workflow is unique and requires a research to consider. As you begin the process of creating an open workflow, consider the following questions:

1. Can you find existing open projects that can inspire your workflow?
2. For each step in your process, are there relevant/disciplinary-specific open tools and open file formats that you should keep in mind? If your discipline does not have best practice protocols, which ones could you incorporate into your work?
3. As your project moves forward and you start creating outputs, how will you keep track of things? Consider preregistering your study design and analysis information to increase transparency.

Open workflows are incredibly important for minimizing the impact of the reproducibility crises happening across many disciplines. Using open workflow tools (i.e., OSF) provides a central landing place for all research collaborators, project files, and versions of project documentation.

OPEN RESEARCH - OPEN SOFTWARE

Ultimately a bunch of 0s and 1s, software risks being a black box holding one's research in the dark: from data collection, storage, and processing, to progress tracking, analyses and manuscripts. It is critical that we select tools and formats that allow for a clear window into what we're doing and that enable access into the future. Free, open software can help realize these goals.

In the following chapters you will:

- Understand the various concepts and degrees of *open* in open software.
- Identify the linkages between open software and reproducible research.
- Recognize how software choice impacts the longevity and transparency of your research.

What is Open Software?

Software helps researchers collect data, analyze results, model systems, and share findings efficiently and accurately. Open Software is often articulated as software that can be adapted – that is Open Source software. In the world of programming, this often includes some sense of collaboration where someone else, who is able to view and edit a copy of your code, is then able to make a suggestion on how to improve your program. Imagine you're the author of a book, and for each new edition, you crowd sourced edits that your readers think will improve the story; new characters, different timelines, you name it!

We'll get into the nitty gritty of different interpretations or implementations of open in the context of software shortly, but to start, the following CNBC news story, *The Rise Of Open-Source Software* (13:51), provides a high level overview of the history and future directions of Open Source Software.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=185#oembed-1

The Rise of Open Source Software. (2019). By CNBC

With this underlying understanding of open software as adaptable, this chapter will be more nuanced in exactly how we might interpret open and the impacts this can have on the research life cycle.

But first, in addition to adaptable code, when we talk about software that is open, we often call it free. *Free* is a term with many interpretations, so we'd like to clarify the difference between free software, Free Software (with capitals), and Open Source software.

Although perhaps nothing in life is truly free, **free software** simply implies no financial transactions being needed in the acquisition of the software. Lots of software is ostensibly free; not all of it has its underlying code available to be adapted by anyone wishing to do so. Often free software is provided without any sort of warranty or promise of support. Most social media platforms fit within this definition of free software: there's no financial transaction needed to access the platform, but users "pay" by viewing advertisements or by having their behaviour tracked on the platform.

When we talk about **Open Source software** we're describing the availability of the underlying code for people to edit, modify, and improve. This certainly does not imply that there is no price tag attached to said software. For example, some software is available free of charge for non-commercial use. Alternatively, some companies provide paid support contracts (with the software being free to use for those who do not wish to have access to customer support).

And finally, when we talk about **Free Software**, we're describing a specific philosophical approach to the development and distribution of software that goes well beyond simple financial transactions and code adaptability. Free Software, in this latter sense, is defined by the four essential freedoms of the user (you) to:

- Run the program as they wish;
- View the source code and modify how the program works;
- Redistribute the original program;
- Distribute modified versions of the program.

Differentiating free software and Open Source software from Free Software is often done, per the GNU philosophy, by suggesting that we're not talking about free in the sense of "free beer", but "free speech".

Dig Deeper

Learn more about the GNU philosophy:

- The GNU articulation of Free Software: What is Free Software?
- The GNU on how Open Source and Free Software differ: Why Open Source misses the point of Free Software
- Founder of the GNU, Richard Stallman discusses the ethos behind and need for Free Software: Free software, free society: Richard Stallman at TEDxGeneva 2014 (13:39)

Where Does My Code Run?

When thinking about various forms of free and open software, we need to consider where the software will run: locally on our own computer or in the cloud? Software as a Service (SaaS) is a business model where software applications are hosted and made available to users over the internet. The primary benefits to software-users are convenience (it's easier to sign-up for a service with your email address than it is to install a piece of software), low upfront cost (often zero, or a monthly free), and access to massive-scale computing power. You probably use SaaS everyday; Google Search, Zoom, and ChatGPT are all examples of SaaS applications.

In the context of Open, the largest drawback of most SaaS applications is the lack of transparency. The source code for SaaS applications is often proprietary and not shared. So, while users may be able to interact with a system without paying they often won't have the four fundamental freedoms of Free Software. Furthermore, software updates are frequent in SaaS systems, which leads to challenges in replication: if you have used a cloud based service in your research and the providers materially change the service (or go out of business), then you may not be able to replicate your prior work.

Not all SaaS applications are closed source. Some, such as Mattermost (a Slack alternative), WordPress, H5P, and GitLab (a GitHub alternative) are provided as Open Source software with the option to self-host the application on your own computer, in addition to their SaaS business model.

The Many Facets of Open in Open Software

Just as free can be interpreted differently in different contexts, so can the intent of open.

When we talk about **open software supporting the research life cycle**, we can think of three tiers of open:

- Software whose code is publicly available — that is, anyone can inspect and verify the code;
- Software that is open source licensed — that is, not only is the code public, it is available for people to edit, modify, reuse and improve; and
- Software that allows for creating human and machine interpretable content.

This last tier can seem like a bit of a leap if you're used to working in programs like Microsoft Word and Excel, for example, to write and build visualizations like bar charts. We'll look more in depth – and with examples – at what it means for the underlying structure of a document and its analysis to be both human and machine interpretable shortly. In the meantime, one example that you might already be familiar with, often used in Open Education, are Wikis. It is not uncommon for class research assignments to be built around editing existing pages on Wikipedia or even generating course-specific content on UBC's Wiki. Wikis employ a flavour of Markdown, a key tool in building human and machine readable content. More on this shortly!

Let's Briefly Recap

Open software can be interpreted by its price tag, the sharing of its underlying source code, and the philosophy that underpins how it should be used and distributed. In short, open source does not equal free, nor does closed source equal paid. And open source can come with many restrictions that Free Software should not.

In supporting transparency in the research process, a key element of open software includes using tools that enable human and machine interpretable content so that even if a particular piece of software is no longer available, a human should still be able to understand what the intent of the code was.

In the scholarship of teaching and learning, engaging in open platforms is just as important as it is in traditional research.

A Note on Licensing:

While the above largely speaks to how software is developed and / or interacted with by the user and developers, creating and sharing open software is an important part of open scholarship. If you are creating software and want to make it available for others to use, there are several standard copyright licenses you can choose from. We'll explore open licenses in more detail in the open education chapters, but understanding software licensing is essential if you plan to modify existing open source code or incorporate another open source project into your own work.

It's important to note that open source licenses are specifically designed for software, while Creative Commons licenses, which are used in open access publishing and open educational resources are generally intended for "content" based work like writing, art, and media, not software. It's also important to note that not all open software licenses are compatible with each other, and you need to be mindful of this when building on someone else's code. While we won't dive into the complex details of which specific licenses are compatible, it's still crucial to pay close attention to licensing when using or combining open source software projects.

Dig Deeper

If you wish to take a bit of a diversion and learn about software licensing, check out the following:

- Introductory post from Free Code Camp on open source licenses
- A bit more information from Opensource.com
- And a 200 page book on open source and free software licenses for those wanting the full story
- A dive into licensing implications for code created by GenAI tools
- Are you interested in applying an open source license to something you created? If so, explore your workplace's intellectual property policies. At UBC this LR11

Why Does it Matter?

In some aspects of the research process, being able to follow the linkages between outputs and inputs is a common expectation. For example, when we read a paper, we expect it to cite its sources. We also expect to be able to track down those sources and investigate the strength and validity of the claims being made.

Consider the following scenario:

Scenario – Open, Reproducible Research

Abdul is a geneticist working at UBC. They recently came across an article in their area of research. Abdul contacted the authors to inquire about accessing the data and scripts for both cleaning and analysing the data; if the results of the study could be confirmed, there could be a huge impact for Abdul's area of practice. The authors forwarded Abdul the data, but responded that they hadn't kept track of everything they did with the data; some of the clean up and organization happened in Excel and subsequent analyses were done in the statistical program SPSS.

Without being able to reproduce the analyses done on the data – changes were not tracked in Excel and Abdul does not have access to SPSS, a proprietary, closed source application – Abdul is unable to verify the findings claimed in the research article. This leaves Abdul unsure how these findings should be evaluated and interpreted.

In the example above, the research that Abdul came across was neither transparent nor reproducible (refer back to the Open Research chapter on Reproducibility & Replicability). The use of open software in this situation would have been one step the researchers could have taken to remediate this. Such a choice would have also contributed to the posterity and reliability of both their research inputs and outputs.

Increasingly, if data is being summarized, we expect to be able to review the underlying raw data to understand how it's been transformed.

Likewise, we should also expect to be able to see and understand the software that was used to interpret that data and generate that output. Proprietary software limits our ability to do so. Open software, on the other hand, helps to increase this transparency.

Additionally, we've all encountered files in formats not supported by our operating system or any current program available. Ideally, whether it be the ethics application that initiated a research project, the data collection tool employed, the data processing tool used, or the final output – poster, audio, video, traditional manuscript – we expect to be able to review the content 5, 10, 15 years post-production. Open software, using open formats, helps to facilitate this.

Reflecting back to the example above, if the data that Abdul needed was readily available in a standardized, open format (more about this in the chapter on Open Data) and the cleaning and processing of this data done using a readily available open source software solution with proper documentation, Abdul could have more readily engaged in verifying the results and potentially improving their own research practices. As we'll see shortly, using scripts to handle the data would improve this transparency and reproducibility still further; making the process an open process using open tools.

Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.bccampus.ca/openscholarship/?p=185#h5p-22

Open Code

As we mentioned in the first section, a key element of open software includes using tools that enable human and machine interpretable content so that even if a particular piece of software is no longer available, a human should still be able to understand what the intent of the code was.

When we talk about open in the context of creating human and machine interpretable code, we're talking about organized, documented code supported through scripting and literate programming.

Programs can be shared either as source code (as the programmer wrote it) or compiled (a format intended only for machine-reading, not to be read directly by people). Sharing a compiled program allows someone else to use it, but does not allow them to see the internals of how the program operates, or modify it to behave differently.

Readable Code

It's all well and good if we make our code available by the ethos of Free and Open Source Software (FOSS) and engage in literate programming when compiling our data and outputs. But if the syntax and structure of our code are not clear, we are no more transparent than the black box of 0s and 1s we are trying to overcome.

Writing clear code that a human can make sense of is critical for both transparency and reproducibility in the research life cycle.

So, what does readable code look like? The following video Readable Code (3:59) from Khan Academy gives a pretty good overview of how code can be made more accessible to a human reader. Don't focus on the actual coding language but on the principles of making it readable.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=188#oembed-1

Readable Code | Computer Programming | Khan Academy(2014). By Khan Academy.

There are a lot of opinions out there on just what makes readable code readable code. After all, some of our most beloved authors break all the rules of good grammar. Some manage to explain the world in a single sentence, while others will fill pages with the briefest moment. In general, this concept is captured well in the WTF per Minute measurement:

> "Cars have MPH (Miles per Hour) that measures the speed that they travel. The better the car the faster the MPH or speed. Developers have WTFPM (WTF per Minute) that measures the number of 'Works That Frustrate' that the developer can read per minute, aka code quality…With a car, the BETTER the road the more MPH it can attain. With a developer, the WORSE the code the more WTFPM can be obtained."
>
> WTF Per Minute – An Actual Measurement for Code Quality

The short of it though is that all rules will be contextual, depending on why you're writing what you're writing and who your audience is. As well as the reality that conventions exist in certain circles of programmers, researchers, and learners.

Dig Deeper

Written for programmers, the introductory content in this book is widely applicable: [The Art of Readable Code: Simple and Practical Techniques for Writing Better Code](), by Dustin Boswell and Trevor Foucher.

Note The above text is available only to UBC Library card holders. We're actively seeking an alternative that is open. In the mean time, you can [check availability at your local library using WorldCat]() and putting in your postal code.

Using GenAI Tools to Create Readable Code

Large language models can be incredibly helpful in both creating readable code and understanding code written by others.

You can paste in a snippet of code and ask the model to explain what it does, break it down line by line, and summarize its purpose in plain language. This is especially useful when working with obscure libraries or unfamiliar programming styles. Similar to pair-programming, using an LLM can save a lot of time when you get stuck or are having a hard time understanding how a piece of code works.

Using an LLM as a coding assistant for code generation can also help you to iterate quickly. You can ask it to write single functions or whole data processing scripts based on natural language descriptions of what you want to achieve. It can also generate boilerplate code, set up test cases, or help scaffold a new project. This makes prototyping much faster and lowers the barrier to entry for people who are newer to programming or working in unfamiliar languages. That said, generated code definitely needs review and testing, as the model might make assumptions or use outdated practices.

When trying to write clear and readable code, it's good practice to follow norms and conventions. Programming languages and major libraries or frameworks all have their own conventions, and individual large software projects may have their own internal styles as well. When using GenAI tools to help write code, you'll need to be aware of the conventions and likely modify the generated output to match the style of your project.

One of the greatest benefits of open software is reuse. One author can create and maintain a library of code to solve a particular software challenge, and many other people can re-use that library. Over time improvements can be made to the library, and all of its users can benefit from the changes. Particularly in areas such as cybersecurity and cryptography, it's very important to use well established, thoroughly vetted software libraries, rather than creating your own or letting an LLM create one for you. LLMs are great at generating new code, but sometimes you will need to steer them towards reusing an existing library instead.

Dig Deeper

To learn more:

- Explore a short course on Pair Programming with an LLM
- "Vibe Coding" is a term used to describe writing code entirely by prompting an LLM to generate code. You can watch a demonstration here

Literate Programming

Clean, readable code is just the first step in increasing our transparency and reproducibility. Literate programming takes us to the next level.

Formally introduced by Donald Knuth, literate programming is inspired by a shift in how one's code is communicated; the goal being to, as Knuth states:

> "[i]nstead of imagining that our main task is to instruct a *computer* what to do, let us concentrate rather on explaining to *human beings* what we want a computer to do… [achieved] … by considering programs to be works of literature."
>
> Knuth, Donald E. (1984). "Literate Programming". *The Computer Journal*. 27: 97–111.

Common implementations of literate programming that you may have heard about include R Markdown and Jupyter Notebooks.

What is R?

R has taken academia by storm. R is a programming language that is becoming commonplace in many disciplines. R is open source and community developed. It is great for statistical analyses. It makes beautiful visualizations from your data. Thanks to community efforts it has add-ons that produce gorgeous documents, allowing you to write something once and export it to html, pdf, or Microsoft Word.

Is R the be-all and end-all?

No. Open, reproducible work flows should be tool agnostic. R just happens to very accessible and well supported. And it is what we'll be referring to when we talk about scripted programming in this chapter. You'll find plenty of alternatives, and more about R, on the Additional Open Software page!

Example of Literate Programming

The following is an example of what literate programming looks like.

First, we have a traditional output, a pdf, that we might be used to seeing; this includes some text and a few tables or graphs. We have no insights into how the data has been handled, and how the visualizations were derived (select the image to view the pdf). Sharing this pdf works well to communicate our findings, but does not enable others to see or reuse the details of our data manipulation.

mtcars

R Markdown documents allow us to interweave narrative text and R code. For more details on using R Markdown see http://rmarkdown.rstudio.com (http://rmarkdown.rstudio.com).

R contains several datasets to allow a user to explore various features of the software before we have our own data to work with. One of these datasets is called mtcars.

The data, from 1974, details 10 aspects of design and performance for 32 car models.

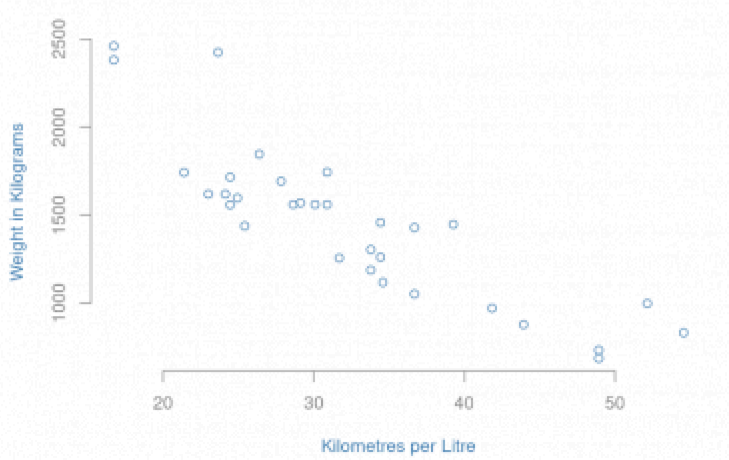
The following is a summary of the data for a subset of the variables:

```
##       mpg             cyl             disp             wt
##  Min.   :10.40   Min.   :4.000   Min.   : 71.1   Min.   :1.513
##  1st Qu.:15.43   1st Qu.:4.000   1st Qu.:120.8   1st Qu.:2.581
##  Median :19.20   Median :6.000   Median :196.3   Median :3.325
##  Mean   :20.09   Mean   :6.188   Mean   :230.7   Mean   :3.217
##  3rd Qu.:22.80   3rd Qu.:8.000   3rd Qu.:326.0   3rd Qu.:3.610
##  Max.   :33.90   Max.   :8.000   Max.   :472.0   Max.   :5.424
```

And here is a tabular view of the data for these same variables for all cars with V6 engine, sorted by increasing mpg

	mpg	cyl	disp	wt
Merc 280C	17.8	6	167.6	3.440
Valiant	18.1	6	225.0	3.460
Merc 280	19.2	6	167.6	3.440
Ferrari Dino	19.7	6	145.0	2.770
Mazda RX4	21.0	6	160.0	2.620
Mazda RX4 Wag	21.0	6	160.0	2.875
Hornet 4 Drive	21.4	6	258.0	3.215

What we really want to know though, is, is there a correlation between a car's weight, and it's MPG. Well, actually, being in Canada, we want to know this relation in KPG. So, first we'll add two columns to our data that contains the converted values (MPG to KPL and lbs to Kg, the latter rounded to the nearest whole number) and then we'll run a scatter plot to investigate.



Download PDF

Secondly, we have the underlying document that generated the above, written using R Markdown. It integrates the code used to generate the above document! If on a system using R, and the tools to interpret R Markdown, it can be used to generate the above document, making our work reproducible. Better still, this document is written in plain text, so it can be opened by virtually any text based program, making our work transparent; even without access to R, we can still read the below and understand how the processing was handled. It's also highly reusable: someone could easily perform an identical analysis on a different dataset, or change the plotting parameters to produce a different visualization.

````
---
title: "mtcars"
output: pdf_document
---
```{r setup, include=FALSE}
knitr::opts_chunk$set(echo = FALSE)
```
R Markdown documents allow us to interweave narrative text and R code. For more details on using R Markdown see <http

R contains several datasets to allow a user to explore various features of the software before we have our own data to worl

The data, from 1974, details 10 aspects of design and performance for 32 car models.

The following is a summary of the data for a subset of the variables:

```{r}
summary(mtcars[c(1:3,6)])
```
And here is a tabular view of the data for these same variables for all cars with V6 engine, sorted by increasing mpg

```{r}
library(kableExtra) # load needed libraries

# select and view subset of data in tabular format
V6 <- mtcars[order(mtcars$mpg, decreasing = FALSE),] %>%
  subset(cyl == 6)
V6[c(1:3, 6)] %>%
  kbl() %>%
  kable_styling()
```
What we really want to know though, is, is there a correlation between a car's weight, and it's MPG. Well, actually, being in

```{r}
mwt <- round(mtcars$wt * 1000 * 0.45359237, digits = 0) # convert imperial to metric and round off
kpl <- mtcars$mpg * 1.609 # convert imperial to metric
mmtcars <- cbind(mtcars, mwt, kpl) # add metric data to existing data set

# plot
````
````

```
plot(mmtcars$kpl, mmtcars$mwt, xlab = "Kilometres per Litre", ylab = "Weight in Kilograms", col = "#4682b4", fg = "#88
```

Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.bccampus.ca/openscholarship/?p=188#h5p-23

Dig Deeper

To learn more about literate programming and readable code, look into the following:

- An interesting web site with a host of resources and references about literate programming: http://www.literateprogramming.com/
  - 20250422: this site is down, but the Internet Archive has a recent copy
- An excerpt from an interview with Donald Knuth on Literate Programming
- A good overview written for tidyverse, but widely applicable: The tidyverse style guide, by Hadley Wickham

Degrees of Transparency

So far, we've covered two broad areas related to open software.

First, the development of software that we might choose to employ in our research. We've discussed the fact that Open Source and Free Software differ from closed source software in that the code behind the program of the former can be accessed by anyone with the knowledge to interpret it. This is one level of transparency in the larger digital ecosystem in which we work.

Second, we've touched on how we might shift the paradigm of a piece of software or code that tells the computer what to do, to one where it tells the human reader of the code what the computer should be doing. In this way, literate programming tries to wed together one's inputs (data) and one's outputs (manuscript). This adds a further level of reproducibility.

We can also take this discussion down a slightly different avenue and introduce the impact of user interface on the transparency and reproducibility of the various aspects of our research.

So let's talk about WYSIWYGs for a moment.

WYSIWIG vs Markup & Scripted Language

An important differentiation when we talk about software that supports open research and transparency is the difference between **WYSIWYG** (What You See Is What You Get) software — which may well be open source and even adhere to the ethos of Free Software — and software that requires the user to explicitly markup what they're doing — generally both human and machine readable, to a degree. We've already introduced aspects of this when talking about literate programming.

You may also hear or read the acronym GUI – GUI stands for Graphical User Interface. This is very much synonymous with What You See Is What You Get; the GUI allows us to undertake actions without explicitly marking up or writing out what we want to do — whether that's saving a document, setting text to bold, or transforming our data. Day to day, all of us engage with GUIs, from tapping our phones to using Microsoft Word! But a bit more on the implications of this for research…

Structure and Content

Openness in a computing environment will always be intrinsically limited — when a program is compiled (turned into a series of 0s and 1s representing computer operations) the resulting product is indecipherable to a human. That being said, if any document is going to pass the test of time in a computing environment, it is a plain text file. The issue with plain text files is that they convey only words — all structure (things like pagination, headings etc) and semantics (word meaning and / or emphasis) are not built-in characteristics. Structure and semantics are an added layer, and bring meaning to the reader.

This might be why we like things like Microsoft Word so much — the program allows us to easily see our document structure and encourages a sense of semantics — through the use of bolding, italics, colour, titling and pagination we construct our prose and our document structure at the same time. The catch is that our prose (content) and structure are embedded in a particular program. This has two knock-on effects. First, lose the program and you lose your prose. Second, you lose the ability to view your content independent of its structure and risk obscuring content behind structure.

Markup, or Markdown — a markup implementation — attempts to resolve this by separating out document structure and document content. Some markup languages integrate significant levels of semantic integration, while others are more focused purely on structure. R Markdown, which we've already encountered, is one implementation of markdown. Another popular option in certain disciplines that you may have come across is LaTeX. HTML, a markup language, provides the underlying structure to the webpage that you are viewing right now in a plain text environment; your web browser renders the content in a pretty way. If you want to see the underbelly of this web, or any webpage, you can right click on your mouse right now and select the option that reads something like "View Page Source".

What all of these iterations of the 'markup' model have in common is that they rely on a second program to translate the markings in the document to visual, interpretable content for human digestion — look back at the R Markdown document and corresponding pdf on the previous page to see this translation in action. What they also have in common is an underlying plain text document that can be read on virtually any computer from the inception of the computer and that will still be readable by both a computer and a human for decades to come.

If you've used a wiki editor, you've used markdown. And wikis can be a great way to introduce students to practices in open sharing of knowledge created through a transparent, text based tool, that allows for greater portability and adaptability than what we would find in a WYSIWYG editor.

Let's Briefly Recap

- WYSIWYGs give you a graphical interface (GUI) where your content and your structure cannot be separated – they provide a document with pagination and the ability to change fonts, bolding, colours etc. on the fly with the click of a button.
- Markup, or markdown, employs a three step process. In a plain text editor, you write, without distraction from the ability to change your formatting. When you're done, you call on another program to transform your text into a Word document, pdf, PowerPoint etc. To view the formatted document, you open it with a third program — your web browser, pdf reader, or word processor.

Dig Deeper

- Check out some basic markdown syntax with this markdown guide.
- Explore the CSS Zen Garden to see examples of the power of separating structure and content. All of the example web pages display the same content (from the html file), but with wildly different formatting (from the various Cascading Style Sheet (CSS) files).
- Check out the Additional Open Software page for help in selecting a markdown editor in which to start composing beautiful text-based documents.

Going Up the Ladder

At this stage, we've touched on the applications that support one's work. These applications all reside within a larger ecosystem, an operating system.

Operating systems exist in a similar environment to that described in our discussion about closed source, open source, and free software. Your choice of operating system will impact your choice of applications to pursue your research, how interoperable these programs are (and by virtue, the content that you build in them), and how transparent and reproducible you can make your work.

Windows OS is entirely closed source. Mac OS is closed source, but because of its underlying structure it is compatible with many tools and scripts built for Linux. Linux is open source and distributions are often driven by the GNU philosophy of Free Software. As you will have experienced, some software is only available for specific operating systems (e.g. Windows only). If you're going to be collaborating with others in your field it's a good idea to ask around and see what systems others are using. In a later section we'll also discuss containers, which can greatly help in collaboratively developing software with people who use different operating systems.

Dig Deeper

- To learn more about Free and Open Source Software (FOSS), take a look at the treasure trove of information, guides, and tutorials on everything Linux and open source found here: It's FOSS (Free and Open Source Software)
- Want to explore Linux without committing? Check out the resources on the Additional Open Software page.

Version Control

Continuing on the journey of increasing the openness of our research with software solutions, we move next into version control.

Version control likely was first born in the context of records management, and has historically relied on naming conventions and multiple copies – or versions – of documents being created and managed. But software developers working in distributed environments really pioneered the way forward in how we track changes in a document and across a project, especially in a digital environment.

In research, version control comes into play in a variety of ways, sometimes in the context of software, sometimes data, as well as in our methods, protocols, and manuscripts. Before delving into each of these aspects, lets start with the following video, *LEARN GIT version control in 10 minutes!*, that discusses why we might want to leverage a version control system instead of naming conventions across multiple documents. There is no need to watch beyond the first 4 minutes and 10 seconds. Indeed, we highly recommend a hard stop at 4:10.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.bccampus.ca/openscholarship/?p=192#oembed-1

Learn Git version control in 10 minutes! (2020). By Python Programme.

Version Control in Open Research and Open Education

In the context of open research, version control provides a window into the evolution of our project, allowing changes in one's plans to be identified and rectified against an original plan. This is transparency in the research life cycle. This is equally as relevant for our protocols or methods as it is for our scripts and our manuscripts. In the context of open education, version control can track the evolution of educational content co-developed in a class across cohorts; version control and time stamps can help other users identify the currency and relevancy of the resource.

Undo or Version Control

We should differentiate here though between version control for transparency and version histories for recovery or tracked changes. Tracking every change made is more about recovery than versioning. Versioning instead is very much about capturing moments of significant change or phases of implementation.

If our methods change, our protocols need to be updated to reflect this, and the nature of these changes should be documented. If our script is processing our data in one way, and we discover the need to adjust this, this update should be captured and documented. The same goes for our manuscript; when a revision is made, this should be both noted and documented to allow a transfer of the tacit processes of the project to be embedded into the project workflow.

Recovery (Undo)

When we think recovery, it's more like having an undo function: the whoops moment, I made a mistake — I didn't mean to delete that paragraph or I didn't mean to put that file in the trash — let me undo that.

So, for example, MacOS Time Machine allows you to trace your documents back through time and recover an older version. Google Docs allows you to see a history of edits over a specified time period. Your R script can document each change you make to your data to get from A to B. Open Refine, a graphical data cleaning tool, similarly keeps a record of every change made to your data set.

Common to all these platforms is the ability to retrace your steps and go back one step. Your individual steps or changes are also not commented; we don't know why what happened happened, we just know it happened.

Version Control

When we think of version control, we should be thinking of a timestamp to capture significant decisions made in the transition or evolution of a project, ideally accompanied by a description of what these changes were. The ability to add comments to a timestamped version of your code is one of the core features of version control. These comments are searchable and you can easily revert to previous versions of your code.

In the context of a manuscript this might be recording two draft versions: the first, ready for review by my supervisor or journal editor, the second reflecting edits made after receiving feedback. Or for our script, a first version that imports and tidies our data, and then an updated version that fixes an issue in our calculations to convert imperial to metric.

Another key feature of version control is *branching.* Recovery/Undo is an inherently linear process: you make some progress, and you can go back to a prior state. Branching allows you to create multiple parallel versions of your work. Branches can also be *merged*, so the number of parallel versions of your code can change over time as it develops. Branching and merging are very useful when multiple authors or developers are collaborating on the same software project. Branches are also useful as playgrounds for experimental development: if an idea seems fruitful, it can be merged into your project, or, if the idea was a dead end the branch can be deleted.

The difference between recovery and version control is more nuanced than this, but this dichotomy helps to highlight the role of version control in transparency versus recovering from a mistake.

Version control is made possible with both software and platforms. Most people have heard of GitHub. Git is the software that handles the version control. GitHub is an implementation of Git owned by Microsoft. Git is designed with text-based documents in mind, which is why it is so popular with people who write code.

OSF provides a similar versioning service as GitHub, but is designed primarily for people working with binary documents – non plain text files like pdfs, word documents and the like.

Common to both of these platforms is that major revisions can be stored on both your local computer and in a remote repository for potential sharing and collaborating. They also encourage you to document your changes.

Dig Deeper

To learn more about version control and the different platforms that enable this, review the following:

- Learn how OSF manages versions of documents: Version control on OSF
- Learn about setting up a UBC affiliated account on OSF Institutions.
- Pro Git is an excellent read on all things Git; the introductory chapter is the place to start: Chapter 1.1 Getting Started – About Version Control in Pro Git, by Scott Chacon and Ben Straub
- Some people prefer to watch a video. For those people, here you go: Git Tutorial Part 1: What is Version Control? (9:35)

Reproducible Environments

At this point, we have covered quite a bit. Open as a principle of software development, open as a principle of human and machine interpretability, and open as a facet of reproducible workflows.

If we think back to the content covered in Open Workflows, and the discussion of reproducibility and replicability, it's worth considering that reproducibility is really about internal validation while replicability is about external validation. Reproducibility confirms the same data and processing methods will produce the same result. Replicability contributes to the evidence base by conducting a new study modeled on a previous study.

In the spirit of open as it relates to the digital environment and reproducibility, one of the gold standards when we're looking at a single study is computational reproducibility; that is to say, if I pass off all of my inputs (data, scripts, etc.) to someone else, can they, on their computer, reproduce what I did exactly. Unfortunately, the answer is frequently no, because computers are complex environments, and no two machines are going to have exactly the same environment; hardware and software differences will exist and these will impact how data is processed by a program. In complex food production, like brewing beer, it's often said that making a great beer once is easy, but making it a second time is much harder. Small variations — such as precise temperatures, ingredient sources, and even the weather — can subtly change the flavour. The same challenge exists in computational reproducibility — unless we use a container and apply the concept of containerization.

The full details of how containerization is deployed are really beyond an introductory section on open research. But the principles being addressed by containerization are critical to navigating a digital environment when we think about the ability of work, embedded within a piece of software, to be validated by others.

A Recipe for Understanding Containers

The thing about any piece of software or any script is that it is never fully self-contained. We always rely on dependencies or pre-existing bundles of code, usually called libraries. Think of it like baking muffins.

When you write your R or Python script, you're writing out your recipe; a set of instructions with particular steps that need to be followed. Your recipe requires certain things to be fully executed though. It requires:

- an environment in which to run; let's call this your kitchen
- something to process your ingredients into the end product; let's call this your oven
- something to validate all the ingredients; let's call this your mixing bowl
- a list of ingredients; let's call these your dependencies or libraries.

Finally, your favourite muffin recipe is dependent on you having eggs, butter, white flour, and cow's milk. Let's now imagine that when you built your working environment — your kitchen — you made sure to include a lifetime supply of all of these dependencies — your ingredients. All is good until you come home one day, and realize that your partner has done some upgrades. One of these upgrades is to replace all of your white flour with rye flour and your cow's milk with goat's milk.

This upgrade was ostensibly made to reflect the need for a healthier lifestyle. Beyond potentially being annoyed about the lack of consultation, maybe you see the problem? Next time you try to make your muffins, your validator — your mixing bowl — will be expecting white flour and cow's milk. Unable to find these ingredients, your mixing bowl will fail to pass all the ingredients off to your oven. No more muffins, in spite of the most well-documented script — your recipe — being in hand.

Even if you never had any upgrades done, what if your friend wanted your recipe? Sure, you could give them the script, and they could source all the ingredients. But if you wanted to ensure that the recipe was a perfect match to your own, you'd gift-wrap all the ingredients with the recipe attached, ensuring success.

This gift wrapping, or bundling, is exactly what software that containerizes a piece of code does — it ensures that the code is accompanied by the appropriate environment and dependencies so that it will run into the future. This is a critical aspect of reproducibility.

Docker is a popular open-source tool for containerizing software and code. For those working in the realm of High-Performance Computing, Apptainer is another popular option.

Dig Deeper

To learn more about containers and the way they can improve reproducibility, review the following videos:

- A conference presentation on the basic elements and implementation of Docker: Using Docker Containers to Improve Reproducibility in PL/SE Research (42:08)
- An introduction to containers using Singularity and some of the differences between Docker and Singularity (48.23)
- An introduction to Apptainer (8 part series)

Using GenAI for Data Analysis: Why Reproducibility Can Be Challenging

Large Language Models are powerful tools for data analysis tasks like sentiment analysis and text summarization. They can very quickly make sense of large amounts of text and generate useful insights in a natural, human-like way.

But while they're impressive, using LLMs comes with a reproducibility challenge. If you run the same data analysis twice using an LLM, you might not get the exact same result. That's because LLMs rely on built-in randomness when generating their text output. This randomness is intentional and helps make the output more natural, but it also makes it harder to get consistent, repeatable results.

The problem is even more complicated when you're using proprietary Software as a Service models like GPT-4 or Claude. These models are hosted by companies and act like "black boxes". You don't have access to their inner workings such as their training data or model weights. That means if the provider makes a change to the model behind the scenes, your results may change too, even if your inputs stay the same.

To work around this, it's important to:

- Save all your prompts and settings
- Use fixed versions of the model when possible
- If available, use model settings such as setting Temperature to 0, using Greedy Decoding, and fixing a Random Seed, to minimize randomization
- Try repeating your analysis a few times to observe the scale of the random effects
- Consider using a locally hosted model such as Llama, Gemma or Mistral

Dig Deeper

To learn more about data analysis with LLMs:

- Download and install ollama, a user friendly tool for running LLMs locally.
- Explore AI-Assisted Data Extraction (AIDE) Demo Video GitHub

Implementing Open Software

This brings us to the final chapter on our journey through open in software. And it is here that we tackle the difficult question of implementation. We'll do this the best we can realizing that there are as many valid solutions out there as there are researchers when it comes to strategies to integrate openness through our choice of digital tools.

Some of the key questions we should be asking ourselves when we think about software selection and implementation for transparency, reproducibility, and longevity of access include:

- Can I run the code locally, or is it only available as a service?
- Is the code open source?
- Is the software Free?
- Does the solution allow for human and machine interpretation?
- Do I need a graphical user interface?
- Can I adopt version control?
- Would my work benefit from containerization?

Choosing Open Source Software

Following on all of this is the question, how do I choose a piece of open source software?

This is a hard question to answer. It will depend on your research needs, your level of comfort with your computing environment, and your desire to get into the nitty gritty of working with code and the command line.

There are some baseline considerations though, not least of which is trying to pick something established and with a strong support community. To figure this one out, do a quick search of the internet. Are the help resources well established? Are the existing users discussing the software in a way that you're comfortable with? What version is the software at — very new software may require more patience and debugging than old, well tested software with a large support community.

Lastly, the internet loves a top 10 list, and a simple search for "[proprietary software name here] open source alternative", will get you a blog or similar post discussing the pros and cons of various alternatives to the closed source application you're looking to replace. You may not find a perfect replacement, but often a free/open alternative ticks many of the boxes.

The following table explores some common examples of proprietary software and their open source alternatives. Learning resources for the Open Source options can be found on the Additional Software Page.

WYSIWYG* Open Source Software and their Closed Sourced Alternative

Review What You See Is What You Get in the chapter on degrees of transparency.

[table id=6 /]

Open Source Software and their Text Based Equivalents

[table id=7 /]

Note: Many aspects of WYSIWYG applications can be accessed from a text based interface, and many text based programs have had graphical user interfaces built around them.

Dig Deeper

Learn more about choosing open source software:

- Visit the Additional Open Software page for a detailed list of open source alternatives and learning opportunities for each of these.
- An article discussing in more detail some of the above: How to Choose the Best Open Source Software.

An Ideal World

In an ideal world, full transparency in relation to the use of open software would involve using software whose code is transparent and that allows for transparent processes — interpretation by both humans and machines, while also permitting a record of contextualized actions to be maintained.

We do not live in an ideal world though. And there are a host of limitations that might prevent the above from reflecting our reality, not least of which will be discipline-specific idiosyncrasies. And all things are ultimately ephemeral. But, with an eye to the ideal, we'll do the best we can, cognizant of the impact our decisions will have on transparency, access and reproducibility.

Additional Resources

It is not possible to cover every piece of open software for every given task a researcher or learner might wish to undertake. The activities in the activity bank for this chapter aim to provide a breadth of opportunities for engagement in software you may never have used before. We have also compiled a separate list of learning resources for a few key pieces of open software that touch on Word Processing, Data, Text Analysis, and Workflow Management, ranging from very low barrier options to ones which will require more investment in time to learn.

Additional Open Software

You know your research and what you need. Maybe it's text analysis. Maybe it's ecological data analysis. Maybe you're writing code explicitly to be deployed in data gathering. Maybe you just need prose that's not wrapped inside of Microsoft Word. The following is a list of resources for learning and working with open software tools that hit some of these aspects.

This is just a small example of what is out there. From texts, to blogs, forums, MOOCs, YouTube channels, and other online courses, you will likely encounter a number of other learning opportunities. The hope is that you'll find at least one tool that you can spend a bit of time with, explore how it best fits in with your research life cycle.

Word Processing

LibreOffice LibreOffice is a full suite alternative to Microsoft Office, available for Linux, MacOS, and Windows. Installation and use is very straight forward.

- Download the full LibreOffice suite
- LibreOffice support pages

Markdown In a plain text editor or dedicated markdown editor, you can mark up your text to indicate what should be a header, bold, italic etc. You can then send your plain text document to pdf, html and other document formats. You can even create presentation slides.

- Read a bit more about Markdown in the Markdown Guide Getting Started page
- Take a Markdown tutorial
- Keep a Markdown cheat sheet
- Dig deeper and read about Pandoc, the engine that fuels the conversion of document types

R Markdown Do you work in R or want to work in R? R Markdown allows you to engage in literate programming, interweaving formatted text with R code that is processed on the fly and can be sent to html, pdf etc. You won't look back.

- Read and tutorials: R Markdown: The Definitive Guide
- Get an overview and tutorial of R Markdown in R Studio

LaTeX Need some serious document formatting? A high quality typesetting application: work in plain text, output beautiful documents.

- Start at the LaTeX project page:
- Get everything you need to install LaTeX and get started
- Get started on your first LaTeX document

Data

LibreOffice Calc Need a spreadsheet? LibreOffice Calc is the perfect open source alternative to Excel.

- Download the Libre Office suite
- Official Libre Office support pages
- An overview of basic functions in Calc
- A quick introduction to the LibreOffice Calc interface

Open Refine Have dirty data? Want to keep a forensic track record of your changes for reproducibility? Still want a graphical user interface, but also the ability to explore introducing customized elements? Check out Open Refine.

- Download Open Refine
- Get an introduction to Open Refine
- Find additional online learning opportunities for Open Refine

R R has made a name for itself in the statistical world. It is usually paired with the integrated development environment RStudio. So, likely you'll want both R and RStudio. But RStudio isn't strictly necessary.

- Get R
- Get RStudio
- Start Learning to use R:
- Learn about how R can support reproducible work
- Get more in depth: R for Data Science

Python When paired with Jupyter Notebooks, you and Python can join the world of literate programming. Like with R, you'll need both Python and Jupyter Notebooks installed.

- Get Python
- Get Jupyter Notebooks
- Start with a tutorial, like this Jupyter Notebook tutorial from Dataquest or this Jupyter Notebook tutorial from Data Camp
- Learn about reproducible research with Jupyter Notebooks: Ten Simple Rules for Reproducible Research in Jupyter Notebooks
- Get more in depth: Python for data analysis: Data wrangling with pandas, NumPy, and IPython

Text Analysis

Voyant tools An open source, web based graphical text analysis application. Upload a text, or find one online and start your analysis with things like word frequency lists, frequency distribution plots, and keywords in context. Built for the digital humanities, its applications can definitely reach further.

- Find a text to play with if you don't already have one at Project Gutenberg Canada
- Head over to Voyant Tools and plug in your text

- Get in depth guidance through the Voyant Tools help pages

Terminal Not where we would normally turn for text analysis, but the command line is designed for handling text and has some powerful tools for interacting with text. A great introduction to both text analysis and the Linux command line.

- Get the bash terminal. On a Mac of Linux? You're already set, just pull up your terminal. On Windows? Follow these instructions
- Take a tutorial: Basic Text Analysis with Command Line Tools in Linux

R Ostensibly not designed for text analysis, some great tools have been developed to facilitate this work. See above for basic installation.

- Read a tutorial: Text Mining with R: A Tidy Approach

Python Python is great for natural language processing especially with NLTK. See above for basic installation.

- Read a tutorial: Text Analytics for Beginners using NLTK

Workflow Management

OSF Everything you need to keep your project organized and connected.

- Check out the chapter on OSF if you haven't already
- Install the R package osfr and get R and OSF connected

GitHub Version control and so much more. GitHub lives in the cloud and on your local machine.

- Create a Github account
- Install Git on your computer
- Take your first tutorial: Getting started with Git and Github, the Complete Beginner's Guide
- Read way more in depth in the Pro Git book

Explore Linux

Virtual Box Not ready to commit to a full Linux install? Don't want to mess with a dual boot machine? Virtual Box will allow you to install a virtual operating environment on your PC.

- Get Virtual Box
- Pick a Linux distribution
- Download your chosen distribution. No links here, it will depend on what you learn above.
- Install your new operating system
- Launch your new operating system

- Learn all about open source alternatives and how to's with [it's FOSS (Free and Open Source Software)]

Large Language Models

Ollama Run Large Language Models on your own computer.

- Download [Ollama]
- Take a course: [Ollama Basics] or [Advanced Ollama]

Explore more open models:

- [Llama] from Meta
- [Gemma] from Google
- [Mistral] from Mistral AI

Other Open Source Software Used in Open Scholarship

Open software is not just used in open research but is widely used in other areas of open scholarship as well. At UBC, the following are are some of the open source tools that are commonly used in open scholarship and education:

- [WordPress] – open content management – web publishing
- [Pressbooks] – open textbook authoring/publishing
- [MediaWiki] – open wiki/knowledge authoring
- [Open Journal Systems (OJS)] – open access publishing
- [Jupyter] – open computational tools
- [H5P] – open dynamic web content such
- [WeBWork] – open homework system used in mathematics

Open Software - Conclusion

In the Open Research – Open Software chapters we have explored what open software is, how to implement it in your research and how it can be used. Open Software can be defined differently depending on context. Open source does not equal free or **Free**, nor does closed source equal paid, and even **Software as a Service** products may have open source / locally runnable versions. Using open formats can help to facilitate long term access to your research for reproducibility, replicability, and reuse. Similarly, well articulated code, directly connected to your prose, is fundamental to making your research understandable. Generative AI tools can greatly help in creating understandable code.

Practices like version control and containerization further strengthen transparency by recording how projects evolve and by making it easier for others to reproduce research environments and results. Large language models may also play a role in analysis, provided repeatability remains a central consideration. There is no single correct open software solution. The most appropriate choice is the one that aligns with your research goals, your comfort with the technology, and the specific needs of your project.

OPEN RESEARCH - OPEN DATA

In the following chapters you will:

- Identify the attributes that distinguish Open and FAIR data
- Describe the steps involved in implementing open data in research
- Contrast descriptive, administrative, and structural metadata
- Identify how open research data can be used in teaching and learning and in government

What is Open Data?

Data is the starting point for progress across all fields of research: it plays a central role in our ability to predict and counter natural disasters, understand human connections, and develop advances in computing technology.

The Internet was built by researchers to share data, but data sharing isn't yet the norm in research. While new discoveries rely on access to data, research data remains largely fragmented—isolated across millions of individual computers, blocked by technical, legal, and financial restrictions.

Text Adapted from Setting the Default to Open, by SPARC Europe used under a CC-BY License.

Open Data: An Introduction

> "Open data is data that can be freely used, re-used and redistributed by anyone – subject only, at most, to the requirement to attribute and sharealike."
>
> From the Open Data Handbook https://opendefinition.org/

The *Open Data Handbook* highlights these critical points:

- **Availability and Access**: The data must be available as a whole, at a reasonable reproduction cost (preferably by downloadable), and in a convenient and modifiable form.
- **Reuse and Redistribution**: The data must be provided under terms that permit reuse and redistribution, including the intermixing with other datasets.
- **Universal Participation**: Everyone must be able to use, reuse, and redistribute. There should be no discrimination against fields of endeavour or against persons or groups. For example, 'non-commercial' restrictions or restrictions of use for certain purposes (e.g., only in education) are not allowed.

As you can see in the definition above, open data is more than making data available. Open data ensures public access to data and should include sufficient details so that others know how that data can be reused or repurposed. By using the FAIR principles, described next, to manage your data at all research stages, you will help ensure your data is both future-proof and open.

The FAIR Principles

The FAIR principles (data that is **findable**, **accessible**, **interoperable** and **reusable**) provide guidance for data management and stewardship.

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FAIR principles by CSC — Tieteen tietotekniikan keskus / CSC — IT Center for Science

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https://pressbooks.bccampus.ca/openscholarship/?p=203#h5p-24

The Value of Open Data

The following TedX talk by Kristin Briney, a Data Services Librarian at the University of Wisconsin-Milwaukee, discusses some of the reasons open data can be so valuable in research and society.

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https://pressbooks.bccampus.ca/openscholarship/?p=203#oembed-2

Test Your Knowledge

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https://pressbooks.bccampus.ca/openscholarship/?p=203#h5p-25

Privacy, Policy and Open Data

Privacy and Open Data

While open data should be governed by the FAIR principles to promote transparency and reproducibility, not all data can or should be made open. Some data may contain personal or other sensitive information that should not be readily accessible. For example, open data that contains the location of a rare plant or species at risk may further endanger that species if others are able to locate it. Identifying personal data from interviews should also not be made available in their raw form. Consultation with a Research Ethics Board may be necessary before making personal information open. In Canada, the Tri-Council Policy Statement on the *Ethical Conduct for Research Involving Human (TCPS-2)* provides guidelines for research and the use of research data.

Methods exist to de-identify data so that it can still be made open and some repositories offer options to keep the data closed or embargoed. De-identifying data is especially important in cases where human participants are involved and confidentiality of identity must be maintained. Good data documentation (i.e., metadata) will protect sensitive data while still making it valuable to others. Even in cases where data can't be openly shared (due to ethical or privacy issues), a best practice is to let others know the data exists by creating a description of your data and using a metadata standard so others can find it, cite it, and request access, if that is an option.

Policy and Open Data

Open data may be required by granting agencies or journals as part of their agreement for funding or publication. For example, in Canada, the *Tri-Agency Statement of Principles on Digital Data Management* stipulates that, "research data collected with the use of public funds belong, to the fullest extent possible, in the public domain and available for reuse by others."

Some publishers are also requiring open data and have various policy requirements in place. There are now journals entirely dedicated to publishing data from all domains, such as *Scientific Data* and the *Research Data Journal for the Humanities and Social Sciences.* The Transparency and Openness Promotion website allows you to look up a journal and learn what open practices it requires or encourages.

Dig Deeper

To learn more about open data, review:

- Read about the challenges of open data in qualitative research
- Review ethical considerations when working with big data

Making Your Data Open - Plan & Describe

Next, we'll guide you through the steps to make your research data open: planning, describing, and preserving and sharing.

Plan

Before collecting your data you need to create a project sharing plan. It is relatively easy to put a dataset on a website or upload it into a project in OSF, but messy or poorly managed data does not help with its reuse. Each stage of the data life cycle should be considered when planning how you will manage your data and make it accessible. A Data Management Plan (DMP) helps you articulate how you will manage your data at each stage from collection to analysis to preservation. DMP tools such as the DMP Assistant or the DMP Tool, can guide you through each step and help save you endless headaches in the long run. You can also use a checklist to help guide your decision making process.

Like open access and open data requirements, some research funders may request a DMP to be submitted with a funding application.

Describe

Metadata

As introduced in the Open Workflows chapter, metadata are a requirement of open data and describe the content and structure of a project/files. There are three types of metadata:

1. **Descriptive**: Help people find or understand the context. Project title, authors, keywords and collection methods are all types of descriptive metadata.
2. **Administrative**: Provides technical, preservation and rights information. This metadate may include: information about what software is required to use the data, file size, copyright status and license terms.
3. **Structural**: Provides information about how the data files relate to one another. You can add additional metadata file links and publication links.

Test Your Knowledge

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.bccampus.ca/openscholarship/?p=207#h5p-26

Readme Files

A plain text readme file is often included alongside data files to assist others in understanding your data. it should include all necessary metadata or indicate which files contain other metadata. A readme ensures that the data can be interpreted by researchers as it includes the contents and structure of the dataset. Readme files may also contain variable level metadata (for example, what does the .csv column labeled *var 1* contain), but reporting variable level metadata is often discipline specific and may sometimes instead be recorded in a separate data dictionary, codebook or other documentation format. This Disciplinary Metadata repository can teach you more about your own disciplinary standards.

Readme Example

Review this example readme file: https://doi.org/10.5061/dryad.j0t179b. Following the image the left, open the drop down to reveal the files associated with the data. Review the readme files to see how the authors have provided guidance to interpret their data set. Note that the file structure allows you to associate the appropriate .csv file with its related readme and the readme files help interpret the related .csv file.

Dig Deeper

Select two of the videos from the Open Dialogues playlist. Listen to UBC faculty talk about their projects and why they use and create open educational resources. As you watch these videos think about the extent that these examples might be applicable in your current practice.

Making Your Data Open - Preserve and Share

Data repositories ensure a persistent location where the data file(s) and associated documentation (i.e., metadata) are preserved and available to share.

Data could be published in either an institutional or disciplinary repository. An example of an **institutional repository** is UBC's Scholars Portal Dataverse, where any researcher can create an account and deposit data. Its required metadata template helps to enhance discovery of data. The Registry of Research Data Repositories includes many **disciplinary repositories**, and you can search by subject to find a resource relevant to your field. Choosing a **generalist data repository** is also an option if there is no discipline specific repository in your field. Below are some common generalist repositories:

- Scholars Portal Dataverse: A publicly accessible data repository, open to affiliated researchers (primarily from Canadian universities) to deposit and share research data. It is hosted by the University of Toronto libraries.
- Dryad: Home for a wide variety of data types.
- Figshare: Cloud-based and features the ability to preview data.
- Zenodo: Does not impose any requirements on the format, size, access restrictions, or license. All data is licensed CC0.

Your choice of repository will depend in part on why you're depositing your data. Is it open to support a publication, open to encourage its re-use as a standalone dataset, or open to contribute to a larger dataset like a gene databank or a databank of human observations?

Regardless of the route you choose, make sure the repository will provide a persistent identifier or DOI (Digital Object Identifier) that can be shared to allow others to access these files. Unlike a URL, which can be unstable and make lead to broken links over time, a DOI will never change.

Scenario – Data Persistence

Marija published an article in the journal *Conservation Biology* and referenced related data sources and a database with citations that could be downloaded from her institutional faculty page. This worked until Marija left that university and the faculty page was disabled. Now when readers tried to download the files referenced in the *Conservation Biology* article they were directed to an “Access forbidden” page, meaning any data or related sources to the article could not be found.

If the institution had its own data repository Marija could deposit that data and related files there. This would provide a persistent DOI, meaning Marija’s data should be accessible for a long time no matter where she is based.

Licensing Open Data

Applying a license when depositing into a repository is an often neglected step. But without a license, no one knows how they can use the data and how they are expected to give credit to your hard work.

Choosing a License

Different types of open licenses make sense for different aspects of open scholarship and data. Funding agencies and journals may require your data be made open. If you are choosing you own licensing option, select the appropriate one based on how you want others to reuse your data. It is a good practice to include a rights statement within your dataset or in your readme file. Here are two resources that can help you compare and select the appropriate data license for your work:

- Licensing Open Data: A Practical Guide (PDF)
- Public License Selector

Dig Deeper

- Licensing Your Data Guide
- FAQs about Data and CC Licenses
- How to choose a license for open scientific data and code: The first 4 minutes of this video covers applying a license to data.

Using Open Data

Research can generate open data, but it can also make use of existing open data. In fact, working with other open data can be a great lesson in learning what makes for a good open workflow in terms of its description, discoverability, and licensing. Now that we have looked at why open data is valuable and the process for making your own data open, let's take a look at situations in which others' open data can provide learning opportunities.

Open Data in Government

Government-collected data are increasingly being made available and may compliment personally collected data. The core idea behind open government data is a simple one: public data should be a shared resource. According to the Open Data Barometer, Canada, the United Kingdom, Australia, France and South Korea are the leaders in making open data available and accessible. Examples of the types of government generated data that can be accessed to support discovery and research include:

- Map data (such as that of the cities of Surrey or Vancouver in British Columbia, Canada)
- Land ownership data
- Census data
- Budgets
- Legislation
- Transit data
- Crime statistics

Ensuring government accountability, coordinating action to improve society, and bootstrapping new business ideas can all benefit from access to government data. Yet far too often there are unnecessary technical and legal restrictions that prevent data re-use. Calls for a data revolution are placing renewed attention on ensuring the collection and management of high-quality data around the world, and are driving a focus on the use of 'big data' resources in policymaking. Against this backdrop, ensuring citizens have the capability and freedom to create, access, and analyze data about their own communities is so important.

Using Open Data to Work on Real-World Problems

The NASA Space Apps Challenge is one example of a governmental agency using open data to work with stakeholders and specialists across various fields and disciplines to come up with innovative solutions to the world's most pressing issues.

In October, 2021, 5,000 participants in 150 countries worked to solve COVID-19 related challenges using NASA, ESA, JAXA, CSA, and CNES space agency data. Participants used open and international open data to evaluate the effectiveness of a country's public health measures by comparing the number of COVID-19 cases and infection rates. Through their data analysis, the participants were then able to develop recommendations to help minimize the negative impacts of the pandemic on a global and national scale.

Discovering Exoplanets

NASA's Citizen Science projects provide an opportunity anyone to access NASA data and contribute to finding planet candidates from the TESS mission, look for brown dwarfs and planets and support detection of exoplanets. Non-expert volunteers worldwide have contributed to thousands of important discoveries.

Training the Researchers of the Future with Open Data

With the increasing availability of open data, teachers can plan learning activities using real data, without having to leave the classroom. Using open data in teaching helps to make scientific organizations more transparent, further provides evidence that public money is well spent, and demonstrates scientific knowledge use for society. Open data also affords opportunities for teaching researchers to connect and share experiences, data, and activities. Javiera Atenas et al (2015) "identifies a set of core, discipline-agnostic competencies" that they believe students can acquire using open data sets.

- **Critical thinking**: Students can understand, verify data, and develop evidence-based arguments across different disciplines.
- **Data curation skills**: Students can analyze data and present complex reports
- **Research skills**: Students can compare data from multiple sources and replicate the research
- **Statistical literacies**: Students can perform statistical operations
- **Teamwork skills**: Students learn skills to help them collaborate in multidisciplinary research teams
- **Global citizenship**: Students can critically evaluate and use data to solve local and global challenges

One example of instructors using open data for course assignments comes from Math 210 at the University of British Columbia:

As a course assignment, students found an open dataset online, used pandas (a tool for analyses and data manipulation) to explore the dataset, and wrote a Jupyter notebook (a sharable document) to present their work. Students chose the subject and the open data-set with the requirement that the dataset must be open, meaning that the readers of their notebook should be able to find the data online and recreate the analysis.

Dig Deeper

Explore open datasets:

- British Columbia Government Open Data
- City of Vancouver
- Discipline specific data repositories
- Open Data resources from the World Bank

Adaptation Statement

Sections of text on this page were adapted from the World Wide Web Foundation, Open Data Barometer Global Report (Second Edition), 2015, licensed under a CC-BY 4.0 License

Open Data - Conclusion

In the Open Research – Open Data chapters we have explored what open data is, how to make your own data open and how existing open data can be used. When research data is made open by applying an open license and depositing it into a data repository, it allows others to easily access, share, and/or re-use the data. This leads to:

Public Service Improvement: Open Data provides citizens with data they can use to engage their governments and improve public services.

Accelerating the pace of discovery: When datasets are openly available, they can be used to create a fuller picture of a given area of inquiry, or analyzed by different research teams that can uncover connections not apparent to those who produced the original data.

Research Transparency: Making all research information available increases the credibility of the research by supporting external verification of the results.

Impact: Others using your data can increase the number of times you are cited, raise your research profile and improve your chance for future funding.

Open data is defined as structured data that is machine-readable, freely shared, used, and built on without restrictions. The FAIR principles are a set of guidelines to make data findable, accessible, interoperable, and reusable.

- To implement open data: **plan** your data management, **describe** your data, and **preserve** and **share** your data.
- Open data is valuable for research and data reproducibility, public service transformation, innovation, impact, and research discovery.
- In teaching and learning, open data can help students develop critical thinking, statistical and data literacy, and global citizenship.

OPEN RESEARCH - ACTIVITIES

Open Research Plan

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.bccampus.ca/openscholarship/?p=215#h5p-27

Open Research Activity Bank

The Open Scholarship Primer Activity Bank are activities that you will complete as part of each chapter. The concept behind the activity bank is to learn by doing. This bank is adapted from the D106 Assignment Bank and the Agora Challenge Bank.

Now that you have completed the Open Research chapters, apply what you have learned so far by completing the Activity Bank.

To complete this activity:

1. Go to the Activity Bank.
2. Filter to Open Research categorized activities.
3. Complete as many activities as interest you.

Glossary

All Rights Reserved

All rights reserved is a phrase that originated in copyright law as part of copyright notices. It indicates that the copyright holder reserves, or holds for their own use, all the rights provided by copyright law, such as distribution, performance, and creation of derivative works; that is, they have not waived any such right. (Wikipedia)

Article Processing Charge (APC)

An article processing charge (APC), also known as a publication fee, is a fee which is sometimes charged to authors. Most commonly, it is involved in making an academic work available as open access (OA), in either a full OA journal or in a hybrid journal. (Wikipedia)

Author Addendum

Additional language and agreements added to a publishing agreement by an author.

Big Deal

"Big Deal" refers to any large journal aggregation, including both "all-in" packages (essentially all titles within a publisher's portfolio) and large subject collections. (Scholarly Kitchen)

Big Deals

Big Deals are multi-year journal contracts sold by major vendors that provide access to all or nearly all of a vendor's journal content for a bundled price that grows at a preset annual rate for the life of the contract.

Bronze Open Access

Bronze open access articles are free to read only on the publisher page, but lack a clearly identifiable license. Such articles are typically not available for reuse. (Wikipedia)

Budapest Open Access Initiative

The Budapest Open Access Initiative (BOAI) is a public statement of principles relating to open access to the research literature, which was released to the public on February 14, 2002.

Budapest Open Access Initiative (BOAI)

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Citation Counts

Citation counts measure the number of times an articles has been cited by other research.

Citizen Science

Citizen science projects actively involve citizens in scientific endeavour that generates new knowledge or understanding. Citizens may act as contributors, collaborators, or as project leader and have a meaningful role in the project. (Wikipedia)

cOAlition S

On 4 September 2018, a group of national research funding organisations, with the support of the European Commission and the European Research Council (ERC), announced the launch of cOAlition S, an initiative to make full and immediate Open Access to research publications a reality. (cOAlition S)

Colonizer

Colonization (British English: colonisation) is a process of establishing control over areas or peoples for foreign people to advance their trade, cultivation, exploitation and possibly settlement. A colonizer is the individual engaging in colonization and continued occupation of the land. (Wikipedia)

Containerization

Operating-system-level virtualization or application-level virtualization over multiple network resources so that software applications can run in isolated user spaces called containers in any cloud or non-cloud environment, regardless of type or vendor. (Wikipedia)

Copyright

A copyright is a type of intellectual property that gives its owner the exclusive legal right to copy, distribute, adapt, display, and perform a creative work, usually for a limited time. The creative work may be in a literary, artistic, educational, or musical form. (Wikipedia)

Creative Commons (CC)

Creative Commons (CC) is an American non-profit organization and international network devoted to educational access and expanding the range of creative works available for others to build upon legally and to share. (Wikipedia)

Declaration on Research Assessment (DORA)

The Declaration on Research Assessment (DORA) goes back to the 2012 annual meeting of the American Society of Cell Biology in San Francisco. DORA supports the development and promotion of best practices in the assessment of scholarly research. It calls for the elimination of journal-based metrics, evaluating research on its own merits, leveraging the use of online publications, and aligning assessment with core academic values.

Derivative Work

A derivative work is a work based on or derived from one or more already existing works. Common derivative works include translations, musical arrangements, motion picture versions of literary material or plays, art reproductions, abridgments, and condensations of preexisting works. (Wikipedia)

Diamond Open Access

Journals that publish open access without charging authors article processing charges are sometimes referred to as diamond or platinum OA. Since they do not charge either readers or authors directly, such publishers often require funding from external sources such as the sale of advertisements, academic institutions, learned societies, philanthropists or government grants. (Wikipedia)

Digital Object Identifer (DOI)

A digital object identifier (DOI) is a unique identifier associated with an electronic object and contains metadata elements that make the object significantly easier to find and track how it has been used. DOIs are assigned to any entity for use on the Web. Digital objects may include: images, data and data sets, books, book chapters, research reports, and dissertations.

Disciplinary Repository

A disciplinary repository (or subject repository) is an online archive, often an open-access repository, containing works or data associated with these works of scholars in a particular subject area. (Wikipedia)

Elsevier

Elsevier is a Dutch academic publishing company specializing in scientific, technical, and medical content. Its products include journals such as The Lancet, Cell, the ScienceDirect collection of electronic journals, Trends, the Current Opinion series, the online citation database Scopus, the SciVal tool for measuring research performance, the ClinicalKey search engine for clinicians, and the ClinicalPath evidence-based cancer care service. (Elsevier, Wikipedia, CC BY SA 4.0)

embargo

An agreed upon delays for the public release of research.

exclusive

Exclusive License

A license in which ownership in one or more of the copyright owner's rights is transferred by the copyright owner to a third party.

FAIR Principles

In 2016, the 'FAIR Guiding Principles for scientific data management and stewardship' were published in Scientific Data. The authors intended to provide guidelines to improve the **Findability**, **Accessibility**, **Interoperability**, and **Reuse** of digital assets. The principles emphasise machine-actionability (i.e., the capacity of computational systems to find, access, interoperate, and reuse data with none or minimal human intervention) because humans increasingly rely on computational support to deal with data as a result of the increase in volume, complexity, and creation speed of data. (GoFAIR)

Free

Free Software (with a capital F) refers to a specific philosophical approach to software that emphasizes the user's freedom to run, study, modify, and share both the original and modified program.

Free and Open Source Software (FOSS)

Free and open-source software (FOSS) is software available under a license that gives users the right to use, share, modify, and distribute the software – modified or not – to everyone and provides the means to exercise those rights using the software's source code. (Wikipedia)

Generalist Data Repository

Generalist data repositories accept data regardless of data type, format, content, or disciplinary focus. (NIH)

Generative Artificial Inteligence (GenAI)

Generative AI is a type of artificial intelligence (AI) that is able to create new content, such as text, images, music, or entire datasets, based on patterns and information it has learned from existing data. While traditional AI systems are mainly used to analyze existing data and make predictions, generative AI takes this one step further by creating new data similar to the data it accesses. When an AI technology is creating something by itself, this is called "generative AI" or "GenAI" (Generative AI, UBC).

Global North

Global North and Global South are terms denoting a method of grouping countries based on their defining characteristics with regard to socioeconomics. The Global North, which the UNCTAD describes as broadly comprising Northern America and Europe, Israel, Japan, South Korea, Australia, and New Zealand. (Wikipedia)

Global South

Global North and Global South are terms denoting a method of grouping countries based on their defining characteristics with regard to socioeconomics. the Global South broadly comprises Africa, Latin America and the Caribbean, Asia (excluding Israel, Japan, South Korea), and Oceania (excluding Australia and New Zealand). (Wikipedia)

Gold Open Access

Gold open access refers to making research freely available immediately upon publication in an open access journal. Unfortunately, many authors are deterred from gold open access publishing because prestigious open access journals often charge article processing charges (APCs).

Grant of Rights

A legal provision typically found within contracts, in which one party (the grantor) provides another party (the grantee) specific rights or permissions over certain intellectual property or resources.

Graphical User Interface (GUI)

A graphical user interface, or GUI, is a form of user interface that allows users to interact with electronic devices through graphical icons and visual indicators such as secondary notation. (Wikipedia)

Green Open Access

Self-archiving by authors is permitted under green OA. Independently from publication by a publisher, the author also posts the work to a website controlled by the author, the research institution that funded or hosted the work, or to an independent central open repository, where people can download the work without paying. Green OA is free of charge for the author. (Wikipedia)

h-index

The h-index is an author-level metric that measures both the productivity and citation impact of the publications. The index is based on the set of the scientist's most cited papers and the number of citations that they have received in other publications. (Wikipedia)

Human-readable

A human-readable medium or human-readable format is any encoding of data or information that can be naturally read by humans. (Wikipedia)

Hybrid open access

A journal that publishes both gold open access and traditional subscription-based research.

Institutional Repository

An institutional repository is a digital archive which centralizes, preserves, and provides access to an institution's intellectual output. (CARL)

Intellectual property (IP)

Intellectual property (IP) refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce. (WIPO)

Ithaka S+R

Ithaka S+R helps academic and cultural communities serve the public good and navigate economic, technological, and demographic change. The organization generates action-oriented research for institutional decision-making and act as a hub to promote and guide collaboration. (About, Ithaka S+R)

Journal Impact Factor (JIF)

The Journal Impact Factor only applies to journals indexed in the Science Citation Index Expanded and/or Social Sciences Citation Index by Clarivate Analytics. The Journal Impact Factor is a measure reflecting the annual average (mean) number of citations to recent articles published in that journal. An essay written by the Institute of Scientific Information (ISI) states "The JCR provides quantitative tools for ranking, evaluating, categorizing, and comparing journals. The impact factor is one of these; it is a measure of the frequency with which the "average article" in a journal has been cited in a particular year or period. The annual JCR impact factor is a ratio between citations and recent citable items published." (Journal Impact Factor - The Metrics Toolkit by The Metrics Toolkit Editorial Board, licensed under a CC BY 4.0)

Large Language Model (LLM)

A large language model (LLM) is a language model trained with self-supervised machine learning on a vast amount of text, designed for natural language processing tasks, especially language generation. (Wikipedia)

Literate Programming

Literate programming is writing out the program logic in a human language with included (separated by a primitive markup) code snippets and macros. (Wikipedia)

Machine-readable

A medium capable of storing data in a format easily readable by a digital computer or a sensor. It contrasts with human-readable medium and data. (Wikipedia)

Metadata

Metadata means "data about data". Metadata is defined as the data providing information about one or more aspects of the data; it is used to summarize basic information about data that can make tracking and working with specific data easier. (Wikipedia)

Open Access

Open Access refers to an alternative academic publishing model in which research outputs (including peer-reviewed academic journal articles, theses, book chapters, and monographs) are made freely available to the general public for viewing, and often for reuse. This is unlike the traditional scholarly publishing model under which publishers require institutions or individuals to pay for access to these materials.

open copyright licenses

Licenses that grant permission for others to freely access, reuse, redistribute, or build upon your scholarly work.

Open Data

Open data is data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and sharealike.

Open Educational Resources

Teaching and learning materials that are made available to others to use without cost, and with an open license that allows them to reuse, revise and redistribute them.

Open Format

A non-proprietary so that the file can be opened using open software that is not owned by a specific company

Open Source Software

Open-source software (OSS) is computer software that is released under a license in which the copyright holder grants users the rights to use, study, change, and distribute the software and its source code to anyone and for any purpose. (Wikipedia)

Open Workflow

When each of step of the workflow is openly shared – making all stages of the research project transparent and reproducible.

Plan S

Plan S is an initiative for Open Access publishing that was launched in September 2018 with the support of the European Commission and the European Research Council (ERC) . The plan is supported by cOAlition S, an international consortium of research funding and performing organisations. 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. (cOAlition S)

Platinum Open Access

Journals that publish open access without charging authors article processing charges are sometimes referred to as diamond or platinum OA. Since they do not charge either readers or authors directly, such publishers often require funding from external sources such as the sale of advertisements, academic institutions, learned societies, philanthropists or government grants. (Wikipedia)

Predatory Publishing

Predatory publishing exploits the Open Access publishing model. Most Open Access journals - including high-quality journals - charge the author a fee ("Article Processing Charge" or APC) to support publication and peer-review costs. Predatory journals exist only to collect article processing charges from authors. There is no legitimate peer review: every article submitted with payment, is published (Avoid Predatory Publishers, UBC Library).

Preprints

A preprint is a version of a scholarly or scientific paper that precedes formal peer review and publication in a peer-reviewed scholarly or scientific journal. (Wikipedia)

Publish or Perish

An aphorism describing the institutional pressure to publish academic works in order to succeed in an academic career.

Publishing Agreement

A legal contract between a publisher and a writer or author (or more than one), to publish original content by the writer(s) or author(s). (Wikipedia)

R

R is a programming language for statistical computing and data visualization. It has been widely adopted in the fields of data mining, bioinformatics, data analysis, and data science. (Wikipedia)

Raw Data File

Uncompressed and unedited data files.

README

A README file contains descriptive information about the content of a directory in which the file is located. The scope of the information generally includes the files of the directory and may include descendant directories; even the directory tree. (Wikipedia)

Replicability

When the same workflow (e.g., research question, experimental design or approach, context or population, and analysis plan) is used using a new data set the outcome is consistent (albeit with a small margin of error).

Reproducibility

The workflow and data used in the research project can be used to yield the same results.

Research Scooping

The circumstance in which research is published by a researcher or researchers before a rival team can publish theirs on the same topic, or where an idea or results are published without proper attribution to those who came up with the idea or had results first. (School of Medicine at Mount Sinai)

Research Workflow

The series of steps and decisions made to do the research, and documenting a research workflow allows the process to be repeated or understood by others.

Scholarly Publishing and Academic Resources Coalition (SPARC)

The Scholarly Publishing and Academic Resources Coalition (SPARC) is an international alliance of academic and research libraries developed by the Association of Research Libraries in 1998 which promotes open access to scholarship. (Wikipedia)

Serials Crisis

The problem of rising subscription costs of serial publications, especially scholarly journals, outpacing academic institutions' library budgets and limiting their ability to meet researchers' needs. The prices of these institutional or library subscriptions have been rising much faster than inflation for several decades, while the funds available to the libraries have remained static or have declined in real terms. As a result, academic and research libraries have regularly canceled serial subscriptions to accommodate price increases of the remaining subscriptions. (Wikipedia)

Software as a Service (SaaS)

A business model where software applications are hosted and made available to users over the internet.

STEM

STEM stands for Science, Technology, Engineering and Mathematics. It encompasses a wide range of disciplines that have the potential to help solve real-world problems and make a global impact. (Study STEM in Canada)

Text and Data Mining (TDM)

Text and Data Mining is a broad label that refers to bulk collection and analysis of a corpus of data. A corpus can be anything from the full text of a set of journal articles to public social media posts to census data. The work of Text and Data Mining is to programmtically extract unseen relationships in the data (TDM, UBC Library).

Traditional Knowledge

Traditional knowledge (TK) is knowledge, know-how, skills and practices that are developed, sustained and passed on from generation to generation within a community, often forming part of its cultural or spiritual identity. (WIPO)

Traditional Knowledge Label

The TK Labels are a tool for Indigenous communities to add existing local protocols for access and use to recorded cultural heritage that is digitally circulating outside community contexts. The TK Labels help non-community users of this cultural heritage understand its importance and significance to the communities from where it derives and continues to have meaning (TK Labels by Local Contexts licensed under CC NC-ND 4.0).

Traditional Knowledge Licenses

Traditional Knowledge (TK) Licenses are developed in conversation with Indigenous communities to provide a set of licenses, similar to the Creative Commons license structure, that identifies the needs of Indigenous peoples when addressing intellectual property.

Transformative Agreement

Transformative agreements are those contracts negotiated between institutions (libraries, national and regional consortia) and publishers that transform the business model underlying scholarly journal publishing, moving from one based on toll access (subscription) to one in which publishers are remunerated a fair price for their open access publishing services. (ESAC)

Tri-Agencies

The three federal research funding agencies—the Canadian Institutes of Health Research (CIHR), Natural Sciences and Engineering Research Council of Canada (NSERC) and Social Sciences and Humanities Research Council (SSHRC).

Unecrypted Data

Data that is accessible to anyone, whereas encrypted data is secure and locked and would require a pass code or key to unlock the data

UNESCO

UNESCO is the United Nations organization that promotes cooperation in education, science, culture and communication to foster peace worldwide. The Organization provides key services for its Member States, setting global norms and standards, developing tools for international cooperation, producing knowledge for public policies and building global networks of sites and institutions inscribed on its lists. (UNESCO)

United Nations Educational, Scientific and Cultural Organization (UNESCO)

The United Nations Educational, Scientific and Cultural Organization is a specialized agency of the United Nations with the aim of promoting world peace and security through international cooperation in education, arts, sciences and culture.

Version Control

Version control is a system of recording changes made to a file or set of files over time that can later be reviewed

WTF per Minute Measurement

A code quality measurement used in software development measuring the number of times you say "What the 'heck'?"per minute when you're trying to understand someone else's code.

WYSIWYG

Software that allows content to be edited in a form that resembles its appearance when printed or displayed as a finished product, such as a printed document, web page, or slide presentation. WYSIWYG implies a user interface that allows the user to view something very similar to the result while the document is being created. In general, WYSIWYG implies the ability to directly manipulate the layout of a document without having to type or remember names of layout commands. (Wikipedia)

About the Authors

Author

Will Engle
UNIVERSITY OF BRITISH COLUMBIA - CENTRE FOR TEACHING, LEARNING, AND TECHNOLOGY

Will is engaged with projects that leverage emerging technologies and pedagogies to support open learning. As a strategist for open education initiatives, he has worked on a range of initiatives that have included helping to support open pedagogy-based assignments that emphasize students as collaborators in the production of knowledge, the effective integration of open resources into individual courses, the development of UBC's Massive Open Online Courses (MOOCs), and learning analytics hackathons for undergraduate students. With a Master's degree in library science, Will is interested in supporting the removal of barriers that limit access to education and knowledge.

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Erin Fields (she, her, hers) is the Open Education and Scholarly Communications Librarian at the University of British Columbia Library, located on the traditional, ancestral and unceded territory of the xʷməθkʷəy̓əm (Musqueam) people. Erin supports a number of courses engaging in open educational resource development and open pedagogy, including course assignments contributing to Wikipedia, developing social justice zines, reviewing case studies, and publishing open-access texts found in the Open UBC Text Catalogue.

Donna Langille

UNIVERSITY OF BRITISH COLUMBIA - OKANAGAN CAMPUS

https://library.ok.ubc.ca/about/contact/donna-langille/

Donna Langille (she/her/they/them) lives and works as an uninvited settler on the unceded traditional territory of the Syilx Okanagan peoples. They are a PhD student in Interdisciplinary Studies at UBCO, working under the supervision of Fiona P. McDonald (Anthropology) and Emily Christina Murphy (Digital Humanities). She is the Open Education Librarian, as well as the subject liaison librarian for film studies, theatre, media studies, and the digital humanities at the University of British Columbia Okanagan (UBCO). In 2019, she obtained her Master of Information Studies from McGill University. Prior to this degree, she earned her Honours B.A. in English and Gender, Sexuality, and Women's Studies from Simon Fraser University. They also hold a diploma in Film Production from Capilano University. As a queer scholar, they are interested in reframing the way we observe and acknowledge queer histories in relation to and with feminist technologies.

Leila Malkin

UNIVERSITY OF BRITISH COLUMBIA - SCHOLARLY COMMUNICATIONS & COPYRIGHT

Leila Malkin (she/her) is the Scholarly Communications Assistant at the University of British Columbia Library, located on the traditional, ancestral and unceded territory of the xʷməθkʷəy̓əm (Musqueam) people. Her work spans open education and open access initiatives, with a focus on supporting the development and publication of open educational resources, including open textbooks in Pressbooks. She also contributes to campus open access services, helping to ensure that teaching materials and research outputs can be shared more widely.

Rie Namba

UNIVERSITY OF BRITISH COLUMBIA - CENTRE FOR TEACHING, LEARNING, AND TECHNOLOGY

Rie designs, develops, supports and maintains resources to facilitate the use of open practices (specifically Wiki and WordPress) in teaching and learning. Rie also supports a variety of web resources development projects including the Learning Commons project, the Digital Tattoo project, and the Open UBC project. Rie is also part of the stewardship committee member of the ETUG (Educational Technology Users Group).

Stephanie Savage

UNIVERSITY OF BRITISH COLUMBIA - SCHOLARLY COMMUNICATIONS & COPYRIGHT

Stephanie Savage is a Scholarly Communications and Copyright Services Librarian at UBC Library. In her current role, she provides copyright expertise to the UBC community and helps develop open initiatives on campus and support researchers in disseminating their research as widely as possible.

Trish Varao-Sousa

UNIVERSITY OF BRITISH COLUMBIA - CENTRE FOR TEACHING, LEARNING, AND TECHNOLOGY

Trish is an Evaluation and Research Consultant at the Centre for Teaching, Learning and Technology at UBC-Vancouver. Her work involves providing guidance and support to instructors and staff evaluating teaching and learning practices. She also assists in the co-ordination of the Institute for the Scholarship of Teaching and Learning (ISoTL). This support comes in a variety of forms, including: facilitating workshops, assisting with research design, conducting data analyses, and bolstering the SoTL community at UBC.

Craig Thompson

UNIVERSITY OF BRITISH COLUMBIA - CENTRE FOR TEACHING, LEARNING, AND TECHNOLOGY

Craig works with students, staff, instructors, and administrators at UBC to answer questions about teaching and learning through the use of analytics. He has been working in the learning analytics field since 2012 as both researcher and practitioner and has published works in the Handbook of Learning Analytics, the International Conference on Learning Analytics & Knowledge, and the ACM Conference on Learning at Scale. Craig received a master's degree in Computer Science from the University of Saskatchewan in 2011.

Lucas Wright

UNIVERSITY OF BRITISH COLUMBIA - CENTRE FOR TEACHING, LEARNING, AND TECHNOLOGY

Lucas supports faculty and staff in integrating technology in their teaching and learning practice. He is an adult learning instructor with more than 15 years of experience teaching adults online, face-to-face and in blended contexts. He has a keen interest in blended learning, open education and the role of learning portfolios in teaching and learning. Lucas supports professional development programs at CTLT including the Instructional Skills workshop, Teaching in a Blended Learning Environment, the Learning Technology Hub and the edX Studio sessions.