# The 5Cs of Openness: Articulating an Open Education Infrastructure (OER)

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Open education needs to evolve to fully realize its potential. Emerging innovations such as generative artificial intelligence (GenAI) and open credentials provide exciting opportunities for this growth. In this chapter, we briefly define the key characteristics of open education, describing its history, current opportunities for open education through generative AI, and then articulate an overarching 5Cs framework for open education that can guide research and practice into the future.

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Some portions of this chapter were repurposed and revised from earlier openly licensed publications by the authors, including:

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Wiley, D. (1998). "Open Content." [OpenContent.org](https://opencontent.org/). Archived from the original on 29 April 1999.

Wiley, D. (2007, May 6). About the open publication license. Available at [https://opencontent.org/blog/archives/239.](https://opencontent.org/blog/archives/329)

Wiley, D. (2017, April 2017). When opens collide. <https://opencontent.org/blog/archives/4990>

Wiley, D. (2018). Open Educational Resources. Foundations of Learning and Instructional Design Technology: Historical Roots and Current Trends, 1st Edition. EdTech Books. <https://edtechbooks.org/lidtfoundations/open_educational_resources>

Wiley, D. (2024, February 5). Do we need a national open education strategy? Available at <https://opencontent.org/blog/archives/7389>

Wiley, D. (2024, December 13). Where open education meets generative AI: OELMs. Available at <https://opencontent.org/blog/archives/7628>

Wiley, D. (n.d). Defining the "open" in open content and open educational resources. Available at [https://opencontent.org/definition.](https://opencontent.org/definition)

## Why We Need Open Education

The phrase open education describes efforts to improve education through openness and sharing. These improvements take on many forms. First, open education can be effective at improving intellectual outcomes. Openly available resources can be more easily updated, and students can “own” them in perpetuity, allowing learners to keep returning to class resources for review even after a semester ends. They can also be modified to apply to unique and local contexts. Open educational practices are more motivating and engaging by privileging learner agency, collaboration, and creativity. Second, because open materials can be repurposed according to copyright licenses that allow for sharing/remixing, they can more actively engage students in creating and remixing, rather than just consuming, educational materials. Third, open education can stimulate economic innovation and growth by removing restrictions on content, licenses, and credentials. Finally, open education can help improve equity in society by driving down the price of education, increasing access to high quality learning resources, and creating the opportunity for more culturally relevant customization of learning. Indeed, Stracke et al. (2023) documented many positive impacts from open education including financial, design, organizational, social, and learning benefits.

Despite these and other benefits, open education needs to evolve to fully realize its potential. Emerging innovations such as generative artificial intelligence (GenAI) and open credentials provide exciting opportunities for this growth. In this chapter, we begin by first briefly defining the key characteristics of open education, describing its history, current opportunities for open education through generative AI, and then articulate an overarching 5Cs framework for open education that can guide research and practice into the future.

## A Brief History of Open Education

Open Education, which does not have a canonical definition, describes efforts to improve education through openness and sharing. We view open education as incorporating “open” versions of everything necessary for education to be successful. As Cronin (2020) described, the key features of open education are efforts to improve learners’ ability to:

1. access education
2. collaborate with others as part of their learning
3. create and co-create knowledge openly,
4. and integrate formal and informal learning practices, networks, and identities.

Because open education represents any effort to improve, through openness and sharing, formal/informal learning through increased access, collaboration, and knowledge creation (Cronin, 2020), there have been efforts to “openly” educate for as long as education itself has existed. Indeed, Jesus’ efforts to freely teach thousands by the Sea of Galilee, Plato’s granting of free entry to the public to his Academy, or Confucius’ willingness to teach people of all social status could be considered early examples of open education.

In more modern times, technological developments have accelerated the open education movement. Nearly every technology can support the acceleration of open education, but the following key innovations were particularly significant in the more recent times of the last 40 years:

**Open source software:** While sharing of computer code was prevalent with early computer engineering, these practices were suppressed by software companies. Richard Stallman’s GNU Manifesto (1985) described a rationale and need for free and open software, which was embodied in the GNU Project to create an open operating system. Shortly afterwards, Linus Torvalds released the Linux kernel in 1992 as freely modifiable source code for a computer operating system (Stallman, 1999). Additional open software components followed, such as Apache web services, MySQL database structure, and PHP scripting language. The combination of these formed the LAMP software framework.

**Open licenses:** As open software was created, licenses were needed to provide legal permissions for using the software. Many consider the first open license to be the GNU General Public License in 1989, but this was followed by many “permissive” licenses (created by academia, and not requiring source code in a share alike manner) and “copyleft” licenses (created by software programmers to require sharing source code with similar openness, see Stallman, 1999). Wiley in 1998 and Wiley and Raymond in 1999 shared their own versions of open publication licenses (see Wiley, 2007), and shortly afterwards, Creative Commons licenses were launched in 2002 (Creative Commons, n.d.).

**Open content:**As technologies and licenses made it more possible for everyone to create and share educational materials, the open educational resources movement gained momentum. Branching out of the online learning movement, Wiley argued for an analogous content version of the open source software movement. At first, universities sought to archive recordings of in-person courses along with all class materials as open courseware, starting at MIT in 2001 (see [https://en.wikipedia.org/wiki/MIT\_OpenCourseWare](https://www.google.com/url?q=https://en.wikipedia.org/wiki/MIT_OpenCourseWare&amp;sa=D&amp;source=editors&amp;ust=1735339180958177&amp;usg=AOvVaw0PinXCFJxx5Ba4-zc9o1WV)). Eventually, universities and private companies began creating courses specifically for open sharing on the Internet, which spurred the Massive Open Online Courses (MOOCs) movement in the late 2000s, beginning at the University of Manitoba in Canada by George Siemens and Stephen Downes, and quickly spreading across the world.

**Open textbooks:** Accompanying the creation of open courses, open textbooks became popular, with early leadership from Connexions/OpenStax, BC Open Textbooks, Flat World Knowledge, and the Open Textbook Library, among others. In 2018, Royce Kimmons of Brigham Young University created EdTechBooks.org as both an open textbook authoring tool and marketplace.

**Open credentials:** Researchers/developers at the Mozilla and MacArthur Foundations created the idea of open badges as an open credential to recognize informal/formal learning utilizing open technologies that facilitated learners owning and sharing their own credentials (Mozilla Foundation, 2012). For more information on the evolution of the open recognition/credentialing movement, see [West, 2024,](https://edtechbooks.org/encyclopedia/open_recognition) in this book.

**Open practices:** The open education movement increasingly seeks to incorporate openness into all educational practices, including in the use of open pedagogy, open universities, open science, and other open educational practices (Boskurt, 2019).

**Open generative AI:** As generative AI burst into the public imagination in 2022 with the launch of ChatGPT, discussions and arguments immediately started over what it would mean for this latest technology to be “open” (see, for example, the Open Source Initiative’s effort to define “open AI” (OSI, 2024). Answers to these important questions, and the implications of those answers for education, are still being worked through today.

## 5 Cs Open Education Framework

As Generative AI causes educators to rethink every aspect of their work, we need frameworks and guiding principles for understanding how various aspects of open education work together for a vision of student learning and success. The [Cambridge Dictionary](https://www.google.com/url?q=https://www.google.com/url?q%3Dhttps://dictionary.cambridge.org/us/dictionary/english/framework%26sa%3DD%26source%3Ddocs%26ust%3D1734494474852322%26usg%3DAOvVaw38ajr-Kt1CxY1Np8ZJ7dM0&amp;sa=D&amp;source=editors&amp;ust=1735339180959559&amp;usg=AOvVaw3G6qUkIQmi-8biQw5GBc9z) describes a framework as “a supporting structure around which something can be built.” If our goal is to build educational systems that are open, equitable, and accessible to all, we need a framework that supports this as it will not be sufficient to have a framework representing a cobbling together of open and non-open educational practices. In the past, much of open education has focused too much on just open content/open educational resources, and this has limited our creative thinking about what open education can accomplish. While it is critical to have open resources for students to learn from, if we believe education is more than content, then open education must be more than open books, resources, or even courses. It must include everything necessary for effective education. We propose the following as an articulated vision for an open education framework:

* Open **Competencies** that articulate what learners should be achieving.
* Open **Content**that teaches about those competencies
* Open **Customs** that utilize these resources, recognition practices, etc. (e.g., open pedagogies, open scholarship, open sharing of AI integration strategies, open communities)
* Open **Credentials** that help students, teachers, and others know what has been accomplished
* Open **Co-Intelligence** that collaborates with designers, teachers, learners, and others in support of their engagement in all aspects of teaching and learning, from planning to credentialing.

## Open Competencies

One of the primary reasons competency-based education (CBE) programs have been so slow to develop in the U.S.—even after the Department of Education made its federal financial aid policies friendlier to CBE programs—is the amount of work necessary to develop a solid set of competencies. Not everyone who needs to teach from competency frameworks has the time or expertise to do this work. However, because this is challenging work, many institutions with CBE programs treat their competencies like a secret family recipe, hoarding them away and keeping them fully copyrighted (apparently without experiencing any cognitive dissonance while they promote the use of OER among their students). This behavior has stymied growth and innovation in CBE.

If an institution would openly license a complete set of competencies, that would give other institutions a foundation on which to build new programs, models, and other experiments. The open competencies could be revised and remixed according to the needs of local programs, and they can be added to, or subtracted from, to meet those needs as well. This act of sharing would also give the institution of origin an opportunity to benefit from remixes, revisions, and new competencies added to their original set by others. Furthermore, openly licensing more sophisticated sets of competencies provides a public, transparent, and concrete foundation around which to marshal empirical evidence and build supported arguments about the scoping and sequencing of what students should learn.

Open competencies are the core of the open education framework because they provide the context that imbues resources, assessments, and credentials with meaning about fit and appropriateness for the learner. Likewise, a credential is essentially meaningless if a third party like an employer cannot refer to the skill or set of skills its possession supposedly certifies.

## Open Content

Open content is what most people think of when they refer to open education, and it involves the open creation and sharing of instructional texts, curriculum, and materials. This includes more than the instructional materials designed for student use, like textbooks. Open content also includes assessment instruments like assignments and rubrics, discussion prompts, and quiz banks, as well as supplemental instructional materials like handouts, pacing guides, and Powerpoint slides instructors might use in support of their teaching.

Open Content and Open Educational Resources are frequently used incorrectly as synonyms of open education. In reality, these terms describe any copyrightable work (traditionally excluding software, which is described by other terms like “open source”) that is either (1) in the public domain or (2) licensed in a manner that provides everyone with free and perpetual permission to engage in the 5R activities:

1. Retain – make, own, and control a copy of the resource (e.g., download and keep your own copy)
2. Revise – edit, adapt, and modify your copy of the resource (e.g., translate into another language)
3. Remix – combine your original or revised copy of the resource with other existing material to create something new (e.g., make a mashup)
4. Reuse – use your original, revised, or remixed copy of the resource publicly (e.g., on a website, in a presentation, in a class)
5. Redistribute – share copies of your original, revised, or remixed copy of the resource with others (e.g., post a copy online or give one to a friend)

While open licenses like the Creative Commons licenses provide users with legal permission to engage in the 5R activities, many open content publishers make technical choices that interfere with users’ ability to engage in those same activities. The ALMS Framework provides a way of thinking about those 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)?
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)?
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)? Is the open content published in a manner making its content easy to revise or remix (e.g., a text file)?
4. **Self-Sourced:** Is 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)?

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 an invitation to instructional designers to be thoughtful in the technical choices they make—whether they are publishing text, images, audio, video, simulations, or other media.

## Open Credentials

Despite always learning, our learning often must be recognized in order to be useful in our lives. Traditionally, the emphasis in learning recognition has been top-down. In this approach, an institution is trusted to appropriately recognize whether and what a student has learned, and certify this learning. This recognition of learning appears in the form of grades, progress reports, competency dashboards, certificates, and degrees. These markers are “proxies for ability and potential” (Gallagher, 2016, p. 38) that signal to other entities in society (e.g., employers) about what the student has learned. These end entities trust these proxies because of the trust they have in the institution recognizing the learning.

This formal, top-down recognition of learning is important as both “the foundation of the business model for most higher education institutions” (Gallagher, 2016, p. 3) as well as a key pillar of an industrialized society in need of specific skill sets. However, this form of learning recognition is also limited for several reasons:

1. **Lack of Equity** — A top-down system breeds inequity as the power within society, as it relates to education, is controlled by few hands—in this case, usually universities. As all institutions can exhibit bias, this has the potential to exacerbate a lack of equity within society.
2. **Lack of Access** — When recognition of learning is controlled by a small segment within society, then access to the benefits of learning recognition is limited. Even though humans are constantly learning, only those who can get their learning recognized by the correct institution will be able to benefit from their learning. As an example, it is possible to learn a skill such as computer programming outside of a university, but for a long time this knowledge was not recognized as equally valuable. Because of the power of technology companies in society, that view, in this particular domain, is changing as more technology companies recognize alternatives to higher education degrees (Caminiti, 2022).
3. **Lack of Openness** — Openness, as related to educational content, has been defined as the ability to reuse, retain, revise, remix, and redistribute (Wiley, 2015). Learning recognition can similarly be considered open only when a learner can retain their own learning data/credentials, reuse them for their own purposes, revise and remix them to better represent their own abilities, and redistribute them. This openness requires new technologies that take control of the recognition of learning away from institutions and instead share it equally with formal/informal learning institutions, as well as learners and communities.

Open credentials use open technologies and practices to recognize all learning, including learning not formally recognized by traditional degrees and certificates. It encompasses similar concepts such as microcredentials, open/digital badges, blockcerts, verifiable credentials, and comprehensive learner records.

Another aspect of open credentials is having open assessments that can be used to determine what type of credential a learner should receive. For years, creators of open educational resources have declined to share their assessments in order to “keep them secure” so that students won’t cheat on exams, quizzes, and homework. This security mindset has prevented sharing of assessments.

In our effort to try and break free from this security mindset, I (Richard) has launched an open assessment/instrument “book” to serve as a database bank of instruments that could be reused/remixed/repurposed for free. This book, Open AIMs (assessments, instruments, and measurements), allows creators to get permanent URLs for their instruments that can accrue citations, independent of any research articles that may use those instruments. Thus, when an instrument is published first in Open Aims with an open license, it will forever remain open, even if later republished in a traditional journal. If interested, view Open Aims at [https://edtechbooks.org/aims](https://www.google.com/url?q=https://edtechbooks.org/aims&amp;sa=D&amp;source=editors&amp;ust=1735339180968446&amp;usg=AOvVaw1S1CiVWU9qIKokv7OoYT2B) and submit through the submission template ([https://edtechbooks.org/aims/template](https://www.google.com/url?q=https://edtechbooks.org/aims/template&amp;sa=D&amp;source=editors&amp;ust=1735339180968636&amp;usg=AOvVaw0_G7SjdayI_k7Jv4OPbzhy)).

In competency-based education programs, students often demonstrate their mastery of competencies through “performance assessments.” Unlike some traditional multiple-choice assessments, performance assessments require students to demonstrate mastery by performing a skill or producing something. Consequently, performance assessments are very difficult to cheat on. For example, even if you find out a week ahead of time that the end of the unit exam will require you to make 8 out of 10 free throws, there’s really no way to cheat on the assessment. Either you will master the skill and be able to demonstrate that mastery or you won’t.

Because performance assessments are so difficult to cheat on, keeping them secure can be less of a concern, making it possible for performance assessments to be openly licensed and publicly shared. Once they are openly licensed, these assessments can be retained, revised, remixed, reused, and redistributed.

Another way of alleviating concerns around the security of assessment items is to create openly licensed assessment banks that contain hundreds or thousands of assessments—so many assessments that cheating becomes more difficult and time consuming than simply learning.

## Open Customs

In the past, the primary emphasis has been placed on open “stuff” (e.g., content, courses, credentials, etc.) rather than on open practices and strategies. In addition to being about products and technologies, openness is also a mental framing around how instructional designers and education professionals do their work. For example, do they view education as an expression of their individual creativity? Something that must be protected and reserved as unique to their person? Or do they view education as freely sharing, in much the same way that you can share a thought or express a feeling with someone else, and still retain it for yourself? We agree with Wiley (2010), “Education is sharing” (see video). This, however, conflicts with an industrial mindset of education that views learning as competitive in the crush to gain more of the resource to prove one’s worth. In short, is education inherently competitive or collaborative? Open customs support a view that education should be collaborative, and mutually beneficial.

 David, in this TEDx talk shares how a mindset of education as sharing can lead to more open customs.

If one accepts openness is about empowering all learners through permissions (both legal and pedagogical) that increase their agency, collaboration, and trust, then open customs are any practices that increase that empowerment. Still, open customs is a concept difficult to define (see this interesting collection of differing opinions around the term “open pedagogy”: [https://www.yearofopen.org/april-open-perspective-what-is-open-pedagogy/](https://www.google.com/url?q=https://www.yearofopen.org/april-open-perspective-what-is-open-pedagogy/&amp;sa=D&amp;source=editors&amp;ust=1735339180970271&amp;usg=AOvVaw1WVLbJcUUQHC-mDLwEIRS_)). However, we argue that for a starting place, we can consider open customs as those that increase learner collaboration, creativity, and agency by:

1. **Removing barriers to individual learning, creativity, and growth.** For example, using open licenses removes restrictions on what people can do with an idea. In addition, removing limitations on when, how, or what “counts” as learning can empower learners. This can lead to what Adam Thierer referred to as “permissionless innovation” (Thierer, 2016). Permissionless innovation is the ability to create and invent without seeking and obtaining prior approval, allowing “the creativity of the human mind to run wild in its inherent curiosity and inventiveness” (Thierer, 2014, para. 4).
2. **Increasing learner involvement in learning.** Open educational customs typically empower the learner to be a co-creator, rather than simply consumer, of knowledge (Cronin, 2017).
3. **Empowering all learners to achieve.** Open customs can improve equity in learning by being especially aware of learner inequities in educational and societal systems and using practices to improve equal access and participation by all in learning.

Open customs, then, are those “that empower educators (and we would add learners) to benefit from the best ideas of their colleagues” (para. 4) as mentioned in the [Cape Town Open Education Declaration](https://www.google.com/url?q=https://www.capetowndeclaration.org/read-the-declaration&amp;sa=D&amp;source=editors&amp;ust=1735339180971042&amp;usg=AOvVaw0EZsMqfQUNdZb2b-pF2Fha). Following these principles, many scholars have posited different practices that could be considered open customs. For example, open scholarship (Veletsianos & Kimmons, 2012b; Weller, 2011), open teaching (Couros & Hildebrandt, 2016), open pedagogy (DeRosa & Robison, 2015; Hegarty, 2015; Rosen & Smale, 2015; Weller, 2014), participating in open and online peer communities, open planning of an educational lesson or experience (Grush, 2014), and using “renewable assignments” that extend beyond single use in a classroom (Wiley, 2017, para. 18).

However, while open customs are growing in popularity in the research literature and among practitioners, we offer a caution—you cannot actually build practices, pedagogies, or customs on a foundation of openness. In other words, the foundational commitments in terms of pedagogy and practices should be based on a sound understanding of how learning happens. Once we have a fundamental understanding and commitment to what effective learning is, then we can use open customs to gain better leverage. In short, good teaching and learning is the first goal, with openness as a means to achieving this goal—not an end to itself.

## Open Co-intelligences

In the two years since it entered the public view, generative AI has quickly become one of the most powerful tools available to instructional designers, instructors, and learners. Instructional designers working with generative AI can dramatically reduce the cost and time of completing each step in the ADDIE process (analysis, design, development, implementation, and evaluation). Instructors working with generative AI can dramatically reduce the cost and time of completing many administrative and instructional tasks (e.g., lesson planning or grading). Also, students working with generative AI can dramatically reduce the cost and time of completing many study and learning tasks (e.g., creating flash cards or engaging in open-ended retrieval practice with immediate feedback). Each aspect of the teaching and learning process is impacted by generative AI, just as every aspect was impacted by the advent of public access to the internet decades ago.

Similar to the other framework components described above, the first powerful generative AI models available for public use were proprietary. The release of powerful, openly licensed generative AI models came later. For example,  large educational materials publishers like Pearson, McGraw-Hill, and Cengage spend a significant amount of time and money creating proprietary course materials. Because these products are expensive and time-intensive to create (sometimes millions of dollars per product), most instructors end up adopting one of these pre-existing resources rather than creating their own. About 25 years ago, individuals, and then organizations, began creating openly licensed alternatives to these proprietary products. Large OER publishers like OpenStax, Lumen, and CMU OLI spend a significant amount of time and money creating open content. These OER are significantly more affordable than the proprietary alternatives and, because of their open licensing, can serve as the foundation for a wide range of innovations in teaching and learning.

In the generative AI space, companies like OpenAI, Anthropic, and Google spend a significant amount of time and money creating proprietary LLMs. Because these LLMs are so expensive and time-intensive to create (possibly more than a hundred million dollars per model), most people end up using one of these models rather than creating their own. But organizations have now begun creating openly licensed alternatives to these proprietary LLMs. Organizations like Meta, Mistral, and IBM are creating openly licensed LLMs that everyone can retain, reuse, revise, remix, and redistribute. These “foundation” models provide the foundation upon which we can build a wide range of innovations in teaching and learning.

Ensuring that every person has access to co-intelligence will be one of the great equity challenges of the 21st century. Ensuring that every person also has permission to adapt, edit, and contribute directly to the localization and improvement of these tools for their own purposes will be one of the great challenges to open in the 21st century.

## Strengthening the Open Education Framework

In conclusion, we argue that an open education framework, which can support extremely rapid, low cost experimentation and innovation, must be comprised of at least these five parts:

* **Open Competencies** that articulate what learners should be achieving.
* **Open Content** that teaches about and assesses those competencies
* **Open Customs** that utilize these resources, recognition practices, etc.
* **Open Credentials** that helps students, teachers, and others know what has been accomplished
* **Open Co-intelligence**that supports efforts across all aspects of education

This interconnected set of components provides a foundation that will greatly decrease the time, cost, and complexity of the search for more effective models of education. (It will provide related benefits for informal learning, as well.) From the bottom up, open competencies provide the overall blueprint and foundation; open educational resources provide a pathway to mastering the competencies; open customs seek to increase learner participation, agency, and learning in innovative ways; open credentials communicate when learners have mastery of the competencies; and open co-intelligence that makes engaging in all the work across the stack more efficient, more effective, more creative, and more affordable

When open licenses are applied up and down the entire stack—creating truly open credentials, open assessments, open educational resources, open competencies, and open generative AI models, resulting in an open education infrastructure—each part of the stack can be altered, adapted, improved, customized, and otherwise made to fit local needs without the need to ask for permission or pay licensing fees. Local actors with local expertise are empowered to build on top of the infrastructure to solve local problems. Freely.

Creating an open education infrastructure unleashes the talent and passion of people who want to solve education problems but do not have time to reinvent the wheel and rediscover fire in the process.

How can you, as students, support and promote open education? Stracke et al. (2023)

offered suggestions for the future of open education research. As part of that, they argued that we need to take “local actions so that we can collectively make a global impact” (p. 23). If each of you, and us, work to increase openness in our local sphere of openness, the impact globally will be massive.

We believe that “openness facilitates the unexpected” (Wiley, 2013). We can’t possibly imagine all the incredible ways people and institutions will use the open education infrastructure to make incremental improvements or deploy novel innovations from out of left field. That’s exactly why we need to build it, and that’s why we need to commit to a strong conceptualization of open, grounded firmly in the 5R framework and open licenses.

## References

Boskurt, A. (2019). An analysis of peer reviewed publications on openness in education in half a century: Trends and patterns in the open hemisphere. Australasian Journal of Educational Technology. 35(4), 78–97.

Creative Commons. (n.d.). The story of creative commons. Available at [https://certificates.creativecommons.org/cccertedu/chapter/1-1-the-story-of-creative-commons/](https://www.google.com/url?q=https://certificates.creativecommons.org/cccertedu/chapter/1-1-the-story-of-creative-commons/&amp;sa=D&amp;source=editors&amp;ust=1735339180974559&amp;usg=AOvVaw0wFziW1Kvi02r9fwImguPS).

Cronin, C. (2020). Open education: Walking a critical path. In Open(ing) education (pp. 9–25). Brill.

Grush, M. (2014, November 12). Open pedagogy: Connection, community, and transparency. Available at [https://campustechnology.com/Articles/2014/11/12/Open-Pedagogy-Connection-Community-and-Transparency.aspx?Page=1](https://www.google.com/url?q=https://campustechnology.com/Articles/2014/11/12/Open-Pedagogy-Connection-Community-and-Transparency.aspx?Page%3D1&amp;sa=D&amp;source=editors&amp;ust=1735339180974993&amp;usg=AOvVaw0U3ntyYuoceMdGFrSkucn4).

Mozilla Foundation & Peer 2 Peer University (2012, August 27). Open badges for lifelong learning. Available at [https://wiki.mozilla.org/images/5/59/OpenBadges-Working-Paper\_012312.pdf](https://www.google.com/url?q=https://wiki.mozilla.org/images/5/59/OpenBadges-Working-Paper_012312.pdf&amp;sa=D&amp;source=editors&amp;ust=1735339180975236&amp;usg=AOvVaw3YjlTiCVQiXuQSXc9ups9a).

Open Source Initiative. The open source AI definition 1.0. Available at [https://opensource.org/ai](https://www.google.com/url?q=https://opensource.org/ai&amp;sa=D&amp;source=editors&amp;ust=1735339180975415&amp;usg=AOvVaw355pfeUe5gIILzV4EhA2SO).

Stallman, R. (1985). GNU Manifesto. Accessed December 18, 2024, from [https://www.gnu.org/gnu/manifesto.html](https://www.google.com/url?q=https://www.gnu.org/gnu/manifesto.html&amp;sa=D&amp;source=editors&amp;ust=1735339180975673&amp;usg=AOvVaw11AGacyzpG16b84Wc1bDGa).

Stallman, R. (1999). The GNU operating system and the free software movement. In C. DiBona, & S. Ockman (Eds.), Open Sources: Voices from the open source revolution. O’Reilly Media, Inc. Available from [https://www.gnu.org/gnu/thegnuproject.html#ft3](https://www.google.com/url?q=https://www.gnu.org/gnu/thegnuproject.html%23ft3&amp;sa=D&amp;source=editors&amp;ust=1735339180976093&amp;usg=AOvVaw2yJ7-gO9EpMxU0ucfsAhpl).

Stracke, C.; Bozkurt, A., McGreal, R.; & Zawacki-Richter, O. (2023). Open Educational Resources and their global needs, benefits and practices: The call for a future research agenda. Bulletin of the Technical Committee on Learning Technology,23(1), 20–23.

Thierer, A. (2014). Bucking the “mother, may I?” mentality. Available at [https://www.rstreet.org/commentary/bucking-the-mother-may-i-mentality/](https://www.google.com/url?q=https://www.rstreet.org/commentary/bucking-the-mother-may-i-mentality/&amp;sa=D&amp;source=editors&amp;ust=1735339180976865&amp;usg=AOvVaw3KRi8jKeMPIe9Xoo62l3Tc).

Thierer, A. (2016). Permissionless innovation: The continuing case for comprehensive technological freedom. Mercatus Center at George Mason University.

West, R. E. (2023). Open Recognition. EdTechnica: The Open Encyclopedia of Educational Technology. [https://doi.org/10.59668/371.13762](https://www.google.com/url?q=https://doi.org/10.59668/371.13762&amp;sa=D&amp;source=editors&amp;ust=1735339180977325&amp;usg=AOvVaw2WnOxeZyyQ-UOUnsUblNQU)

West, R. E. (2024). [O](https://www.google.com/url?q=https://edtechbooks.org/foundations_of_learn/open_recognition&amp;sa=D&amp;source=editors&amp;ust=1735339180977653&amp;usg=AOvVaw2mz5R_3apcyJ_oUPJUAK_v)[pen Recognition, Badges, and Microcredentials](https://www.google.com/url?q=https://edtechbooks.org/foundations_of_learn/open_recognition&amp;sa=D&amp;source=editors&amp;ust=1735339180977833&amp;usg=AOvVaw3lzGQu72pmZNgc0NA8-WNN). In R. E. West & H. Leary (Eds.), Foundations of Learning and Instructional Design Technology, 2nd Ed. Edtech Books. Available at [https://edtechbooks.org/foundations\_of\_learn/open\_recognition](https://www.google.com/url?q=https://edtechbooks.org/foundations_of_learn/open_recognition&amp;sa=D&amp;source=editors&amp;ust=1735339180978131&amp;usg=AOvVaw0ac0-458kSE3B6hN4SPhsI).

Wiley, D. (1998). "Open Content". OpenContent.org. Archived from the original on 29 April 1999.

Wiley, D. (2007, May 6). About the open publication license. Available at [https://opencontent.org/blog/archives/329](https://www.google.com/url?q=https://opencontent.org/blog/archives/329&amp;sa=D&amp;source=editors&amp;ust=1735339180978456&amp;usg=AOvVaw2xdVjwT2p-sJ6SWZHhH0zP).

Wiley, D. (2017, April 2017). When opens collide. [https://opencontent.org/blog/archives/4990](https://www.google.com/url?q=https://opencontent.org/blog/archives/4990&amp;sa=D&amp;source=editors&amp;ust=1735339180978643&amp;usg=AOvVaw3aPC_LSocq0763sRoMP6yi)

Wiley, D. (2018). Open Educational Resources. Foundations of Learning and Instructional Design Technology: Historical Roots and Current Trends. [https://edtechbooks.org/lidtfoundations/open\_educational\_resources](https://www.google.com/url?q=https://edtechbooks.org/lidtfoundations/open_educational_resources&amp;sa=D&amp;source=editors&amp;ust=1735339180978861&amp;usg=AOvVaw127AY81smkNI_fPPcbslG2)

Wiley, D. (2024, February 5). Do we need a national open education strategy? Available at [https://opencontent.org/blog/archives/7389](https://www.google.com/url?q=https://opencontent.org/blog/archives/7389&amp;sa=D&amp;source=editors&amp;ust=1735339180979045&amp;usg=AOvVaw27IXANDVWZL-SjnaWmSj7b).

Wiley, D. (n.d.). Defining the “open” in open content and open educational resources. Available at [https://opencontent.org/definition](https://www.google.com/url?q=https://opencontent.org/definition&amp;sa=D&amp;source=editors&amp;ust=1735339180979292&amp;usg=AOvVaw3QyMPOVq2gjgmsuhL5et4g).

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